Instead of 'dividing up' the artistic experience into pieces which can never be recombined into a living unity, we must find a method of analysis which neither falsifies sociology nor distorts the work of art (Durvignaud, 1967, p.150).

(Brenizer, 2005, New beginnings. Used with permission)
Dedication

I am especially grateful to my supervisor, Professor Bob Hodge, for supporting me in my endeavour to express the ineffable. Thank you!

Without the generous support and confidence of twelve Inspectors from the NSW Fire Brigades this research would not have been possible. Their depth of understanding and willingness to contribute provided a rich and motivating body of knowledge – which demanded many time-pressured decisions of me!

Lisa Armitage, Susan Robbins, Susan Mlcek, Maryanne Mozer, Ian Manock, Claudio Dionigi and Ann Jensen have been my encouraging companions, colleagues and critics. To the many others not mentioned by name, I am fortunate in having you as an invigorating circle of friends who have encouraged and followed this journey with genuine interest. Thank you for the sustenance, support and the diversions you afforded me.

Partners do not have as many options as friends. They cannot pop in and out of your life at opportune times. To Sue, the biggest thank you!

A special thank you to Ben Ingham, Colin Semmler, Sue Atherton and Lisa Armitage for their detailed reading and valuable feedback on final drafts.
Acknowledgements

In this thesis I present various incidents and my related ideas, several of which have previously been reported in journal articles and conference presentations. For a full list please refer to Appendix 3.

February 2009
Statement of Authentication

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.

Signature:

Name: Rhoda VALERIE Ingham

Date:
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### Abbreviations

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<th>Description</th>
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<tbody>
<tr>
<td>BA</td>
<td>Breathing Apparatus</td>
</tr>
<tr>
<td>ComCen</td>
<td>Communications Centre, either Sydney, Newcastle or Katoomba. Receives triple-0 calls and monitors all radio and satellite communications.</td>
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<tr>
<td>DEMO</td>
<td>District Emergency Management Officer</td>
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<tr>
<td>Displan</td>
<td>Disaster plan</td>
</tr>
<tr>
<td>Firey</td>
<td>Colloquial expression for firefighter</td>
</tr>
<tr>
<td>FIRU</td>
<td>Fire Investigation and Research Unit</td>
</tr>
<tr>
<td>Hazmat</td>
<td>Hazardous materials</td>
</tr>
<tr>
<td>IC</td>
<td>Incident Controller</td>
</tr>
<tr>
<td>ICS/ IMS</td>
<td>Incident Command System/ Incident Management System: a tool for marshalling pre-identified and pre-assembled resources to respond to an emergency or disaster (Perry, 2003, p.405). IMS is used more by law enforcement agencies, ICV by fire services.</td>
</tr>
<tr>
<td>ICV</td>
<td>Incident Command Vehicle</td>
</tr>
<tr>
<td>IPP</td>
<td>Inspectors Promotional Program</td>
</tr>
<tr>
<td>MDM</td>
<td>Multimodal Decision Making</td>
</tr>
<tr>
<td>NDM</td>
<td>Naturalistic Decision Making</td>
</tr>
<tr>
<td>NSWFB</td>
<td>NSW Fire Brigades</td>
</tr>
<tr>
<td>NVivo</td>
<td>Software used in data analysis; it forms links and classifies information as an aid to building theory</td>
</tr>
<tr>
<td>OH&amp;S</td>
<td>Occupational Health Safety</td>
</tr>
<tr>
<td>Permanent</td>
<td>A fulltime firefighter</td>
</tr>
<tr>
<td>Pump</td>
<td>Standard firefighting appliance</td>
</tr>
<tr>
<td>Recce</td>
<td>Reconnaissance</td>
</tr>
<tr>
<td>Retained</td>
<td>A part-time professional firefighter who is on call</td>
</tr>
<tr>
<td>SCAT</td>
<td>SCAT paramedic – Special Casualty Access Team</td>
</tr>
<tr>
<td>SCBA</td>
<td>Self Contained Breathing Apparatus</td>
</tr>
<tr>
<td>Sitrep</td>
<td>situational report</td>
</tr>
<tr>
<td>SO</td>
<td>Station Officer</td>
</tr>
<tr>
<td>SOG/SOP</td>
<td>Standard Operating Guideline/Standard Operating Procedure</td>
</tr>
<tr>
<td>SOLO</td>
<td>State Operations Liaison Officer</td>
</tr>
<tr>
<td>SOPP</td>
<td>Station Officers Promotional Program</td>
</tr>
<tr>
<td>CODE</td>
<td>MEANING</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>YELLOW</td>
<td>General message</td>
</tr>
<tr>
<td>GREEN</td>
<td>Incident message — stop</td>
</tr>
<tr>
<td>BLUE</td>
<td>Incident message — medium priority</td>
</tr>
<tr>
<td>RED</td>
<td>Incident message — high priority</td>
</tr>
<tr>
<td>WHITE</td>
<td>Incident message — very high priority</td>
</tr>
</tbody>
</table>

| CODE 1 | Responding to incident |
| CODE 2 | Arrival at incident    |
| CODE 3 | On-scene at incident   |
| CODE 4 | Available to respond   |
| CODE 5 | Returned to station    |
| CODE 6 | Incident in RFS area   |
| CODE 7 | Unavailable to respond |

Codes used by NSW emergency responders  
(NSW Emergency Service Scanning, 2008)
Abstract

Decision making on the fireground is a difficult and accountable activity. Incident Controllers constantly juggle their legal obligations, the welfare of firefighting crews and the plight of victims and property in complex and often life-threatening situations. Assessing risk and subsequent decision making are core aspects of their role.

The positivist-scientific paradigm dominates the decision theory landscape in the form of the Rational Choice model. The best alternative is Naturalistic Decision Making, but its challenge has been almost neutralised by a struggle to shape research concerning experienced intuition into the framework of science.

Through an investigation connecting the aesthetic judgement of artists and the situational assessment of Incident Controllers on the fireground, Multimodal Decision Making is developed as a challenge to the position that somatic and aesthetic forms of awareness are unsophisticated and inferior sources of knowledge.

Aesthetic judgement is the place where disciplinary boundaries melt and new connections and networks electrify in an instantaneous moment of insight. Incident Controllers responding to the live image of a fire must read the image immediately and decide how to respond, given their available resources. Against the backdrop of the visual and the artistic, the image Incident Controllers on the fireground work with, work on, mould and shape, consists not only of the fire itself, but of the situation as a whole, incorporating risk, danger, sparse pieces of conflicting information and the pressure to act rapidly.

I apply the theories and practices used by artists in a creative investigation of the somatic response and aesthetic awareness of Incident Controllers. In the spirit of multimodality I draw upon visual culture, social semiotics, art education, and the concept of the artist-as-theorist found in arts-based practice. There is an exceptionally strong impulse within us to sort, delineate and
categorise. I have resisted this impulse in an attempt to mirror the multimodal theory I am developing.

The benefit of recognising a connecting theoretical positioning between art and firefighting is the enriching and the heightening of alternative explanations and the encouragement of a decision making discourse which would otherwise remain within the framework of ‘science’. Understanding that Incident Controllers on the fireground may be relying on different discourses in their decision making should aid us as community members, researchers and emergency service professionals, to better understand alternative ways of conceptualising decision making behaviour.
Preface

This thesis presents an alternative approach to understanding decision making in emergency time-pressured situations, which I term Multimodal Decision Making. Until recently decision making was predominantly discussed in terms of making choices through the application of rational logic, probability, and the weighing up of options. In the 1980s a new theory called Naturalistic Decision Making emerged. As a theory it recognised the intuitive aspects of expert decision making in that there is not enough time to apply a rational logical approach when multiple decisions must be made rapidly. It is also firmly based within a positivist-scientific framework, which I argue does not adequately support the exploration of experienced intuition.

The foundational assumptions underlying decision making on the fire ground require deeper critical inquiry. Artistic expression can fulfil the lapsed and unfulfilled promise of Naturalistic Decision Making, making the revolutionary insight of experienced intuition even more ground-breaking. This thesis seeks to formulate a new philosophical foundation for decision making, where the current world view of the scientific perspective is integrated into an holistic, multimodal perspective.

As an introduction to firefighting and decision making for the reader, a seven minute film clip is provided on the DVD inside the back cover of the hard copy thesis. In the film clip a fire officer makes an intuitive decision to recall his crew from firefighting inside the Old Bingo Hall in Leicester, UK. The documentary, focusing on the human mind, explains the fire officer’s decision using an image of the brain, while providing a psychological explanation based on the workings of the human mind. The Art of Multimodal Decision Making by Incident Controllers on the Fireground presents a complementary alternative approach, based in the arts and concentrating on the embodied somatic and aesthetic awareness of the Incident Controller.

The DVD also provides a number of photographs and film clips relating to various incidents analysed in Chapters 4 to 7. It would be beneficial to flick
through these now, and then return to them in detail later when the incidents are fully described. This will provide a sense of growing Situational Awareness for readers who may, as yet, be uninitiated in fireground activities.

Please view Old Bingo Hall Fire film clip

Located inside the back cover of the hard copy thesis is a DVD containing a seven minute film clip from a three-part series on the mind, produced by the BBC (Winston et al., 2003). I have used the title *Old Bingo Hall Fire, Leicester* on the DVD homepage.

The DVD homepage has four options. Please click on the words ‘Old Bingo Hall Fire’ to view the film clip.

In the Old Bingo Hall Fire film clip an experienced fire officer, Andy Kirk, leads his crew into what he says looked like a “normal” fire. After five minutes the crew felt they were making headway and starting to get the fire under control, but then “for no apparent reason, Andy Kirk had a strange feeling.” He ordered his crew to withdraw from the interior of the building based on his “strange feeling”, much to the crew’s chagrin. He says:

> I couldn’t put my finger on it. I didn’t know what it was, but I was sure something out of the ordinary was going to happen (Winston et al., 2003).

His crew was reluctant to leave, but Andy Kirk was insistent. It was a well-founded call because moments later the building began to explode. The fire raged on for another three hours before being brought under control by a much larger firefighting operation.

Fire Investigation arrived and took photographic evidence, witness statements, and generally pieced together what happened. They found that the explosion was caused by a backdraft. A backdraft occurs when all available oxygen has been used up by the fire, which then begins to suck air in from the outside. This process builds up phenomenal heat, culminating in a huge explosion. In the case
of the Old Bingo Hall the area of impact was likened to a large football field. Backdrafts are not an everyday occurrence for firefighters. They are considered quite rare.

Three pieces of information are presented as informing Andy Kirk’s gut feeling that something was not quite right although in the interview, which occurred some time later, he says it took a lot of reflection for him to consciously realise why. He reveals that the colour of the smoke was orange, which was very unusual. There was very little sound; he was expecting to hear lots of crackling and noise; and he saw smoke being sucked indoors, rather than puffing out of the building. Individually, these indications were certainly not in his catalogue of expected fire behaviour. Putting them together created a “warning signal” to withdraw because “something was not quite right”.

The explanation for Andy Kirk’s uneasy feeling, according to the commentator of the program, lies with his mind and his brain. We are told that he compared all his previous fire experiences with this one, resulting in a feeling of “uneasiness”. While the commentary is unfolding, viewers are presented with an image of the brain, morphing with colours and shapes mildly imitating fire.

From a Multimodal Decision Making perspective, I am also interested in these pieces of information. The acknowledgement of uneasy feelings generated by a fire which is not behaving or responding in the expected manner is common to the BBC program snippet and to Multimodal Decision Making. The difference between the program’s explanation and a Multimodal Decision Making explanation lies within the framework from which the explanation arises. Within this thesis, rather than springing from a scientific platform such as cognitive psychology to explain intuitive actions by firefighters, I draw upon an artistic and aesthetic framework. I see this as a more hospitable domain from which to discuss the ineffable, the somatic and the aesthetic awareness of Incident Controllers on the fireground.

Despite being embedded within a psychology-based program, the film clip summarises the need for Multimodal Decision Making. It is provided here as a
demonstration that fire officers are drawing upon all their senses. The film clip provides an illustration of Andy Kirk’s Situational Awareness, which in essence means the capacity to aesthetically judge the situation and make appropriate decisions. Situational Awareness is a function of experience, but not necessarily measured in years. People can learn from one mistake. Others never learn and make the same mistake repeatedly. Situational Awareness is discussed in greater detail in the last section of Chapter 1.

On the Leicestershire Fire and Rescue Service website (http://www.leicsfire.co.uk/incident.htm) the fire is logged as occurring in October 2000, rather than 2001, as reported by the BBC. Parts of the three minute video downloadable from the website have been used in the BBC series.

**Background context**

My background involves both practising as an artist and working as a lecturer of Emergency Management. My experience has led me to connect these two previously disparate fields, and to shape my research with a multimodal approach. This has resulted in the emergence of aesthetic realisations concerning the art of decision making on the fireground by Incident Controllers, which I term Multimodal Decision Making.

The idea began to grow in earnest a few years ago when I facilitated a number of decision making subjects for the NSW Fire Brigades as a component of their Inspectors Promotional Program (IPP). Once decision making had been decided upon as a focus, I began a reading frenzy, scanning and sorting through everything I could read on the internet, find in a book and locate in a journal. I swung off the beaten track to follow a lead and was taken captive by Gary Klein (1998) and Rhona Flin (1996) as they described an exciting new paradigm in decision research called Naturalistic Decision Making. Here decision researchers, all cognitive psychologists, left their controlled laboratory conditions and entered into the uncontrolled, complex and ‘natural’ environments of Incident Controllers: firegrounds, airplane cockpits and hospital emergency wards to name a few. The research was captivating and
exciting, and the Inspectors Promotional Program candidates immediately identified with it. They eagerly embraced the idea of Naturalistic Decision Making, ran with it and constructed various assignments around it, but as the course progressed I felt the distinct lack of a particular dimension. Naturalistic Decision Making identifies ‘experienced intuition’ as pivotal to decision making in emergency situations, yet the research was unable to capture this elusive element in any tangible way. Calling upon my background as an artist, I had a hunch that there was a connection between the non-verbal aesthetic insight usually relegated to the realm of the arts, and the fast-paced decisions that Incident Controllers on the fireground were required to make. The Art of Multimodal Decision Making by Incident Controllers on the Fireground is the result of this spark.

I understand the Inspectors participating in this research as ‘experts’. Typically, they have twenty or more years experience in firefighting and although they are newly promoted to their rank, they are not new to the role of Incident Controller. The difference is that as Inspectors they generally attend larger or more demanding incidents. The participant Inspectors are also experts in the sense that they have been sifted and selected from their peers and intensively trained and tested within the Inspectors Promotional Program.

Having been involved with previous research concentrating on firefighters at the rank of Station Officer (Childs & Ingham, 2002; Childs, Morris, & Ingham, 2004), I was aware that cold canvassing was not the most expedient way to generate research participants. In 2002, there were less than twenty positive responses from a possible six hundred and fifty for interview, although many more completed the survey. I therefore approached the graduates of one Inspector’s Promotional Program and twelve of the sixteen agreed to participate in the research. Their level of trust and commitment to the research process extended far beyond my expectations. A number of the participants continue to actively follow my research, have reviewed papers and parts of this thesis, and are engaged in discussing and processing their most recent fireground decision making experiences.
Research question

Overall, the research is encapsulated by the question: What is the relationship between the risk perception, decision making and aesthetic and somatic forms of awareness in Incident Controllers on the fireground?

The aim is to develop an aesthetic of decision making by Incident Controllers on the fireground and to establish a new way of conceptualising decision making in emergency situations, thus enabling the explanation of decisions previous thought illogical and of no sound basis.

To accomplish this, the data analysis is approached in an artistic, holistic and multimodal way in an effort to encourage awareness of aesthetic judgement in a domain previously conceived as a ‘science’. Aesthetic awareness and somatic response are demonstrated in the risk perception of Incident Controllers on the fireground, and ultimately an aesthetic of firefighting is initiated.

A core challenge of the thesis was to broaden Incident Controllers’ sense of the artistic and aesthetic as a necessary preparation for their work. To develop Multimodal Decision Making within the current theory of Naturalistic Decision Making would be participating in further ‘scientificising’ the understanding of decision making.

The goal for Incident Controllers is to manipulate the live fireground image before them towards a speedy resolution. Delicately slipping and shoring up the various threads means expertly predicting what will happen to the whole when one part is adjusted or moved. The effects of most decisions made by Incident Controllers are irreversible, yet they must be made under time-pressure, often on the basis of conflicting and incomplete information.

I propose that Incident Controllers arriving on the fireground are basing their decisions on more than scientifically verifiable measurement and calculation. I maintain that they are aesthetically and somatically attuned to reading the fireground in the same way that an artist makes decisions about image construction or criticism. This thesis will provide a rich body of data and
detailed analyses demonstrating that Incident Controllers use their body as a source of non-verbal somatic intuition to appraise the fast-moving image before them; and that they have learned, through practice and experience, to control their levels of arousal, which usually consists of fear or excitement. I argue that they make decisions using information gained through visual and somatic awareness which is at present little acknowledged because it is so difficult to recognise, describe and explain. As such, this thesis challenges a whole tradition in decision making research in that it employs a focus on the artistic and aesthetic dimensions of fireground decision making. Art, as a realm of experience, is valuable in pushing the limits of decision making theory, and even the semiotic approach, in a way that complements these practices, as new insights become possible and are more deeply embedded in experience. Understanding Incident Controllers as nascent artists enables a respect and understanding of their work at a depth previously unexplored to this extent.

Within fire services, the positivist-scientific worldview and its attenuate vocabulary of measure and report are dominant. Credibility is established through successfully negotiating a framework of rigid structure and measurable outcomes. The fragile, organic and colourful leaf on the thesis cover symbolises the essence of Multimodal Decision Making, which would be trapped if it remained within the rigid and unforgiving repeating pattern of positivism, here symbolised as fence wire.

Fire fighting is overwhelmingly described and researched as a ‘science’. For example, much attention has been paid to the way fire will behave in the presence of certain elements and substances; predictions of flashover, backdraught, rollover and air flow; the cracking rates of concrete and the vulnerability of particular building materials. These are all tested and documented as ‘objective’ facts. Rapid advances have been made in the science of protective clothing, night vision cameras, heat sensing equipment, fire appliance features, and the construction and constant revision of Standard Operating Guidelines. These important advances are firmly based within the scientific framework of testing and measuring for effectiveness. Of course there
is the human element of judgement, but if the Standard Operating Guidelines are followed, even this is understood to be fairly predictable.

The challenge for me, as I approach from another direction, is to emphasise and acknowledge the non-verbal processes which involve a depth of field far beyond a mathematical calculation of probability and risk. I wanted to document something elusive and intangible, but nevertheless strong in Incident Controllers reflections upon their decision making. I did this through appropriating some of the language of art criticism, visual sociology and social semiotics and the more recent fields of visual culture and arts-based research. This perspective is echoed by Sullivan:

There is a desire to move beyond discipline boundaries and into areas of inquiry that interact and intersect and require new ways to conceptualise forms and structures (2005, p.152).

Complexity is inevitable when working at the “intersection” of art, decision making and firefighting. Attempting to cover all fields adequately proved quite a challenge. Rather than providing a lengthy and weak coverage, I decided to focus on holding all three areas in tension while continually making connections, drawing the seemingly disparate threads together, and carefully avoiding the well-trodden debates which characterise each domain, in order to maintain an holistic and productive outlook.

A fireground is dynamic, constantly changing, and sometimes unpredictable. These are the conditions Incident Controllers must negotiate, while holding in tension the lives of their crews, possible victims, and the built and natural environment. This is a complex situation, not effectively described or explained in a linear, cause and effect sequence. It requires recognising the entirety of the scene and an aesthetic perception which moves beyond verbal description, encompassing a somatic and artistic appraisal. I maintain that current theories of decision making are not quite capturing the dynamic complexities of the fireground.
Multimodal Decision Making was developed in response to the restrictions which compel the Naturalistic Decision Making research community to conform to the positivist paradigm. From my perspective, their most valuable and beautiful discovery has been brutally trampled underfoot in the contention for ‘scientific’ acceptance. Rather than developing a methodology which would elucidate their major finding, Naturalistic Decision researchers have become preoccupied with a time-consuming and cumbersome form of cognitive task analysis. From my point of view, this method effectively wipes away the traces of intuition, which seep quickly through the cracks of coding and categorising, leaving only a vague impression; a fleeting sighting. This situation leaves the researchers holding a thin and ill-defined reminder of their most precious and important discovery, which I contend science-based methods are ill equipped to capture. For this reason, I decided that contributing to Naturalistic Decision Making would not enable me to creatively explore what I thought might be happening. I needed to move right away into a more hospitable framework which recognised aesthetic and somatic awareness and had the semblance of language to accommodate it. This framework is the artistic domain. One legacy of the long-running debates in art and aesthetics is the recognition of the ineffable and a semblance of language with which to discuss it. Here it is possible to theorise about the unseen, but felt; the known, but inexpressible. And here it is possible to talk about gut feelings and intuition in a far more developed sense, due to a framework which favours embracing the whole of the work, as opposed to dissecting it into parts for analysis.

Useful negotiating tools

Acronyms

Within the thesis I avoid the use of acronyms, preferring to use full terminology. The intention is to reduce the reader’s difficulty when covering such a wide terrain. Deciphering what I am saying is challenging enough without having to negotiate a series of capital letters in three digit lots. At times though, I place the relevant acronym into its customary bracket, but then call upon it no more. The purpose of this is to help acculturate readers for the data analysis chapters of 4 to 7, in which acronyms do appear in transcript excerpts.
and in direct quotes from the literature. In addition, I have decided to join a number of words in line with common usage, such as ‘fire fighter’ which appears as ‘firefighter’ and also ‘fireground’.

**Pseudonyms and identification of participants**

After trialling the use of pseudonyms for the participants, I decided it was more expedient to identify them with their incidents, for example ‘the Fruit Juice Inspector’. Therefore the unreferenced quotations in each section belong to the participant Inspector who related the incident. For example, unreferenced quotations in the section ‘Fruit Juice Factory Fire’ belong to the ‘Fruit Juice Inspector’ unless otherwise noted.

A number of participants contributed more than one incident and I have not made these groupings clear. The purpose of the research is not evaluatory, and allowing readers to group and compare incidents on the basis of who was Incident Controller, I felt, would contravene the requirements of the UWS ethics committee and my promise to the participants.

**Roles and ranks**

The reader needs to be aware that there is a difference between the rank of Inspector or Station Officer, and the role of Incident Controller. The participants were all at the rank of Inspector. When in command of an incident they assumed the role of Incident Controller. Similarly, a person at the rank of Station Officer may assume the role of Incident Controller.

**Blurring of boundaries**

At times, the reader may experience a mild sense of frustration with the interchangeability of key words, for instance: artistic, aesthetic and somatic response. I have loosely defined various words periodically throughout the thesis, but in an effort to mirror a sense of multimodality I have purposefully avoided a ‘cut and dried, once and for all’ delineating definition of each. This is to afford the reader some sense of their own interpretation and to assist with an
intuitive determination of what is meant by the word when placed within a particular context.

In the data analysis chapters of 4 to 7 there is, at times, an almost deliberate blurring of comment. This is intended to precipitate a double-take in the reader, and the thought “was that applying to the fireground incident or to the painting under discussion?” This, again, is a deliberate blurring of the boundaries in order to illustrate my understanding that aesthetic awareness is an important informer of decision making in firefighting and in art.

*Vision involves more than seeing*

Seeing involves not only eyesight, but also being a part of a cultural context. Within the thesis, ‘visuality’ and ‘seeing’ are understood as multi-sensory experiences, not confined to literal eyesight:

Visual perception does not operate within the mechanical faithfulness of a camera (Arnheim, 1974, p.43).

During the act of simply living we filter and sort visual information, selecting what is relevant and useful to us. In a very stark kind of way, we see visual concepts only in a stereotypical sense. There is good reason for this – we would be completely inundated with visual information if we processed absolutely everything we saw. We register primarily only what we need in order to get on with the way we live our lives. Millions of colours are reduced to a palette of a dozen or so. Changes in tone and hue throughout the day, as the result of light falling on a settee or filtering in through a window, are barely noticed. Part of the reason for this filtering is that we simply do not have the time to watch and experience the subtle changes. We would be overwhelmed by the complexity of the environment and become slaves to the particular.

To cope with the complexities of colour we give general labels to colours. For example, we describe the coat of a horse as “She’s black all over with a little white star on her muzzle.” Or is she? In the sunlight her coat sparkles golden red, in the shadows it looks blue, by sunset it is russet. These many tones and
shades are simply labelled as ‘black’. She’s written down at the veterinary clinic as ‘black’ and she’s described by the next-door neighbour as ‘that black horse’. McKim describes it this way:

Nature does not separate seeing from the other visual senses; only words do. Seeing is polysensory, combining the visual, tactile, and kinaesthetic senses (1980, p.71).

As with all expert areas, there are people attuned to notice subtle variations in colour and texture, and their experience is “polysensory”. Wine tasters and cheese tasters, for example, are experienced in noting the colour, scent, taste and texture of their product.

Incident Controllers, depending on colour as a vital sign in their work environment, cannot generalise; they must be specific in their looking. The gradations between grey smoke and the black of blackness indicate whether conditions are safe and whether the firefighting plan is bearing the desired results. I maintain that for Incident Controllers, vision is a physical, embodied experience, encapsulating all of their emotions and intellect. It is integral to their judgement and decision making, intimately and holistically bound with their aesthetic and somatic perception of the scene.

According to Bartram (2004, p.287) there is an ocular centrism “Which has emerged in the last ten years that has reconfigured the way in which we view the world and dramatically changed the way in which we participate in it.” In terms of developing this new perspective he writes:

We might also reconsider the proxemics of space, time and the body, and the non-verbal, but importantly non-visual part of our world. It allows us to problematise the distinctions that social and cultural research often draws between, say, haptic, kinaesthetic and visual experiences and reconstitutes visuality as a multi-sensory experience (p.286).
Thus the understanding and use of the words ‘visual’ and ‘seeing’ in the thesis involves more than light rays to the eyeball distilled into an image. For instance, I may make a statement such as “Firefighters learn to read visually because it is an important means through which they assess risk and communicate with one another”, understanding the word “visually” to incorporate a polysensory, somaesthetic perception.

**Thesis armature**

Chapter 1 outlines a brief history of decision making, locating the current emergency decision theory, Naturalistic Decision Making, and the theory I am developing within this thesis, Multimodal Decision Making.

Within Chapter 2, I have presented a synthesis of the art-related frameworks I called upon, noting the theorists who especially informed my thinking. In Chapter 3 the research design is outlined using the Standard Operating Guideline for ‘Responding to Hazardous Materials’ as a blueprint. This is followed by an introductory analysis of a fireground incident. The incident, the Liquorland Fire, was selectively placed in order to introduce Fire Brigade terminology and procedures, in addition to demonstrating what to expect in the ensuing data analysis chapters.

Chapters 4, 5, 6 and 7 form the essence of the thesis and incorporate the presentation and analysis of various fireground and hazmat incidents, during which I continue to develop Multimodal Decision Making. Chapter 8 is a fast-paced concluding discussion with brief, practical recommendations.
Chapter 1: Positions within decision research

Introduction

Decision making and risk perception are major themes interwoven throughout this thesis. Within the last fifteen to twenty years a considerable amount of research has been conducted towards trying to understand how people make decisions in stressful, time-pressured, rapidly changing environments. Work places such as hospital emergency wards, military combat zones, wildfires, structural fires, aviation cockpits and other dynamic situations have been considered as sites of investigation. To demonstrate how I arrived at my present position in decision research I begin with a brief overview of decision making theory, commencing with the economist researchers of the 1950s.

To the overview of academic writing and research in decision theory I add another dimension or “facet” (Richardson & St Pierre, 2005, p.963) to the research, in the form of an extensive literature review of fire magazines and journals, the majority of which are of American origin. The essence of this investigation is reported at the end of the chapter as ‘Situational Awareness and size-up’. Although it is not current practice to include magazines, informal websites, and un-refereed journal articles as sources of information within a formal literature review, I am breaking with academic ‘Standard Operating Guidelines’ because I consider the written voice of practitioners in the field to contribute an important dimension which is not evident in the academic prose of accredited publications.

Rational Choice

The positivist-scientific paradigm has determined the nature of the landscape for decision making theorists since the mid-twentieth century, when economists, along with interested psychologists, developed Rational Choice theory. They engaged a logical approach to the development of various models as an aid to choosing the most profitable option, the goal being to maximise investment returns. The language of these economist researchers included words such as optimise, minimise, maximise and predictably, profit and loss. Applying Rational Choice theory to explain decisions made in everyday life
failed to precipitate the same gratifying results. Rational Choice theory is about selecting the most expedient option and passing value judgements on what is good and desirable. Most sociologists avoid making value judgements because they believe that ‘what is good cannot be proven’ and that Rational Choice theory does not fit into a postmodern world which understands a multiple of alternative moralities. Having said this, the influence of Rational Choice theory, with its contingent emphasis on objectivity, is evident amongst qualitative researchers in that we acknowledge our own limitations. This, in a sense, indicates that we do have implicit judgement and that it does colour every aspect of our research, from the framing of our research question to the interpretation of our data. The dominance of Rational Choice is succinctly summarised by Meredith (2004), for whom Naturalistic Decision Making does not rate a mention:

The Rational Choice Model has held sway as the standard normative theory of decision making and rational action for the last sixty years…the core basis of the model – striking a balance between logical-empirical beliefs on the one hand, and normative-affective desires on the other – presents a reasonable basis for rational decision making (p.547, 553).

Rational Choice theory encountered a problem. Humans, being emotional beings, did not take logic into much account in their everyday decision making. Consequently, it was thought that even if the Rational Choice model was not accurately taking into account human emotion, at least it was prescriptive and people could be trained to make the ‘right’ decisions, but the approach was not very successful. At this point behavioural psychologists entered the decision research arena in earnest, the seminal writer being Ward Edwards (1954). Edwards and his quickly expanding group of followers held that people making decisions had their own rules of thumb, which were not based on pure logic. Human bias was acknowledged and decision research broadened to include the possibility of multiple decision making strategies. Behaviourists also adapted Rational Choice theory to be more prescriptive, and their work continues on as behavioural decision theory to this day.
What the early economists and behavioural psychologists had in common was an understanding that a decision is a choice between two or more options; gambling as a metaphor appears to have been quite acceptable. The models they developed were intended to help people weigh up alternatives and select the most expedient option. Research was, and still is, conducted in a controlled environment, and consequently it is difficult to apply Rational Choice theory to ill-structured and complex situations, such as those found on a fireground. Rational Choice models incorporate probability theory, preference and uncertainty, and they are prescriptive. That is, they begin with a model which prescribes various courses of action for selecting the most expedient decision.

Organisational decision making

Next, organisational decision theorists observed that understanding a decision as a gamble, although it took risk into account, was not going far enough. It was the passivity of this definition of a decision that these researchers objected to. They agreed that people selected an option, but they realised that few people then sat back and waited, rather they put a lot of effort into making their decision work.

In addition, psychologists began to notice that people who understood the probability and logic involved in making the ‘correct’ (that is, the most logical) decision, were frequently deciding on another course of action. Decision researchers began to acknowledge that other factors besides the scientifically verifiable, mathematically provable criteria they were providing was influencing people’s decisions making. For example, Vahabi and Gastaldo (2003) researched the choices women made when diagnosed with breast cancer. They found women frequently based their treatment decisions on factors other than the ‘mathematically verifiable’ medical science model. Another example is the work of Wilson and Schooler (1991), who hypothesised that sometimes we make decisions or form opinions based on “reasons that are unknown to us”. In a tasty experiment they had two groups of students try a number of jams from an already judged competition. One group were provided with a set of instructions detailing how to analyse an award-
winning jam. The other group left the lab more quickly; they were simply asked to taste and state which jam they preferred, and this group predominantly chose the award-winning jam. The first group, who were provided with a list of prompting questions regarding what to look for in an excellent jam, became engrossed in the analysis and far fewer eventually selected the award-winning jam.

What made the difference? According to Wilson and Schooner we can “think too much” and “at times, the unexamined choice is worth making” (Wilson & Schooler, 1991, p.192, original italics). I propose that the faster, second group, were relying on their senses of taste and pleasure. The first group had their attention called away from trust in their own taste sensations to look at the colour, texture and so on of the jam, in an analytical approach which separated them from the simple pleasure of relying on their own somatic judgement. Wilson and Schooler put this down to “reasons that are unknown to us”. Today there would be little hesitation in calling this phenomenon ‘experienced intuition’. That is, if you have tasted a pleasant jam in a previous experience it is possible to immediately identify one again.

Moving closer to the present day, Lee Roy Beach is a decision psychologist working out of the University of Arizona. He has developed Image Theory, which, possibly because the word ‘decision’ is lacking in the title, appears to be omitted from a number of major literature reviews on decision making. Beach himself reflects upon the naming of his theory:

I have often regretted that the theory was named image theory, if only because the description of images is its least well-developed feature. Although I have tried to be more specific about the nature of images (Beach, 1990), it is difficult to see how the concept can be more rigorously developed until a measurement method is devised (Beach, 1998, p.263).
In desiring his theory to be ‘measurable’, Beach indicates a keenness to have his theory recognised by other decision experts situated within cognitive psychology.

Beach observed that decision makers often choose the ‘right’ option, which perhaps is not really in their own personal best interest; that is, it may be to someone else’s benefit. Decision making, according to Beach and his Image Theory, is “strongly shaped by beliefs, morals, ethics, and social conventions, which we refer to collectively as principles. They function as guiding imperatives” (Beach, 1998, p.7, original italics).

Image Theory understands that decision making is integrated into the complex fabric of life and highlights three main areas of influence: a person’s principles or values, their goals, and their plans for achieving these goals. In this way Image Theory is similar to Multimodal Decision Making in that it recognises a complex interweaving of influences which are inextricably intertwined.

The point to note here is that Beach recognises decisions may be based on “principles” which “cannot be readily articulated, but they are powerful influences on decisions”(Beach, 1998, p.9). The research of Wilson and Schooner and that of Beach highlights first, that there is something besides rational logic upon which people are basing their decisions and second, that whatever it is, it is rather difficult to articulate.

Weick and Sutcliffe (2001) break down unexpected events precipitating judgement and decision making into the following:

Unexpected events can get you into trouble unless you create a mindful infrastructure that continually tracks small failures, resists oversimplification, is sensitive to operations, maintains capabilities for resilience, and monitors shifting locations of expertise (Weick & Sutcliffe, 2001, p.21).
This list forms the chapter headings for their book Managing the unexpected (Weick & Sutcliffe, 2001, revised 2007). They warn that to “generate reliable action”, these five principles need to be made a “higher priority” (p.139). Weick and Sutcliffe write for the business and managerial community, although their work is tempered by the understanding that decisions made within a business context may require quick judgement and intuitive reasoning similar to that of a time-pressured emergency. To this end, Weick wrote Sensemaking in organisations in 1995, and in 2000 he teamed up with Gary Klein to write an article on managerial decision making which draws distinctions between an intuitive and an experienced approach (Klein & Weick, 2000; Weick, 1995).

Helga Drummond (2001) contributes to the study of business and organisational decision making, examining the collapse of large organisations as well as a variety of emergency service case studies. Within her book, The art of decision making, she positions herself with intuitive, gut feel decisions, and her use of ‘art’ is in the sense of practice rather than the artistic.

In summary, prescriptive models are generated by behavioural psychologists and they incorporate the idea of logic and rationality. The theory of Naturalistic Decision Making (NDM), discussed in the next section, and my theory of Multimodal Decision Making (MDM), explained throughout the thesis, would both be considered descriptive theories.

**Catastrophic disasters**

In the late 1980s, a series of catastrophic disasters impacted on a global scale and caused widespread concern over how time-pressured decisions were being made. Increasing reliance on technology had left the world wide open to the risk of major technological, biological and man-made disasters. Some of these disasters included the 1984 Union Carbide gas explosion in Bhopal, India, which killed thousands of sleeping local residents; the July 6th 1988 explosion of the Piper Alpha oil platform in the North Sea, in which 167 people perished, and the July 3rd 1988 shooting down of an Iranian passenger jet over the Persian
Gulf. In the Iranian disaster, the US Navy Commander had only 90 seconds in which to decipher much disparate information, and determine whether the non-responsive aircraft was friend or enemy. He made the judgement call of ‘enemy’ and nearly 300 civilians lost their lives.

The result of these previously inconceivable catastrophic events was an outraged world. How could this kind of misjudgement and human error occur in an age of such tremendous technological sophistication and expertise? As an illustration, a brief summary of the etymology of one disaster is presented.

On July 3rd 1988, the US battleship, Vincennes, fired upon an aircraft flying towards them in the Persian Gulf in an erroneous judgement that it was unfriendly, resulting in the death of 290 innocent people. There were several of factors contributing to the perception that a regular passenger flight posed a direct threat. Some of these factors included: the flight took off 27 minutes late, the US battleship had already been warned of a planned Iranian attack, the aircraft was not responding to repeated requests to identify itself and most importantly of all, the navy Commander and relevant crew had approximately 90 seconds in which to make a decision whether to fire on the aircraft or not. Unfortunately they read all the pieces of information, judged the aircraft to be unfriendly, and fired upon it (for a more detailed account see Collyer & Malecki, 1998).

**Naturalistic Decision Making**

As a direct result of this and previous catastrophic incidents a large amount of research funding was released through the US Department for Defense, with the specific mandate to investigate how decisions were being made in stressful, time-pressured and dynamically changing conditions (Zsambok & Klein, 1997, p.3). One of the successful contenders was a psychologist, Gary Klein, who had previously conducted research with fire officers, had worked as an academic at Oakland University in Rochester, and was employed by the US Air Force as a research psychologist. In 1978, Klein started his own consultancy and in 2003 he sold it, remaining on as chief researcher. In recent
years Klein has successfully transposed his theories of time-pressured decision making into the business world, both in consultancy and in writing books with titles such as Sources of power (1998) and Intuition at work (2002). The notable exception of the words ‘decision making’ from these titles means Klein’s more recent work tends to be catalogued in libraries under ‘leadership and management’ rather than ‘psychology of decision making’. I suspect this titling may be a deliberate decision to encourage managerial and organisational decision makers to access his work.

A part of Klein’s research, and also that of a small number of other research psychologists such as Rhona Flin (Rhona Flin, 1996; R. Flin & Arbuthnot, 2002) a research psychologist and academic at Aberdeen University; Eduardo Salas (2001); Raanan Lipshitz (2001a); Janis Cannon-Bowers (1998); and Caroline Zsambok (Zsambok & Klein, 1997) focuses on what Incident Controllers do when they are not using deductive logic or probability theory. These researchers endeavoured to find out how experts in the field were making decisions under pressure, recognising that the decision making of Incident Controllers did not fit the Rational Choice model. The problem they sought to address was that behavioural oriented theories might be suited to long range planning problems, but they were found ineffective and cumbersome in the immediacy of high pressured environments (Collyer & Malecki, 1998, p.6):

Whereas more traditional research has involved inexperienced people engaging in laboratory tasks where contextual or situational factors play a limited role, Naturalistic Decision Making research has involved experienced people in real-life decision-making situations (Meso, Troutt, & Rudnicka, 2002, p.64).

So, what exactly is a decision? Up until fifteen to twenty years ago it was thought to be a choice between one or more options. The revolutionary theory of Naturalistic Decision Making announced that it was not necessarily a choice between options, but rather in time critical situations experienced Incident Controllers just knew which course of action to take; in other words, they did
not make a choice. For Naturalistic Decision theorists making a decision means:

selecting the adequate, appropriate, or right option, and not comparing options and selecting the best (Jungermann, 2001, p.367).

This idea had been heralded by Herbert Simon (1957) some years previously, when he wrote about bounded rationality and coined the term ‘satisficing’, meaning using the first available option that comes to mind which will get the job done satisfactorily. That is, the decision may not in retrospect have been the ‘best’ choice, but it worked and not selecting between choices saved a lot of time.

Naturalistic Decision Making investigates tasks that are “ill-structured” and “strongly context dependent” (Serfaty, MacMillan, Entin, & Entin, 1997, p.392) and is defined as “how people use their experience to make decisions in field settings” (Zsambok, 1997, p.4). According to this model Incident Controllers in familiar situations will make many decisions without much conscious thought, following procedures they have practised and experienced many times before, rather than focussing on the available options and selecting between them.

Klein and others contend that Naturalistic Decision Making, and Klein’s tenet of the theory, Recognition Primed Decision making, are best suited when the following conditions exist in a particular decision making environment:

- Time pressure, to make decisions and achieve results quickly
- Ambiguous information
- Ill-defined goals
- Changing conditions
  (Klein, 1997, p.287)

Naturalistic Decision Making is firmly anchored in applied psychological science (Salas & Klein, 2001, p.xiii). The research of Klein, Flin and the other
decision psychologists mentioned previously originally converged at a conference sponsored by the US Defense Force in 1989, and the results were published in 1993 (Klein, Orasanu, Calderwood, & Zsambok, 1993). The focus of investigation was determined to be time critical situations such as hospital emergency wards, aviation incidents, military situations and fireground incidents, and the aim was to investigate how experienced Incident Controllers made decisions in time critical and information sparse situations.

The proceedings of the second conference, held in 1994 and published in 1997, stressed that for Naturalistic Decision theory the “comprehensive definition emphasises complex, uncertain, and unstable situations where decision makers cannot rely on routine action or thinking” (Zsambok & Klein, 1997, p.6). This definition is a little paradoxical as the theory calls upon the concept of pattern matching in quite a large way:

NDM holds that decision makers are more concerned about sizing up the situation and refreshing their situational awareness through feedback, than they are about developing multiple options to compare one to another (Meso et al., 2002, p.64).

Montgomery, Lipshitz, and Brehmer (2005) edited the proceeds of the fifth conference on Naturalistic Decision Making held in Stockholm in 2000. The book is divided into three parts covering the broad areas of individual decision making, social decision making, and new advances in decision making. Although there is a return to ‘decisions’ in the title, How professionals make decisions (Montgomery et al., 2005), the impress of time pressure is now missing. This has interesting implications – it appears that books with the word ‘decision’ in the title are catalogued under the psychology of decision making, while others lacking this keyword are scattered throughout library collections, shelved according to leadership and other descriptors. For example, Flin’s Sitting in the hot seat (1996) and Tales from the hot seat (2002), and Beach’s Image Theory (1998), are each catalogued in completely different locations. The proceedings from the sixth conference, the latest to point in writing, again reinterpret the goal of Naturalistic Decision Making research:
The goal of NDM research is to increase our understanding of expertise and its development, so that people can be accelerated on the learning curve, so that the knowledge, skills and wisdom of top experts can be preserved for future generations, and so that new and better forms of human-computer interaction can be developed (Hoffman, 2007, p.xiii).

I suspect this latest revised goal reflects the membership of prominent Naturalistic Decision Making researchers to the Human Factors and Ergonomics Society, who initiated a technical research group called ‘Cognitive engineering and decision making’ to accommodate them (Lipshitz et al., 2001a, p.331). The imperative of time-pressure appears to have been superseded by a focus on expertise.

In essence the sixth conference ends with the same conclusion as the first of a decade before, with the recognition by researchers that it is difficult to satisfy their own research aims and at the same time produce research that is easily embraced by other decision psychologists working within the scientific paradigm.

**Intuition and expertise**

As a Naturalistic Decision theory leader, Gary Klein developed a model called Recognition Primed Decision making (Klein, 1998; Klein et al., 1993). This model acknowledges that in time-critical situations, Incident Controllers recognise patterns and cues and act on them without necessarily registering that that is what they are doing (for example, Andy Kirk in the Old Bingo Hall Fire). Within this context, Klein correlates the words intuition and experience: “Intuition depends on the use of experience to recognize key patterns that indicate the dynamics of the situation” (Klein, 1998, p.31). Klein understands the experiences that build into intuition may be subconscious and unanalysed, therefore leading to the word ‘intuition’.

Naturalistic and Recognition Primed decision research focuses on experts in the field because, contrary to popular belief, rapid instinctive decisions are not
the domain of the inexperienced novice, but are frequently made by experienced leaders. Conversely, a slow and measured consideration of alternatives is best left for those who need to think about things in depth, due to their lack of experience and understanding. The key feature of Recognition Primed Decision Making is it is the situation that is evaluated, not the available options. Thus Situational Awareness is a key feature of Naturalistic Decision Making and Recognition Primed research.

**Cognitive Task Analysis**

As psychologists, the Naturalistic Decision researchers enlarged upon a method of data collection and analysis called Cognitive Task Analysis (CTA):

> The purpose of a cognitive task analysis (as opposed to behavioral task analysis) is to understand the decision requirements that lie behind an experienced person’s job or task performance (Zsambok & Klein, 1997, p.13).

The use of Cognitive Task Analysis in Naturalistic Decision Making research was pioneered by three researchers who have collaborated to write the current definitive ‘how to’ text (Crandall, Klein, & Hoffman, 2006). These psychologists define Cognitive Task Analysis as:

> a family of methods used for studying and describing reasoning and knowledge…CTA methods provide procedures for systematic, scientific examination to support description and understanding (2006, p.3).

In relation to the labour intensiveness of Cognitive Task Analysis, Meso, Troutt, and Rudnicka (2002) make the comment that “Most of the knowledge resident in experts is largely tacit, involving complex perceptual and cognitive skills that the experts have difficulty articulating” (p.70). This comment hints at the difficulties encountered when employing Cognitive Task Analysis methodologies in an investigation of experienced intuition.
At this point it is important to note that the early psychologists and economists started with the statistically based theory of rationality and applied it to economics; when transposed to help make some sort of order out of the messy real-world of every decision making, it fell short. In a dramatic reversal, the Naturalistic Decision researchers began with the complex real-world setting and worked backwards towards developing a theory. They termed their research ‘Naturalistic’ because it was conducted in complex real-world settings rather than in the controlled conditions of a laboratory. As such these researchers placed, and continue to place, a lot of confidence in observable decision behaviour and the expertise of their subjects.

In summary, within the positivist-scientific framework, decision making is understood through various Rational Choice models. Most research concentrating on the Naturalistic Decision Making model still conforms to the positivist-scientific framework, where I consider the major finding of experienced intuition to largely escape detection when investigated through Cognitive Task Analysis.

**Critique of Naturalistic Decision Making**

According to Beth Azar (1999), in her review of decision research for the APA Monitor Online, there is a “rift (that) has developed in the branch in psychology that studies judgment and decision making” and “most researchers believe the two will eventually coexist peacefully, if not begin to collaborate” (Azar, 1999).

Azar’s comments illuminate the current situation of decision research revealing that decision research in general, and Naturalistic Decision research in particular, is firmly situated within psychology and the cognitive sciences. Furthermore, there is a rift between Naturalistic Decision researchers and those whom Azar refers to as “traditionalists”. This rift has been fuelled by the Naturalistic Decision researchers’ positioning of their writing with little appreciation for laboratory controlled research.
In 2001, the Journal of Behavioral Psychology held a forum on Naturalistic Decision Making in which they invited eighteen writers and researchers to critique Naturalistic Decision Making and provided Klein and his co-researchers with the opportunity to present their case and a rejoinder to the critiques. Glancing through the contributors to the Forum, it is immediately obvious that they are either situated within the managerial and business world or the psychology departments of major universities. This indicates the spreading borders and application of Naturalistic Decision Making into organisational psychology and a continued alliance with the cognitive sciences as a framework for shaping research. From my perspective it is of concern that the contributors did not include practitioners from within the emergency services.

The contributors generated numerous points, ranging from complimentary and encouraging to suggestive and also dismissive. The overriding theme, from my perspective, was that Naturalistic Decision Making research was found wanting in regards to satisfying scientific rigour. I compiled a brief summary of the critiques, which I present in the next section as a platform to the necessity of Multimodal Decision Making.

**Scientific rigour: Where should Naturalistic Decision Making sit?**

Kerstholt and Ayton (2001, p.370) ask the question “Should NDM defend itself against criticism that it is not scientifically rigorous, or should NDM regard traditional scientific rigor as irrelevant?” They conclude that Naturalistic Decision Making researchers must apply rigorous standards in order to be taken seriously by other scientists.

Both Kerstholt and Ayton (2001, p.370) and Klayman (2001, p.372) questioned whether Naturalistic Decision Making is about making decisions or whether it is simply researching “skilled reactions”.

Naturalistic Decision Making “attempts to describe the cognitive processes of skilled decision makers by focusing on their observed behaviour” (Whyte, 2001, p.383). This situation, according to Whyte, indicates that the Naturalistic
Decision Making model is “conceptually impoverished” because it is descriptive (Whyte, 2001, p.383).

**Scientific rigour and the use of verbal data**

A weakness of the theoretical approaches in NDM research is its tendency to choose verbal data (such as think-aloud protocols, self reports, questionnaires) as major empirical evidence... (NDM) may be useful in constructing subjective theories... scientific theories never rely on what people say. The validity of our theories depends on how well they predict or explain behavior (Jungermann, 2001, p.368, original italics).

The consequences, according to Jungermann, are that “NDM data rarely allow for a rejection of assumptions or models. Rather, they tend to match the researcher’s expectations” (Jungermann, 2001, p.368).

**Scientific rigour and the use of experts, experience and expertise**

Around 1994 there was a “virtual explosion of studies of experts in their operational settings, scientists in such fields as psychometrics, computer science, ergonomics, and military command and control” (Zsambok & Klein, 1997, p.10). The controversy concerning the use of experts as research participants also increased.

The steady focus on the expert is a distinguishing feature of Naturalistic Decision Making researchers, and this invites a barrage of criticism. Discontent ranges from what determines an expert, and the interchangeability within the writings of Naturalistic Decision theorists between ‘expertise’ and ‘experience’; for other researchers the two words do not necessarily mean the same thing. According to Moran (1998), experience “can refer to either years of service or involvement with certain types of critical incidents” (1998, p.40). Naturalistic Decision Making emphasises the competence of experts rather than their dysfunction (Meso et al., 2002, p.64). This gives rise to criticism, as their research tends to avoid evaluating performance and assumes their
participants, by virtue of their years on the job and position within the organisation, are ‘experts’.

Zsambok and Klein state up front that they look for the strengths of experts, and not weaknesses (1998, p.40). The Naturalistic Decision Making focus is on “How experts make decisions not how they ought to make them” (Zsambok & Klein, 1997, p.5).

According to Beach, whose Image Theory manages to straddle both traditional and Naturalistic Decision Making: “I agree that we have to move away from simplistic models that take intuition and emotion out of decision-making, but the laboratory can provide some interesting findings.” He claims that Klein is not investigating decision making, but rather “a general model of learning – using experience to make future behaviour automatic.”

For Zsambok and Klein simplicity is an indication of expertise:

Novices initially make decisions and take action by learning a set of rules. They then gain competency by compiling those rules into more and more comprehensive and abstract rules that permit faster, more fluid decision making and acting. But, a major shift occurs at the highest levels of competency, or expertise. Experts do not rely on ever-more complicated rules to make decisions and take action. Instead, the cognitive underpinnings of how experts decide and act are qualitatively different from how novices decide and act. These are cognitive understandings that NDM researchers are attempting to describe or to support through the decision aids and training they design (Zsambok & Klein, 1997, p.9, my italics).

From my perspective, this has been a relatively unsuccessful mission so far, and it will continue to be. I argue that applying a cognitive science methodology actually contributes to the demise of the project in that experienced intuition, the essence distinguishing the novice from the expert, is escaping through the very large fissures created by parceling off information.
through Cognitive Task Analysis. What these researchers should be “attempting to describe and support” at this level of participant expertise is the importance of the ineffable aesthetic awareness and somatic response of their participants; instead they facilitate the escape of these elusive, mutually linked parts by breaking their bonds.

Scientific rigour: Why Naturalistic Decision Making’s change in emphasis?

In their Focus Article: Taking Stock of Naturalistic Decision Making, seminal writers Lipshitz, Klein, Orasanu and Salas (2001a) define Naturalistic Decision Making as “an attempt to understand how people make decisions in real-world contexts that are meaningful and familiar to them” (2001a, p.332). There is a noticeable lack of the previous qualifiers which originally acted as an imperative for their research – such as time pressure, high stakes and conflicting information. Does this mean that the other researchers, and not only Klein, are moving the theory into a larger domain?

This substantiates my underlying feeling that as long as Naturalistic Decision Making has to ‘measure up’ to the scientific method, its most precious and important ‘discovery’ (that of experienced intuition) will continue to be pushed to the sidelines and overshadowed by a battle for acceptance within the cognitive psychology community. Obviously this battle is not being waged in the ‘real’ world where Klein and associates continue to enjoy a much greater level of acceptance amongst a broadening variation of disciplines, ranging from the original defence force to include shopper habits and job choice (Salas & Klein, 2001, p.xiv).

Is it possible that the influence of the psychological framework is leading these researchers to conform to the scientific rigour demanded by behavioural psychologists? Have they been pressured to generate a workable model that can be replicated and taught, measured, evaluated and applied across diverse situations bearing little or no resemblance to the time-pressured and information sparse situations of an emergency situation? Furthermore, is this a result of frustration at the slow progress and few researchers who appear to
have taken up the core challenge of Naturalistic Decision Making? As mentioned in the Forum introduction by Yates, “Unfortunately, for a variety of reasons, naturalistic decision-making research has been far less widely debated than many believe it should” (Yates, 2001, p.330).

It is apparent that, in common with Naturalistic Decision Making (and therefore perhaps in line for the same criticism), I have used verbal data, interviewed experts, and started with the real world and moved from this towards a theory. This is where the similarity with Naturalistic Decision Making draws to an abrupt end. The next section introduces the model developed throughout this thesis, Multimodal Decision Making.

**Multimodal Decision Making: connecting in multiple non-linear ways**

Originally I intended to build on Naturalistic Decision Making with a study of the contribution and importance of somatic and aesthetic awareness in the decision making process, constructing a complex, multifaceted and holistic depiction. As it turned out I found the aesthetic and artistic domain much more hospitable, especially when developing a multimodal perspective and incorporating non-verbal data.

I appreciate Naturalistic Decision Making as a theory, but the problem for me is that the research has been conducted from a Cognitive Task Analysis perspective, where typically each decision has been broken down into its supposed constituent parts, analysed and then reassembled. I understand this process to be counterproductive to appreciating complex and interrelated decision making. Experienced intuition, the elusive and shy medium in which the time-pressured decision making process is nurtured, is completely bleached out of the picture. The scientific framework does not effectively support an holistic investigation into the ineffable, non-verbal and intuitive understandings that inform time-pressured decision making. This is because it requires systems of analysis which break the bonds and facilitate the escape, rather than capture, of non-verbal, intuitive understandings.
Therefore, although I appreciate various aspects of the Naturalistic Decision Making models, I propose an alternative explanation which I call Multimodal Decision Making.

In essence, Multimodal Decision Making acknowledges the importance of intuition in the recognition of patterns, spatial awareness and the reading of differences. These somatically informed elements contribute to decision making in time-pressured situations, facilitating the anticipation and recognition of the unexpected, and of discrepancies and variations as the critical incident progresses. As with Naturalistic Decision theory, Multimodal Decision Making includes more than formal reasoning, but it also encompasses multi-reasoning appropriate to highly complex critical incidents with the understanding that somatic response and aesthetic awareness are primary modes of perception. Naturalistic Decision theory is potentially multimodal, but the research paradigm hooks it back into positivism. Multimodality is distinguished from formal rationality and informal sense-based rationality in that it approaches art, science and practice as an irreducible whole; a monomodal approach would not capture the holistic dimensions of decision making in time critical situations.

In summary, Multimodal Decision Making poses a challenge to the dominant paradigm of the traditional Rational Choice models. Naturalistic Decision Making is understood as the failed ally. Within Naturalistic Decision Making was the seed of failure from the start. The reliance on a scientifically orientated methodology is crucially limiting and made in response to the dominant model of positivism which heavily influences psychology. Naturalistic Decision Making has been overwhelmed by the strength of the dominant traditional position and I aim, with Multimodal Decision Making, to recover the complex, holistic perspective which was a possibility of Naturalistic Decision Making in its early days. The purpose is to demonstrate a whole new tradition, namely art, which needs to be mobilised to counter the forces which have held Naturalistic Decision Making captive.
Naturalistic Decision Making was a new paradigm formed around an unmanageable problem, but it has been normalised and is losing its separate identity to become absorbed into the mainstream of decision science. Twenty years from its inception the revolutionary moment which challenged the limited paradigm of decision research to that point, has been abandoned for the ideal of science. Thus the tradition of Naturalistic Decision Making has shaped and confined itself in the name of a limiting idea of science. Through formulating Multimodal Decision Making I hope to reinvigorate the longstanding debate between what I understand to be the false divide of art and science, and demonstrate that artistic expression can fulfil the lapsed promise of Naturalistic Decision Making, making its groundbreaking insight even more revolutionary.

A crucial aspect of Naturalistic and Multimodal Decision Making is Situational Awareness, which is introduced and discussed in the next section.

**Situational Awareness and size-up**

*Transformed by the continuing information revolution, inundated by increasing floods of signs, images, and factoids, we already have too much to attend to in the surrounding environments of our natural, social and virtual worlds of experience (Shusterman, 2008, p.2).*

Incident Controllers “attend” to an “inundation” of information on the fireground, through a process known as Situational Awareness.

Situational Awareness sums up aesthetic judgement and all the features of artistic practice. It is the overall ‘title’ or ‘name’ that encapsulates the place of action where Multimodal Decision Making happens. Situational Awareness is accepted and researched within the emergency service community, but not from an artistic, aesthetic perspective, which has the ability to include the unspoken, non-verbal, somatic and aesthetic aspects of Incident Control, decision making and the fireground.
This section provides a more detailed account of Situational Awareness as a platform for the features and aspects to be presented in the data analysis chapters of 4 to 7, where, throughout the incidents analysed, decision making and Situational Awareness on the fireground are threaded and interwoven as aesthetic and somatically informed linked activities. Within this section I draw these threads together into a distilled essence, clarifying the importance of aesthetic judgement for Incident Controllers in the resolution of the tensions they face in time-pressured decision making.

Situational Awareness involves the ability to negotiate and attend to the relevant “floods of signs, images and factoids” (Shusterman, 2008, p.2) without becoming distracted by responding to every piece of incoming information, as this would slow decision making down considerably. Incident Controllers notice what they have been trained to observe – smoke escaping from under the eaves, melting rubber between tilt-slab walls, cracks in structural concrete and so on. Their aesthetic judgement of these indicators and signs helps them gauge and measure the progress of the fire, and actively informs their decision making process.

According to Foster (2006), a lieutenant in the Los Angeles Police Department, the term Situational Awareness was first used by pilots in World War I and more accurately described as positional awareness, while they were airborne and fighting. Later, when other factors were taken into consideration, such as “aircraft capabilities and known battle tactics” (p.1), it was more accurately referred to as Situational Awareness. The current understanding of Situational Awareness is:

the ability to identify, process, and comprehend the critical elements of information about what is happening to the team with regards to the mission. More simply, it’s knowing what is going on around you (United States Coast Guard, 1998, original italics).
Mica Endsley (Endsley, 1988; Endsley & Garland, 2000), the seminal writer and researcher who rounded out a more fully developed concept of Situational Awareness, defines it as:

The perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future (1988, p.97).

Endsley’s company, Situational Awareness Technologies, conducts research and training for medical, military and aviation organisations (http://www.satechnologies.com).

Benefiting from the discussions of the previous twenty years, I found Strauch (2004) to have the most comprehensive definitions. He distinguishes between ‘situational awareness’ and ‘situational assessment’:

**Situational assessment** is the process of acquiring data to understand or obtain a mental picture of the immediate environment; **situational awareness** refers to a person’s understanding or mental picture of that environment (Strauch, 2004, p.198, my bold).

As an illustration of the compelling forces affecting Situational Awareness, in the following excerpt a newly promoted Inspector expresses his frustration when managing the competing demands of the public, his own organisation, and the fire itself, resulting in having to make and communicate decisions without feeling he was able to adequately form his own Situational Awareness of the incident ground:

So many people are coming at you. The police are coming at you. The managers of the shop or factory are coming at you. Now the firefighters and then you have got senior officers coming at you to make sure you have done everything right for them. You know – like drawn it, put a time, sent your messages; and all you want to do is get down there to get your head around it.
**Voices of practitioners**

When reading and writing about Situational Awareness and size-up there are a small number of academic works written by notable researchers such as Endsley (2000), Strauch (2004) and Orasanu, Martin and Davison (2001). Their work is relevant and interesting to read, but for a deeper, more embedded practitioner understanding I visited the NSW Fire Brigades Library at the State Training College in Alexandria. Here I accessed a number of fire journals and magazines relating to fire management, many of them from the USA. They provided a collaborative viewpoint in which practitioners did not hesitate to call upon their embodied perception and aesthetic judgement as a mediator for the fireground situations facing them. A number of contributors wrote instructional articles for less experienced firefighters, encouraging them to use their senses in sizing-up and Situational Awareness. For example, Smith (2003) has Observing through the use of our senses as a subheading in his article. He writes:

> Size-up requires the use of the senses of touch, smell, hearing and sight. What do you feel? What do you hear? What do you see? (p.22).

I also detected a degree of blurriness in the writing of these practitioners concerning the use of the terms size-up and Situational Awareness, with many contributors using the words interchangeably. To illustrate, according to Smith (2003, p.20) “Size-up is problem identification”, while for Foster (2006, p.1), the “essence” of Situational Awareness is “Comprehension of observations is the essence of situational awareness.” Any perceived difference between these two definitions becomes a question of semantics.

Thompson (2000), a Deputy Regional Forester from the Rocky Mountain Region of the USA, describes the issues firefighters face today as “so complex that they are impossible to circumscribe with a few images and themes”. He states that “Our desire for a science-based management also tests our leadership” (p.17). Why would this be so? In the absence of an explicit explanation from Thompson, I suggest it is because there is a conflict between
the acceptable language and vocabulary available, the role of the embodied senses, and the requirements of reporting within a positivist-scientific framework. These are important areas of contact for Multimodal Decision Making.

Brennan (2002) of the Fire Department of New York says that size-up is: “the job of everyone on duty…it is an ongoing process” (p.162). His writing breaks up the structure of fire size-up and response according to job role. For instance, he states the engine officer (in Australia, referred to as the pump operator) en route to the fireground should be considering the following questions:

Where do I go? What will be my probable position? Where will my water be? What is burning? Where is it burning? What size hose will ensure penetration on an aggressive interior attack? How many lengths of hose? (Brennan, 2002, p.162).

Brennan considers these questions to be a part of sizing-up the fire and gaining a situational awareness; bear in mind that the firefighter has not yet arrived on the fireground. In other words, he is expecting all firefighters to be thinking ahead, imagining what they will come across and anticipating their possible actions. Each Inspector I interviewed in some way also described going through this forecasting process while en route.

Another Fire Chief, this time from Los Angeles, reiterates the concept of size-up beginning while en route to the fireground. In relation to a firefighter fatality he writes “Not enough information was provided to establish the scope for all units to see from an initial radio report” (M. Smith, 2002, p.16). The idea that firefighters should “see” from a radio report issued before arrival aligns with Brennan’s expectation that firefighters en route will be asking questions in order to help formulate an image of the fireground and their initial response. This means that when alighting from the appliance they are not taking up valuable seconds asking “What do we do now?” but rather they head straight to work. These radio reports, says Smith, “must paint a picture” for those travelling towards the scene (p.16).
Foster (2006) uses the terrorist attack on the World Trade Centre to demonstrate the role of experience in developing our own Situational Awareness. When the first plane struck, he asks, “What did you think?” According to Foster, most people were wondering what human error caused the crash. By the time the second aircraft appeared, “We knew we were under attack…The additional information of the second aircraft altered our perception of the first crash” (Foster, 2006).

Teaching a firefighter to be aggressive in attacking the fire can be accepted only for the lesson being told. Until the firefighter feels the intensity of the fire and learns firsthand that a little heat must be endured, he cannot fully appreciate the information being relayed (Sandleben, 2002, p.110).

This quotation from Otto Sandleben, an experienced firefighter trainer, besides being gender biased, demonstrates the practitioner’s belief that hands-on experience cannot be replaced in the effective development of Situational Awareness.

According to Foster (2006) a community’s “political, social and cultural infrastructure” should form part of a firefighter’s Situational Awareness, which he says, has a predictive element:

Total situational awareness is gained through increasing comprehension of what we observe. It results in a greater ability to make short-term predictions about what is going to happen and therefore make decisions regarding our response. Comprehension is gained through education, training and experience (Foster, 2006).

Through analysing these viewpoints, it is apparent that practitioners are using the terms size-up and Situational Awareness rather loosely; that they expect size-up to start before the fireground is reached; that both size-up and Situational Awareness are concerned with making predictive decisions; and that “total Situational Awareness” is possible.
Moving on from size-up and Situational Awareness, it is important to recognise that for Incident Controllers an emergency situation is a part of their predictable routine. What indicates an incident as routine? Smith (2002), a Chief of the District of Columbia Fire Department, in his article “Two words: ‘Routine’ and ‘size-up’” writes in relation to the high number of firefighter deaths in the USA and the paradox of “routine” in emergency response: “What magnitude must it be to be considered dangerous to firefighters?” (p.16). This is quite a different question to the NSW (and Australia in general) perspective, where, after accounting for all life, the focus is on crew safety rather than the magnitude of the fire. This in some ways reflects the differing influences of the insurance industries within the USA and Australia. In the USA firefighters must demonstrate that they have performed every possible action to prevent fire-spread and save the structure on fire, in order for insurance to be liable. In Australia, with more stringently enforced OH&S guidelines, firefighter safety takes precedence over property protection, resulting in markedly fewer firefighter deaths (Burton, 2007).

The US publication on fireground support operations (International Fire Service Training Association, 2002, p.7) defines ‘routine’ as “Fires that appear to be relatively innocuous and easy to control.” The converse would be “disaster”, usually defined as an incident requiring assistance and resources from agencies outside the council or municipal area, and involving non-routine tasks (Auf der Heide, 1989, p.63 & 115-118).

Conscious distinctions in the use of size-up and Situational Awareness were more apparent in fire instruction manuals and academic writing and research, than in the semi-formal writing of practitioners. In the manual published by the International Fire Service Training Association, the first chapter is titled “Size-up” and directs readers to consider, among other things, fire behaviour and building construction (International Fire Service Training Association, 2002). Similar to the preceding magazine and journal articles, this chapter begins with an account of firefighter deaths directly attributable to poor size-up.
Rather than simply write about it, I have included Figure 1.1: Training manual image, which is extracted from the International Fire Service Training Association textbook (2002, p.10) and provided to give the reader some sense of Situational Awareness in relation to toxic black smoke and firefighter working conditions.

![Figure 1.1: Training manual image](International Fire Service Training Association, 2002, p.10)

The International Fire Service Training Association (2002, p.4) define size-up as “the continual and ongoing assessment of an emergency situation from initial alarm to incident termination.” This textbook passage concurs with practitioner reports that size-up and Situational Awareness starts from the moment the fire alarm sounds at the fire station.

Size-up happens in split seconds, “This is normally a quick mental process taking in all factors of the environment, predicting how they think the situation will play out allowing them to determine strategies based on information gained” (Clancy, 2005, p.45). Clancy adds that another word being used lately is ‘appreciations’, which he defines as a “sequential set of steps: aim, factors, courses open, plan” (p.45). Multimodal Decision Making challenges the understanding that the decision making process is a stop-start linear sequence.

The following incident, Fire in a Panel Beating Shop, is provided as a means of introduction to Multimodal Decision Making.
Fire in a Panel Beating Shop

This incident took place while the participant held the rank of Station Officer. Having attended one fire in a panel beating shop earlier in the day, in which his focus was to prevent an oxyacetylene cylinder from getting too hot and exploding, he is again the first arriving officer. Panel beating shops typically contain many flammable substances, such as decanted petrol, thinners and paint, as well as cylinders of oxyacetylene gas which is used in the welding process; oxyacetylene gas is highly explosive and extremely unstable. In the following incident all the workers had been evacuated when the participant entered the shop with his partner and a fire hose:

It wasn’t that big a fire, but it was right down the back of the panel beatering store, probably maybe 30 or 40 metres in. So we were inside and we were starting to put the fire out. Anyway, there was this almighty BANG from about 20 metres. Big bang, big fire ball, everything starts to rock and carry on. And I turned and looked at it and thought “Oh, that’s not acetylene, that’s LPG” (Liquid Petroleum Gas) and just kept on doing what I was doing. Didn’t move. And I turned around, and the other bloke’s bolted…He got sort of three quarters of the way out and realised I wasn’t behind him and thought I’d got hurt, so he turned around and came back in to try and find me, ’cause it was all pitch black with smoke and he sort of said “We’ve got to get out, the acetylene’s blowing up!” And I said “No, it’s LPG” and he went “ok” and so we stayed.

Now I really don’t know why I thought that it was LPG other than I knew that it was…And I don’t know why I knew that it was LPG other than the fact that I’ve seen it and it was in my subconscious what LPG must look like as opposed to what acetylene bangs look like…So without thinking I made a decision as to what it was and I didn’t perceive there to be a particular danger in that…But I can only put that down to the fact that I had seen it go ‘bang’ and whilst I didn’t register consciously that ‘that bang is LPG’ I just kind of knew that it was, and I don’t know why, but
all I can say is that intuitively, whether it was the way the flames looked or whether it was the percussion I got from it, I don’t know.

In this incident the participant attempts to understand how he knew that the explosion was not acetylene, but LPG. He tries a number of avenues, such as pattern matching – he’s seen both explosions before, in training and on the fireground. He tries the visual dimension – perhaps it was the way the flames looked? Perhaps it was the sound – the percussion of the explosion? Throughout his musing he mentions the involuntary dimension – “without thinking”, “I didn’t register consciously”, and “intuitively”. He concludes with “I don’t know”. In trying to analyse his decision to stay after the explosion he has taken a linear approach, looking at each somatic response, trying to pick up on one perception in particular, but is unable to decide between them. Multimodal Decision Making understands his somatic awareness to be simultaneous, holistic and inseparable, as he in fact demonstrates by his inability to separate out one particular cause for his unwavering conviction that it was safe to stay.

Multimodal Decision Making recognises that placing pieces of information in parallel (such as hearing the explosion and seeing the colour of the flame) creates an organisational structure that enhances the apprehension of rhythms and relationships, similar to the somatic awareness of an artist, making creative decisions around balance, colour and texture.

In the practice of an artist, spatial awareness may take the form of encompassing multiple images with one sweeping glance, or a concerted ‘look’; there is a sorting and comparison between patterns, objects and movement, some of which will appear in the image under construction and some which will not. This capacity to compare and sort elements of images in parallel, resulting in a selection and an understanding of contrast, I argue is comparable to the process of sizing-up for an Incident Controller. In size-up not only are visual pieces of information placed side by side and meanings ascertained, but conflicting verbal reports are also visualised and reviewed in instants of a second.
As the data analysis chapters will demonstrate, I understand heightened Situational Awareness and consequent decision making to be a visible indication of contribution and inclusion within the cultural practices of firefighting.

**Conclusion**

As Tallyrand once remarked, *if we go on explaining, we will stop understanding altogether* (Gilbert Rose, 1980, p. 213).

Naturalistic Decision Making, and the contingent method of Cognitive Task Analysis, opens the way to a semiotic method, but is restricted because researchers are enmeshed by the demands of the scientific framework. As such, Naturalistic Decision Making was originally an innovative paradigm which has, to some extent, been normalised and absorbed into mainstream decision theory.

There is a crisis in Naturalistic Decision Making theory where an incipient move in the right direction continues to be crushed by behaviouralist researchers. I am engaging with decision making in a way which sets it within a wider framework, thus generating Multimodal Decision Making, which is a creative response to ambiguous and rapidly changing conditions. Through Multimodal Decision Making, Incident Controllers are provided with the opportunity to reframe what they are told and make connections with other things they know and which are denied recognition by the dominant model.
Chapter 2: The importance of art

We have...concretized our view of what it means to know. We prefer our knowledge solid and like our data hard. It makes for a firm foundation, a secure place on which to stand. Knowledge as a process, a temporary state, is scary to many (Eisner, 1997, p.9).

This chapter is intended to give the reader a Situational Awareness of the terrain to be faced in the data analysis chapters of 4, 5, 6 and 7. It stands at the confluence of the seemingly disparate, but in fact, multimodally related disciplines of art and firefighting. I draw upon the way art and artistic practice is managed within the social sciences, art education and arts-based research, to create a multimodal conceptual framework which recognises the importance of art in constructing an aesthetic perspective.

In a study of this nature, the theoretical stance taken towards art needs to encompass art and aesthetics as both a practice and an experience. An understanding of art as simply an object or an image or even an event, with disregard for the processes entailed in its making and reception, is not productive. Researching fireground decision making from a social science perspective involves understanding images as social practice rather than simply objects for textual analysis. This is discussed from a visual culture perspective (Sturken & Cartwright, 2001) and a social semiotic viewpoint (Hodge & Kress, 1988). I also draw on the work of John Dewey in his educational capacity, who understood Art as experience (1934). In the present day, Richard Shusterman has taken up the work of Dewey and developed a pragmatic aesthetic which incorporates an understanding of bodily awareness which he terms ‘somaesthetics’ (Shusterman, 2000, 2008). Somaesthetics provides a tangible method for understanding the aesthetic and somatic dimensions of decision making on the fireground. I also draw on the art educator, Elliot Eisner, who writes:
Any practice whatsoever can have aesthetic or artistic qualities. This includes three-year-olds building castles in the sand as well as surgeons engaged in a life-sustaining operation (Eisner, 2002, p.xiv).

Eisner and Powell’s definition of aesthetic experience is adopted in this thesis, that is: “forms of experience that possess an emotional quality that is both feeling and satisfying” (Eisner & Powell, 2002, p.135). They highlight their understanding of aesthetic by explaining the antonym anaesthetic, meaning ‘without feeling’. Finally, I draw on arts-based research because it highlights the artist as researcher and is concerned with the processes of creation.

I begin the discussion with an examination of the false dichotomy between art and science. Although perhaps declining, the repercussions of the positivist influence are still being felt with the current broad separation of philosophy and art, from science and technology. I propose that rather than attempting ‘reunification’, we need to recognise these arenas as falsely divided and indivisible to begin with.

**The unreal art-science divide**

*It is crucial to realise that the work of art draws on infinitely more than material existence. In this context a psychological approach is inadequate. More precisely, the psychology of art only sketches in an outline which, since by itself it is incomplete, must be given real form by being set within a much larger context (Durvignaud, 1967, p.19).*

Durvignaud was a French academic writing in the newly emerging field of the sociology of art. Today this field has evolved, to some extent, into Visual Culture. Durvignaud’s understanding that the psychological framework could not contain the wider visual picture and his appeal to move beyond the “material existence” of the visual image resonates strongly with the multimodal conceptual framework presented within this thesis. Durvignaud was opposed to dividing up the artistic experience into little pieces and recombining them, saying this process “loses the living unity” and “distorts the work of art” (1967, p.150). This statement echoes with my aim to examine the
data holistically, thus mirroring my intuitive hunch that this is the way Incident Controllers in time-critical, information sparse, emergency incidents are operating.

Art criticism has tended to focus on the psychology of the creative process more than the actual achievement of the image itself and judgements made about its ‘success’. As an immediate illustration of this, I feel the need to put the word ‘success’ in inverted commas because it is a concept so foreign to us in this postmodern period; that is, that judgement can be passed on the quality of technical excellence, successful conveyance of message, and overall pleasingness of the created image.

There are numerous texts devoted to sensory perception, emotion and motivation, somatic response and non-verbal communication, researched and reported from a cognitive science perspective. Although in this thesis I deliberately avoid the psychology of art framework, I do have a number of these texts on my own shelves, especially Rudolph Arnheim (1967, 1969, 1974, 1986, 1996), whose research and writing straddles psychology and art in an engaging and productive fashion. Texts such as these on the psychology of art make valuable and important contributions, but in the main they are counterproductive to the aesthetic and somatic perspective I am exploring. This is because they are based within a positivist framework where there is an emphasis on cause and effect, repeatable experiments, and the gathering of quantitative data. To avoid, as much as possible, losing or distorting the ineffable and the intuitive essence of Incident Controllers on the fireground, I have purposefully adopted a multimodal artistic framework with the understanding that this will help capture the invisible and almost indescribable. What I seek to document is something so obvious that it is elusive, we see right past it, yet without it we cannot function. Eisner refers to this as “Those forms of understanding that resist dissection and measurement” (1985, p.71).

As Stafford (2008) suggests, the separation of ‘art’ and ‘science’ was a false one in the first place:
I want to propose a counterexample to the usual art and science dialectic, one that is not resolved by the absorption of the second term by the first (Stafford, 2008, p.31).

That Stafford opens a chapter in a book published in 2008 with a statement like this indicates to me that I am not out of step with current trends. The current separation of understanding between art and science is a reality still working towards a resolution. Another arts-based researcher to recognise this is Sullivan (2005):

Artists cast their minds to issues, ideas, and experiences that reveal imaginative insights, yet the process resists capture by the freeze-frame of clinical analysis. Art practice cannot be reduced to standardized dichotomies of cause and effect, input and outcome, or process and product (Sullivan, 2005, p.146).

Despite the postmodern atmosphere we live in today, in contemporary Western society there remains the legacy of modernism in the idea that art is a liberating and free activity, while technology is “mechanical, constraining and subject to rote and rule” (Wartofsky, 1979, p.338). Within this construct, art is supposed to be original and imaginative, while technology is thought of as an acquired skill learned through training:

Technology…is not the alternative, or conflicting model to that of art, but is a part of what a viable model of art contains; conversely, the aesthetic, the explorative, the creative is what a viable model of technology contains. Far from conflicting, these are complimentary models of a unified mode of human activity (Wartofsky, 1979, p.355).

For Wartofsky, aesthetics forms a valuable and productive link, drawing together two elements of a field which have been artificially separated by modernist-positivist theory. Today there is a ground swell towards an holistic approach being experienced in various disciplines. For instance, Taylor (2002) with regard to physical therapy, argues for a new
philosophical foundation and an integrative approach to physical therapy encompassing the physical, emotional and intellectual body. Another investigation, conducted by Eisner and Powell (Eisner & Powell, 2002), explored the “artistry in the practice of research in the social sciences”. In this study, participants (all postgraduate research science students) were asked about their ‘ah ha’ moments of discovery and insight. Connections were then drawn between scientific moments of insight and aesthetic forms of awareness and artistic modes of thought.

By far the most sizable body of comparable research is located within nursing where “personal knowing” and “clinical judgment” are recognised as “important in enabling nurses to respond to new situations creatively, using imagination and abstract thinking” (P. Rose & Parker, 1994, p.1007). In nursing, the art-science debate has been continuing for at least the last decade (Baumberger-Henry, 2003; Darbyshire, 1999; Delanty, 1997; LeVasseur, 1999):

Authors have used the phrase ‘the art of nursing’ to refer to those elusive things that cannot be accounted for by science and in this way a schism has developed between the notions of artful and scientific nursing (LeVasseur, 1999).

LeVasseur demonstrates the current dilemma in that logical, rational decisions are usually considered objective, while empathetic and intuitive decisions are frequently understood as subjective and consequently untrustworthy, as they are usually unverifiable and perceived to be based on something other than ‘fact’. This perspective is unhelpful, so rather than highlight a divide which is at present not well recognised within fire services, my thesis aims to make a valuable and strong contribution through drawing connections enabling the art of decision making on the fireground to remain viewed as a whole. The rational, technological perspective alone cannot hope to adequately describe and explain decision making on the fireground, which needs to be viewed holistically from the perspective that it is an integration of art and science with links which cannot be dissected into parts and separated out, tested and
reassembled. I argue that the somatic response and aesthetic awareness of Incident Controllers on the fireground is dissipated and distorted when analysed by a process which relies on coding and cutting the data and then reconstituting it. I argue that the ‘ineffable’ largely evaporates during this process. I therefore employ elements of various visual research methods because I consider them to be more conducive to capturing the essence of the whole:

Although virtually all visual images are multimodal in this way – they always make sense in relation to other things, including written texts and very often other images – they are not reducible to the meanings carried by those things (Gillian Rose, 2007, p.11).

Multimodal Decision Making moves the understanding of firefighting and decision making from a science-based practice and transcends it to a higher dimension. Without the concept of Multimodal Decision Making, decision making on the fireground faces the same dangers as nursing:

A rampant and unchecked technical rationality poses a threat to nursing or any practice discipline because it can quickly become a totalizing and enframing orthodoxy, a template to be squeezed down on top of all thought and practice until uniformity is achieved (Darbyshire, 1999, p.131).

**Multimodal research in the social sciences**

Until recently, Art History departments influenced how art specialists trained and researched. Cultural Studies in the 1990s realised the inadequacy of the Art History approach, but basically backed out of a confrontation, and there was very little exchange between Art History and Cultural Studies departments in contemporary Western universities during this period. When there was, it was heated. In relation to a survey on Visual Culture published in the art journal October in 1996, Thomas Crowe from Yale University wrote:
To surrender the discipline [art history] to a misguidedly popularist impulse would universally be regarded as the abrogation of a fundamental responsibility (1996, p.35).

Consequently, Visual Culture emerged as a new academic field and there are now two electronic journals, more than a dozen readers and a rapidly expanding number of books and tertiary education programs.

Internal debates within the field of Visual Culture revolve around the broadness of areas of study, and questions over whether it is a continuum of Art History or simply not on the same plane at all (Dikovitskaya, 2005). There are also debates over the definitions of ‘culture’ and ‘visual’ (Barnard, 1998, 2001). In my study I have leaned towards Mirzoeff’s (1999) understanding of ‘visual’, which he says is by no means the only somatic response intended by the term.

As a discipline, Visual Culture may be in danger of becoming too broad – that is, what exactly is the object of study? And how would it be researched? These questions are issues because Visual Culture:

- involves an attempt to theorise the visual as a form of communication that applies broadly across disciplines and social circumstances rather than just a specialised form of expression and aesthetic good taste (Duncum, 2002, p.16).

Visual Culture research is multimodal in its approach to how meaning is made out of the aural, visual and textual world (Sturken & Cartwright, 2001). In this way it is interdisciplinary, incorporating a postmodern understanding of art, and tending to focus on the individual and the community and where they fit together, rather than the image and its meaning. Transposing this concept to the fireground, the Incident Controller deals with images holistically, viewing them as a contextualised social phenomenon and acknowledging the various potentials for resolution.
Mirzoeff (1999) established the need for Visual Culture, writing that:

The gap between the wealth of visual experience in post modern culture and the ability to analyse that observation marks both the opportunity and the need for visual culture as a field of study (p.3).

There is no doubt that the ever-widening visuality of the modern Information Technology landscape has played a major part in bringing visual understandings to the fore. In a broad sense, Visual Culture is a reaction to the ‘snootiness’ of traditional studies in aesthetics, which concentrated on the past and a ‘cannon’ of artwork. In contrast, Visual Culture confronts the present visual world, embracing a diverse understanding of what an ‘image’ or ‘artwork’ is through its incorporation of cultural influences.

Although visual images have become increasingly dominant in our culture, higher learning remains a text and symbol based curriculum. Visual Culture poses a challenge to the emphasis on written text in intellectual debate, especially in contemporary West societies where there is a strong focus on the spoken and written word, while visual representations are often understood as second-rate illustrations of ideas (Jenks, 1995; Mirzoeff, 1998, 1999).

A problem faced by researchers in Visual Culture involves portraying the visual in the written form and the converse, translating the textual into a diagrammatic form (Doloughan, 2002). This does not mean that the ‘visual’ in Visual Culture excludes text; many images are integrated with words.

In her thesis, Visual Culture: The study of the visual after the cultural turn, Dikovitskaya defines Visual Culture as:

a new field for the study of the cultural construction of the visual in arts, media, and everyday life. It is a research area and a curricular initiative through which meaning is made in a cultural context (2005, p.1).
Dikovitskaya does not see Visual Culture as replacing Art History. Rather, she views Visual Culture as an expansion of the study of images, which adds a new dimension to the traditional history of art by looking at images that have not previously been considered ‘art’.

The terrain covered by Visual Culture, according to Sturken and Cartwright (2001), authors of the key text Practices of Looking, “encompasses many media forms ranging from fine art to popular film and television to advertising to visual data in fields such as the sciences, law and medicine” (p.2). In the same vein, Gillian Rose (2007), author of Visual Methodologies, also writes about research in the social sciences and the humanities looking through the Visual Culture lens. For Rose, Visual Culture means any form of visual production in relation to political and cultural contexts. Her work is in some respects limited because it begins with possible methods rather than issues to be explored, making it difficult to apply to cross-disciplinary studies. What she does well, however, is to helpfully position Visual Culture within current debates in the social sciences (Gillian Rose, 2001, 2007). Similarly, van Leeuwen and Jewitt (2001) focus on the way “social and cultural practices are used to convey meaning using visual information and how meaning is made from images.” Another prominent author in terms of visual methodologies is Sarah Pink (2001; Pink, Kurti, & Alfonso, 2004). Pink writes about visual ethnography with a focus on the researcher’s involvement in the visual work.

These writers and researchers are positioned within the social sciences or humanities and what they ‘miss’ is the working artist. That is, the work of Visual Culture authors may be easily taken up by researchers within fields in the social sciences and media studies, but working artists researching through the visual arts are rarely discussed.

So where have these texts led so far? What methods can I use for interpreting the fireground, which includes the Incident Controllers and the fire? Gillian Rose (2007, p.33) encourages researchers to regard the breadth of visual materials open to them, but there is no mention of a live practice of any sort. Her list of possible sites for research reads: “contemporary exhibitions,
galleries, magazines, cinemas, TV shows, videos and web pages; historical archives and museums.” I suggest this kind of inventory needs to be expanded to include explorations into live practice, that is, into images which cannot be rewound, recorded or preserved in their original integrity. From the point of this research, Rose’s inventory needs to include images which are fast moving, life-changing, and fraught with serious implications for life and property.

In this thesis I harness the methods and ideas of Visual Culture in order to explore ‘real’ life situations which do not fit the typical category of ‘art’. This is because for Incident Controllers on the fireground, responding to the image is not an option that can be embraced or simply ignored. In a basic sense they have no choice in that they are mandated to respond. They are commissioned, ordered, trained and willing to respond. It is their job, their work, their mission. Incident Controllers must read the image immediately and decide on the spot how to respond. What are they using to do this? How are they approaching the fire images before them?

Many researchers employing Visual Culture are investigating power relations and the effects of visual images (Gillian Rose, 2007, p.xiii) and they examine how images are subconsciously or consciously understood as a reflection of a culture or political discourse. I am not investigating how the image places the Incident Controller in terms of political discourse and power relations, but rather how their aesthetically informed reading of the image is a means and source for their own direct action. The image is not something done to them, but something they work with and mould and change. This is analogous to Stuart Hall’s perspective of culture, that it is not about things so much as processes and “a set of practices” (Hall, 1997, p.2).

Writing and research within Visual Culture tends to relate to artists in terms of choice in doing the things they do – impacted by culture, influenced by politics, hampered by lack of materials and so on, but it is their choice to make, to create, to reshape, to invent, to reinvent. With Incident Controllers on the fireground, although the means for working are provided in terms of training and equipment, I argue that the opportunity to work is randomly generated by
other people’s misfortune. It is, to a certain extent, unpredictable, and in this sense there is no control over when the image starts, only when it is completed.

Despite these incompatibilities and drawbacks, which are probably to be expected in an emerging discipline struggling to assert itself, I find moving from the positivist-scientific framework towards the more fluid interpretive structure of Visual Culture helpful for understanding fireground decision making because it centres on an aesthetic and somatic response to the visual, through highlighting the visual as “a place where meanings are created and contested” (Mirzoeff, 1999, p.6).

**Social semiotics**

Social semiotics is concerned with the way images make meanings:

> At its narrowest, it is merely a codification of the symbols offered us by our culture, and the formal description of how those symbols are usually combined, be they words, gestures, graphics, food or clothes. At its most general and most powerful, it is the analysis of how we deploy our cultural resources for making sense of the world: language, depiction, action (Lemke, 1994, p.76).

As a methodology, social semiotics is ideally suited to the investigation of decision making on the fireground as it does not lean towards quantifying, especially when examining a text; this means that frequency of mention does not equate with importance. Semiotics is more concerned with relationships within a structural whole and the worth that readers give to the signs within a text:

> We now see social structures and processes, messages and meanings as the proper standpoint from which to attempt the analysis of meaning systems (Hodge & Kress, 1988, p.vii).
Rather than using the visual and somatic as a means of gathering and interpreting data only, I am moving towards understanding ‘the arts’ in a broader sense, more as a set of practices. That is, a shared experience of mutual understanding and being able to participate indicates inclusion within the community. Put another way, it means being so integrated within the environment of the fireground that being able to ‘see’ means more than a visual understanding; it carries the connotation of embodiment, a relationship with the characteristics of the fireground. It means an aesthetic experience. By aesthetic experience I mean the way an activity of perception is organised and informed to unspoken but shared principles for recognising fire features and characteristics. The ability to share these principles helps with the building of identity. I propose that Incident Controllers have been through a mostly unrecognised process of somatic and visual training in which they have been enculturated with a distinct way of seeing and that it is this way of seeing that marks their inclusion and participation in their community of practice.

For semioticians, the goal is to connect the visual and the verbal through building a polyvalent web of connections as opposed to decoding or translating the visual into the verbal. The idea of connecting and of bringing together meanings and images is integral to Multimodal Decision Making. Kress and van Leeuwen (2001) are prophetic in their prediction that eventually we will have a “visual meta-language which we can see traces of now in pastiche, visual irony and parody” (p.113). This is echoed by Leavy (2009):

It is fair to say that arts-based practices are moving from interdisciplinary to transdisciplinary…We may need to develop a new kind of practice-based language to explain and facilitate these new transdisciplinary procedures (p.257).

The same need is being felt within the emergency services. While researching the emergency response to a volcanic eruption in New Zealand, Paton, Johnston and Houghton (1998) identified the necessity for a shared terminology when working in an interagency situation. Their research participants reported encountering problems with the “inflexibility of
information provision” (p.8). In addition, Paton, Johnston & Houghton reported that “Prescriptive decision making, likely to typify routine decision making, is inappropriate for crisis circumstances” (p.9).

In my research of Incident Controllers I draw upon a wide set of contextual factors that influence visual knowing and construct a framework which recognises an aesthetic whole, incorporating multimodal understandings of images and events. This is not a thesis exploring dichotomies between science and art and aligning these up to be ‘equivalent’. Rather, it is a multimodal embracing of both realms (although extrapolating on the artistic realm), suggesting they were never separate realms of investigation, but one and the same site – the site of practice.

Science systems acknowledge pattern recognition. Multimodal Decision Making is much more complex in that it recognises different patterns in different semiotic modes, for example, voice is one semiotic mode. Multimodal Decision Making is multisemiotic – that is, in many ways, it is beyond words:

> The semiotic approach provides an analysis of the artwork’s specificity based not on some questionable inherent qualities but on its performance, distinct from any other texts, in a social setting (Mirzoeff, 1999, p.26).

In the data analysis chapters I place a number of images into the context of a fireground, creating a ‘social setting’ in which aesthetic and somatic parallels and trajectories can be explored. The number of recent texts focusing on methodologies for incorporating visual research into the social sciences illustrates that the visual has been neglected in the mainstream social sciences until fairly recently (for example: Kress & van Leeuwen, 1990; Pink et al., 2004; Gillian Rose, 2007; Sturken & Cartwright, 2001; van Leeuwen & Jewitt, 2001).

Common to Pink, Rose, Sturken and Cartwright, and van Leeuwen and Jewitt, is a concentration on critiquing the image, rather than the actual creation of it. Generally, writers of Visual Culture have “very little to say about the creation
of new knowledge using visual means that might be undertaken within a
research perspective” (Sullivan, 2005, p.xv).

Although all Visual Culture writers would not agree with the following
statement from Mirzoeff (1999), it does encapsulate why Visual Culture alone
is not enough to work as a conceptual basis for my research, in that I am
focusing on the producer, the firefighter:

Visual Culture is a tactic with which to study the genealogy, definition
and functions of postmodern everyday life from the point of view of the
consumer, rather than the producer (Mirzoeff, 1999, p.3).

**Multimodal research in art education**

Unlike nursing, which includes both artistic and scientific traditions,
firefighting has predominantly been defined in terms of technical and
pragmatic procedures, policies and guidelines. There is very little written on
firefighting with respect to aesthetic awareness and its importance in the
decision making process. One exception is Lloyd-Zantiotis (2004) who
provides original insight into the daily functioning of a group of firefighters.
Her research focuses on information literacy in the workplace and
demonstrates that the firefighter’s whole body is engaged in the learning
process, which entails far more than simply reading and writing.

By focusing on firefighting, and in particular decision making on the
fireground, utilising the aesthetic approach of John Dewey (1934) for whom
‘Art is experience’ and the related pragmatic aesthetics of Richard Shusterman
(1992), I explore the connections between aesthetic experience and decision
making on the fireground. I draw on a number of art education theorists who
have helped shape and influence the direction of this study: Dewey (1934),
is Eisner, who writes on the importance of the curriculum in art and aesthetics
education. Arts-based research is a term loosely used by these researchers, who
“take advantage of the way the arts offer unique insight into the human
knowing and understanding” (Sullivan, 2005, p.xvii). Arts-based research is explored more fully in the next section.

Aesthetic judgement is a focus for researchers in both art education and arts-based practice. The moment of sensing the rightness of fit, of seeing the solution which was always there but never quite in focus, is a function of aesthetic judgement. Aesthetic judgement is the place where disciplinary boundaries melt and new connections and networks electrify in an instantaneous moment of insight, which may or may not have been anticipated or brooded over for microseconds, hours, days or perhaps even a lifetime. It is the split second when everything comes together into a cohesive point of understanding. For scientists and aestheticians alike, this is the ‘ah ha’ moment (Eisner & Powell, 2002; Wechsler, 1978) when the seemingly disparate threads of a problem drop into an arrangement which solves a piece of the puzzle.

Traditionally the study of aesthetics has been about the appreciation of beauty, or as the Oxford Dictionary puts it “the principles of good taste”. Its application has been to culture and the arts. Traversing all epochs and styles, aesthetics is a way of knowing.

Today there is an increasing sense of inquiry around decision making and knowledge in terms of somatic and aesthetic response. Eisner and Powell write:

It may be that somatic forms of knowledge – the use of the physical body as a source of information – play an important role in enabling scientists to make judgments about alternative courses of action or directions to pursue. It might be that qualitative cues are difficult to articulate, indeed cues that may themselves be ineffable, are critical for doing productive scientific work (Eisner & Powell, 2002, p.134).

That is, sometimes the physical body is used as a source of information, and at times it is difficult to express in words how this happens. For Dewey, thinking was problem solving, but thinking is not necessarily a visible activity. What is
visible is the product of the thought, “the artistic expression of their problems” (Feldman, 1970, p.34, original italics). Karl Weick, who writes about sensemaking in organisations, echoes this outlook by claiming “We think by acting” (Weick, 1988, 1995).

In relation to thinking and acting, Dewey, under the influence of Darwin, understood human beings as biological entities, situated within an environment. Because the environment is not always conducive to pleasant events there is a desire to both control and adjust to it. In order to do this, Dewey realised there needed to be intelligence and that this intelligence “was based, in a large measure, upon the experience and past resolutions to problems the individual had achieved” and so the part played by experience in education is of supreme importance to Dewey (Eisner & Ecker, 1966, p.8). The word ‘experience’ appears to have caused Dewey problems though, as it does for Naturalistic Decision researchers who have taken it a step further and concentrated their research on ‘experts’. The difficulty lies in establishing working definitions. In fact, Dewey said that if he was to rewrite his book Art as experience he would retitle it Art as culture:

I would abandon the term ‘experience’ because of my growing realisation that the historical obstacles which prevented understanding of my use of ‘experience’ are, for all practical purposes, insurmountable (Dewey, cited in Jackson,1998, p.2).

These days ‘experience’ is commonly applied as it relates to a person’s psychological state, but according to Dewey experience is not the sole domain of the individual, and it is not purely a psychological concept. Experience for Dewey incorporates objects and events which are so interfused that ordinarily we do not distinguish between ourselves, objects, and what is happening. When we do, it is because of problems that arise and we need to think about what has happened. Then we distinguish or isolate various elements as we deal with what is happening as a whole. In addition, time may change our understanding of experience, as “An experience is a product, one might say a by-product, of
continuous and cumulative interaction of the organic self and the world” (Dewey, 1934, p.224).

Further to this, Dewey understood that experience could only be of value, indeed could only be gained, if the problems worked on were real and meaningful to the person involved. Richard Shusterman has extended Dewey’s understanding of experience, incorporating his professional experience as a Feldenkrais practitioner and academic philosopher (2008, p.7) through the development of pragmatic aesthetics (1992) and later extending his ideas into somaesthetics (2008). He defines somaesthetics as:

Somaesthetics forms a useful conceptual basis for this thesis because it acknowledges learning through doing or performing, and that simply reading, watching or hearing about something is not enough to properly develop the skill; one needs to practice it ‘live’.

Dewey does not distinguish between an art-generated aesthetic experience and a general, everyday life, unexpected, aesthetic experience, such as witnessing a leaf falling to the ground in the most beautiful way. “All experience can be treated in an artful manner, not just those portions that are confined to specific spheres of life” (Jackson, 1998, p.123).

In the same vein, Merleau-Ponty (1999) began by exploring perception and how we as humans perceive the world. He recognised the subjective knowledge of an individual’s embodied experience as a mediator for understanding. In so doing Merleau-Ponty challenges contemporary Western society’s dependence upon science as the ultimate truth. Carey (2000), reflecting on Merleau-Ponty’s philosophy of embodiment, writes “Before the rational mind can dissect the world into concepts and definitions, the
capabilities of the body are already engaged with the world in the activity of perception” (2000, p.4).

The central artery connecting this body of writers is the significance of the soma, the body, and the aesthetic appreciation for the experience itself, rather than the singular focus on a work of art.

There is a domain of thinking where distinctions between conceptions in art and science become meaningless. For here is manifest the efficacy of visual thinking, and a criterion for selection between alternatives that resists reduction to logic and is best referred to as aesthetics (Miller, 1978, p.73).

Miller (1978) writes of the great philosopher-scientists of the twentieth-century, Bohr, Einstein and Poincare:

For in their research the boundaries between disciplines are often dissolved and they proceed neither deductively through logic nor inductively through the exclusive use of empirical data, but by visual thinking and aesthetics (Miller, 1978, p.97).

Shusterman recognises “The stubbornly dominant dualism of our culture” in which acknowledging feelings is not considered entirely appropriate in places such as an operating table, or in my case, a fireground (Shusterman, 2008, p.3). Generally, the Greek perspective, which has formed the basis of contemporary Western thought, is that through gaining control and subjugating the body with its physical desires, needs and so on, the power of the mind is enhanced:

The body in fact exerts a very powerful (though generally negative) presence in philosophy’s persistent privileging of mind and spirit. Its dominantly negative image – as a prison, distraction, source of error and corruption – is both reflected and reinforced by the idealistic bias and disregard for somatic cultivation that Western philosophers generally display (Shusterman, 2008, p.ix).
Several Eastern philosophies, for example Buddhism, reflect the same sense of subjugation of the body. The term ‘body’ has such negative connotations, according to Shusterman, that he tries to avoid it by using the term ‘soma’ which “concerns the living, feeling, sentient, purposive body rather than a mere physical corpus of flesh and bones” (Shusterman, 2008, p.xii).

If art and aesthetics are understood as experience (Dewey, 1934), a whole new realm of investigative possibilities unfolds. Divisions between what constitutes high art as opposed to commercial art, and craftwork as opposed to gimmick, are disregarded as a pragmatic perspective on aesthetics comes to bear (Shusterman, 2000). Dewey, and subsequently Shusterman, hold the ‘dynamic aesthetic experience’ in a much higher position than the actual art object created. Their emphasis on experience means that it is not only what is produced that is important but “the dynamic and developing experiential activity through which they are created and perceived” (Shusterman, 2000, p.25).

With this privileging of aesthetic process over product, art is redefined as “a quality of experience” rather than a collection of objects or a substantive essence shared only by such objects; the aesthetic experience thus becomes the cornerstone of the philosophy of art (Shusterman, 2000, p.25).

The perspectives of art education outlined here fit neatly with the conceptual framework of Visual Culture, where the artistic processes of creation and participant reception are as important as the object or product itself. In the next section I examine arts-based practice, which focuses primarily on the artist and the site of production.
Multimodal research in arts-based practice

I consider arts-based practice as part of my conceptual framework because it enables me to discuss two separate issues which may otherwise become confused. One is the actual ‘performative doing’ of the practice of art or firefighting; and the other is the reflection that happens afterwards in the interview. The participating Inspectors related their incidents within the structure of an interview, and this formed a reflection after the event. But I am investigating what actually happens during the event. This meant that the participants generally employed a rational, logical and chronological approach to relating what happened in a time-pressured situation in which rational logic was not a major player. I am interested in capturing the multimodal and holistic essence of the scene in its entirety and arts-based research enables me to do this through its emphasis on the artist as both practitioner and researcher. Within art education it is the teacher and the pupils who are at the centre of the research. For the social sciences it is the researcher through whom the data is mediated. By placing the Incident Controller in the position of artist-practitioner I come closest to their firsthand view of the scene.

Visual art may serve as a vehicle for transmitting ideology while it can as effectively be used to challenge, dislodge, and transform outdated beliefs and stereotypes (Leavy, 2009, p.216).

I am, with this thesis, “challenging and dislodging” the “outdated belief” that a positivist based methodology is an effective method for investigating aesthetic and somatic awareness and intuitive experience. I am also recognising the congruency of skills necessary to conduct artistic practice and qualitative research. The multimodal theory I am developing therefore places the Incident Controller’s aesthetic and intuitive experience at the centre, enabling insights which come from images, both fireground and artistically constructed. Multimodal Decision Making is grounded in artistic forms of knowing and practices.
“Visual arts practice is a form of inquiry” that can “generate important creative and critical outcomes” (Sullivan, 2005, p.xvii). For me, however, it is the Incident Controller who is the ‘artist’ and it is my experience as an artist-practitioner which I bring to the interpretation of what is happening for the Incident Controller as a way of explaining their time-pressured decision making:

Explanation is an important goal of inquiry, yet there are aspects of human understanding that are beyond the scope of explanatory systems where insight is not the consequence of causal, inferential, or predictive means (Sullivan, 2005, p.xix).

From the perspective of arts-based research, as a practising artist I am both the ‘researcher and the researched’, a positioning that breaks apart existing boundaries. For Leavy, arts-based research actually crosses many borders and is not the sole domain of the artist practitioner:

Arts-based research practices are a set of methodological tools used by qualitative researchers across the disciplines during all phases of social research, including data collection, analysis, interpretation, and representation. These emerging tools adapt the tenets of the creative arts in order to address social research questions in holistic and engaged ways in which theory and practice are intertwined (Leavy, 2009, p.3).

Why employ arts-based research? Leavy (2009), who applies these concepts to social justice, expands on four reasons, summarised as:

- Arts-based practices can be employed as a means of creating critical awareness or raising consciousness
- Raising awareness leads to giving voice to subjugated perspectives
- Arts-based practices can also promote dialogue, which is critical to cultivating understanding
- Arts-based practice is predicated upon evoking meanings, not inducting them (Leavy, 2009, p.13-14, original italics).
The application of multimodal research

In this section I summarise the applicability of multimodal research in general to the decision making of Incident Controllers on the fireground. I propose that there is a certain timbre, or resonance, to the experience of engaging with the visual and aesthetic which is different in quality to engaging with a written text. As Incident Controllers are intimately engaged with the visual world in an aesthetic sense, it makes sense to adopt a framework which resonates strongly with their experience. This reverberation is aesthetic in both its quality and nature and involves the entire body.

My discussion of multimodal research is displayed diagrammatically in Figure 2.1.

<table>
<thead>
<tr>
<th>Visual culture</th>
<th>Social semiotics</th>
<th>Art Education</th>
<th>Arts-based practice &amp; research</th>
</tr>
</thead>
<tbody>
<tr>
<td>The human element</td>
<td>The researcher as the consumer of art</td>
<td>The producer &amp; the consumer, artist &amp; audience</td>
<td>Teacher &amp; the students</td>
</tr>
<tr>
<td>The terrain</td>
<td>The individual and the community and where they fit together</td>
<td>How images make meanings</td>
<td>The art classroom</td>
</tr>
<tr>
<td>Usefulness for investigating the Incident Controller on the fireground</td>
<td>The Incident Controller deals with images holistically, viewing them as a social phenomenon and acknowledging the various potentials for resolution.</td>
<td>Seeing is not believing, it means interpreting how meanings change and are changed in use (Gillian Rose, 2001, p.77)</td>
<td>Can adapt/adopt strategies from art education and apply to Incident Controller training</td>
</tr>
<tr>
<td>Goal</td>
<td>Decode or translate visual data into verbal data</td>
<td>Successful interpretation of the signs by the Incident Controller</td>
<td>Create and appreciate visual data, including the performing arts</td>
</tr>
</tbody>
</table>

Figure 2.1: Summary of methods as they apply to the research
Synthesising aspects of the sociology of art, art education and arts-based research into a workable framework, proved quite a challenge from the perspective that there is plenty to read about (Barrett, 2003; Duncum, 2002; Efland, 2004; Kindler, 2003), but not many writers are explicit in terms of how they undertook their research and the actual practicalities of it. As a result, I have synthesised my own understanding of Multimodal ‘Visual’ Research in relation to other research methodologies such as Phenomenology, Ethnography, and Grounded Theory, which is illustrated in Figure 2.2.
Figure 2.2: Multimodal ‘Visual’ Research in relation to other research methodologies

<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td><strong>What is the purpose of the research?</strong></td>
<td>To understand how images function in a broader cultural sphere and how looking practices inform our lives beyond our perception of images per se (Duncum, 2002).</td>
<td>To describe an experience from the participant’s points of view</td>
<td>To understand the relationship between behaviours and “culture”</td>
</tr>
<tr>
<td><strong>What is the nature of the research process?</strong></td>
<td>Studies images</td>
<td>Studies individuals</td>
<td>Studies sites</td>
</tr>
<tr>
<td></td>
<td>Focuses on how meaning is made out of the visual, aural and textual world (Sturken &amp; Cartwright, 2001, p. 3)</td>
<td>Focuses on lived experiences</td>
<td>Focuses on naturally occurring processes/change</td>
</tr>
<tr>
<td><strong>What are the methods of data collection?</strong></td>
<td>In-depth unstructured interviews</td>
<td>Participant observation</td>
<td>Structured interviews with “informants”</td>
</tr>
<tr>
<td></td>
<td>Purposeful sampling of 5–10 individuals</td>
<td>Artefact/document collections</td>
<td>Variable, multiple “units”</td>
</tr>
<tr>
<td><strong>What are the methods of data analysis?</strong></td>
<td>Multimodal and holistically oriented</td>
<td>Meaning oriented</td>
<td>Event oriented</td>
</tr>
<tr>
<td></td>
<td>Reflective–rich portrayal of participants’ views, including the author</td>
<td>Search for themes and patterns across participants</td>
<td>Structured indexing, coding</td>
</tr>
<tr>
<td></td>
<td>Comparisons</td>
<td>Open, tentative, intuitive</td>
<td>Constant comparative method</td>
</tr>
<tr>
<td></td>
<td>Social semiotics</td>
<td>Social semiotics</td>
<td>Social semiotics</td>
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<tr>
<td></td>
<td>Personal, synthetic interpretation</td>
<td>Personal, synthetic interpretation</td>
<td>Personal, synthetic interpretation</td>
</tr>
<tr>
<td></td>
<td>Follow the development and maturation of a problem or issue</td>
<td>Follow the development and maturation of a problem or issue</td>
<td>Follow the development and maturation of a problem or issue</td>
</tr>
<tr>
<td><strong>How are the findings communicated?</strong></td>
<td>Image construction</td>
<td>Thematic narratives</td>
<td>Holistic descriptions of everyday events</td>
</tr>
<tr>
<td></td>
<td>Holistic descriptions &amp; explanations</td>
<td>Use of literature, film, art, word origins</td>
<td>Assertions</td>
</tr>
<tr>
<td></td>
<td>Reflective vignettes</td>
<td>Analytical vignettes</td>
<td>Analytical vignettes</td>
</tr>
</tbody>
</table>
As mapped in Figure 2.2: Multimodal ‘Visual’ Research, interdisciplinary strands are centred by the ‘visual’. The ‘visual’ in the research was generated by images created by the participants during the interview process, images from the journalistic media such as newspaper and television reports, images from NSW Fire Brigades media in the form of video footage, and images created by artists such as Munch, Mondrian and myself.

These ‘visual’ aspects were used in the data collection and analysis in various ways. Broadly speaking, in the data collection phase participants were invited to express what happened on the fireground through their visual and verbal descriptions of the incident; in the data analysis phase, the visual and verbal material were sometimes analysed as an image representing information about an incident, as in the case of the Inspector’s mudmaps and timelines; in the data interpretation phase, visual images were sometimes used to draw comparative explanations, for example between a fireground incident and a painting. Finally, visual images were also used as representations in that there is a sense in which all the visual images employed in this thesis have a representational aspect.

A firefighting operation at first glance may appear purely scientific and logical. That the processes of incident command and decision making involve a rational, logical approach is accepted as a given by contemporary Western fire services. Of what use is a discussion of art and somaesthetics when what is pressing is the volume of water to be had, its rate of flow and the length and width of the hoses available, the measurable strength of the firefighters to lift all their gear, and the quantity of available resources to hand? How can a discussion on the aesthetic judgement and decision making of Incident Controllers on the fireground possibly contribute something positive to this situation?

This is the challenge I face – to bring into line of sight the invisible glue that is informing every motion and movement of this fireground scene. The unacknowledged yet imperative essence that draws it all together; the inescapable element that cannot be separated, divided, extracted or described except in relation
to the whole. Aesthetics is about relationship: structure, harmony, discord, context, and therefore well suited to the study of the complex, the multifaceted, the indivisible whole. I argue that despite the ways in which these relationships are logically and rationally articulated in the science of firefighting and consequently understood as ‘facts’, that without aesthetic judgement they cannot even begin to be apprehended.

If in my research I relied solely on a social science perspective and did not incorporate an arts-based perspective, I may have investigated seeing, sensing and knowing without reference to actual image production and the perspective of the artist as theorist. This would have created a lopsided and unbalanced perspective of the decision making of Incident Controllers on the fireground.

**Artistic practices**

*Visual art is often thought of as a potential source of data or as a creative means of representation. However, the usefulness of visual art extends into the realm of analysis and interpretation, key components of the research endeavour (Leavy, 2009, p.231).*

In order to understand artistic practice as research, some of the techniques artists utilise in the construction of their images are described. This is not a conclusive ‘list’, but it forms an introduction to the strategies that some artists employ in design and construction, which I claim are the same in aesthetic nature for an Incident Controller making decisions on the fireground. It is important to grasp that I am not forwarding these as two separate issues and drawing them together as similar, but rather I am arguing that they are the same practices in terms of their aesthetic quality and nature. The end result may be different – the construction of a painting, or the extinguishing of a fire, but both are practices which involve blocking in, closure and the use of visual information in a concrete fashion. If I was to say these practices are similar but not the same, I would be adding to the artificial dichotomy of the art-science construct.
Blocking in

In the construction of a painting there is a planning stage in which the large movements and the key features are designed and blocked in. The essential foundation of the work, the underpinning structure, the framework, is thought about and decided upon, although generally it is realised that, to varying degrees, there will be changes with the application of further ‘layers’ of paint; however, in order to make a start something must be done.

As an artistic strategy, blocking in enables a sense of balance and purpose at the start of a work. It involves the initial broad compositional development of a painting. Roughly conceptualised, it is the process of building up the painting from the general to the particular, with increasingly refined detail. This progression is accompanied by somaesthetic feelings around the compositional balance and movement of the painting and whether it is working or holding together as a whole. This thesis mirrors the blocking process in that foundational concepts are introduced from the beginning and refined as the thesis progresses.

Blocking in for an artist is the same in aesthetic essence to the beginning stages of a fireground incident when the Incident Controller designs or maps out the placement of crews, appliances and other available resources. The composition may change as the incident progresses; new information may be exposed, the design may require altering, more resources may be called for, but these decision points are informed by an aesthetic and somatic awareness of the scene and what actions would contribute to its resolution.

Not all artists use the technique of blocking in; one who does is Barbara Bolt, a practising artist and lecturer in Visual Media at the University of Melbourne. She writes of the experience:
For the purpose of my argument I want to recall the process of the painting. At first the work proceeded according to established principles of painting practice – blocking in the shapes, establishing a composition, paying attention to proportion and the shapes of light and dark – a re-iteration of habits and strategies of working. However, at some indefinable moment, the painting took on a life that seemed to have almost nothing to do with my conscious attempts to control it. The “work” (as verb) took on its own momentum, its own rhythm and intensity. Within this intense and furious state, I no longer had any awareness of time, of pain, or of making decisions. In the fury of painting, rules give way to tactics and the pragmatics of action (Bolt, 2004, p.1).

Bolt’s words “rules give way to tactics and the pragmatics of action” identify her as an expert practitioner. The close following of guidelines is an indication of the novice, while an experienced practitioner has imbibed and become familiar with these principles to such as extent that they are able to employ them without consciously retrieving them, and in a sense this frees them up to move beyond to greater depths of understanding. It is at this early stage of blocking in that the expert practitioner might recognise when something is not quite right. A less experienced person, still developing their skills, style and technique, may continue on for some time without noticing until later, when it becomes obvious that something is not actually working – in that it is causing problems and stopping progression to the next stage of the work.

In the following illustrations I demonstrate blocking in from an artistic perspective, using a number of my own works.
The photograph in Figure 2.4 was taken after the last patch of white canvas was covered, when I considered the painting ‘blocked in’. At this stage I am able to determine that the weight of the darkness on the right half of the painting will need to be broken up when the paint is dry. At this stage I may also turn the painting upside down and prefer it that way. Up until this point I have refused to let my conscious mind become involved with the human figures I intend to draw out at a later stage. As if wearing blinkers, I concentrate only on covering the white canvas with fair speed and rough accuracy to the bark photograph.
Below is another example. This time I am deciding between a front or a back nude view from the start of the process, because the figure is so entirely obvious to me, right from the beginning.

![Figure 2.6: Photographic source](image1)

![Figure 2.7: Blocking in complete](image2)

![Figure 2.8: The almost finished painting](image3)

The intention of blocking in is to avoid detail and to lay down the underlying foundation, thus indicating the work in its entirety, giving an holistic sense across the entire space to be used. It enables the practitioner to gain a sense of spatial
awareness and balance and become alert to potential problems which will require attention in the future execution of the work. It is understood that things may shift and change as the shape and weight of the succeeding layers demand, and if there is too much shift one may start again, the original foundation no longer holding. Bear in mind this idea of having to start again when reading the Quivering Voice incident presented in Chapter 4, where the Inspector realises that the current blocking in of resources would not be effective in extinguishing the fire or preventing its spread; at this point he takes the almost unheard of last recourse and in calling all crews off the fireground to regroup and plan a different attack. In other words, he started again. The experienced practitioner realises when it is not productive to work over ineffective blocking in, and more expedient to start again.

I propose an aesthetic correlation between detecting difference in terms of balance and colour harmony in the early stages of the execution of an artwork and in the artistic and aesthetic awareness of moving flame, smoke and burning materials. An extrapolation of blocking in as it relates to decision making on the fireground and the execution of a work of art is that a strict adherence to a prior plan, without constantly reassessing and reformulating the effects of the current approach, may result in an image that has followed the rules, but not necessarily accomplished its purpose.

This demonstration of blocking in has placed the Incident Controller in the position of artist, however an aesthetic appreciation of decision making on the fireground needs to move beyond only viewing the firefighter as an artist, because firefighting is not self-centred and focused solely on the fire. The view also involves the good of the community and the individuals within the community affected by the incident. Firefighting is not an end in itself. It is not firefighting for firefighting’s sake. For this reason I also draw upon the practices of looking found in Visual Culture and social semiotics.
Closure

A good perceptual system has to go beyond the information given; it has to “invent” things. Your brain sees more than what your eye sees. Intelligence means making bets, taking risks (Gigerenzer, 2007, p.42).

Gigerenzer’s experience as a cognitive psychologist did not explain the intuitive decisions he saw being made in everyday life. He wrote a short book which allowed him to say, unobstructed by research convention, that there is an explanation for the seemingly illogical decisions we make by ‘gut instinct’. Similarly, Multimodal Decision Making has an approach to recognising the importance of artistic perception in decision making when contradictory and incomplete information has to be processed quickly. ‘Closure’ is a common technique used by artists and it means to suggest, but not fill in, every detail necessary. The viewer is left to fill in the missing parts in order to complete their understanding, and with it a fuller understanding of what is being viewed. A very simple example is provided in Figure 2.9.

![Figure 2.9: A very simple example demonstrating closure](Dr McGuff's psychology classes web page, 2008)

I propose that Incident Controllers, faced with time critical situations and unclear, conflicting and contradictory information, are practising a form of closure. I argue that they employ a multimodal approach to decision making, using all their senses to perceive and ‘fill in the gaps’. de Lucio-Meyer describes closure this way:
The eye and indeed the imagination frequently supplement and compensate for missing elements in a composition. As a result of this, the observer assumes that the missing element is in fact present. The eye of the onlooker also sometimes creates rhythm where it does not exist and often continues such rhythmical arrangements and compositions to the extent unconsciously desired. The eye sees and complements the missing parts quite easily, often without being detected by the conscious mind (de Lucio-Meyer, 1973, p.135).

Incident Controllers make decisions under pressure with sparse and conflicting information, given the immediacy and transience of a fire, where claims to know anything may be speculative. Artists and Incident Controllers alike are relying on closure to ‘fill in the gaps’.

**Drawing up**

Drawing is a language, a mode of reproducing ideas, and as such is a means of forming and developing these ideas….Drawing thus becomes a tool with which to think. To draw an object requires a mental activity comparable to that which occurs when a thought is translated from one language to another (Sargent, 1912, p.5).

Participating Inspectors were given the opportunity and materials to draw the incidents they were describing in order to integrate visual learning with visual understanding and perception. For those who were visual learners (I made no attempt to determine who they might be), drawing the incident helped them to remember and place information; it also helped them see the incident differently during what Leavy calls “multiple interpretive moments” (2009, p.232). Allowing the data to become visual clarifies and distils reflections that might otherwise never make it to the surface in verbal explanation.

In addition to this, I recognise that as a visual learner myself, I was helped greatly by the visual images not only in the formal data analysis stage of the research,
where they increased my “idea generation” (Leavy, 2009, p.232), but also during their actual construction during the interview. In other words, through their drawings, the Inspectors were able to get on with relating their incident and not be waylaid by having to explain details which became immediately obvious to me once drawn. In this way the mudmaps and timelines helped to visually explain some very complex concepts and relationships through representing spatial relationship, distance and time. Today, teaching the use of drawing as a tool with which to think has been superseded, to some extent, by a focus on originality, creativity and freedom of expression:

Art education shifted from a concern with correct drawing, picture study, and hand-eye coordination to an emphasis on unlocking the creative capacities of children. Creativity, a concept seldom found in the literature prior to the twenties, now became one of art education’s major organising ideas (Eisner & Ecker, 1966, p.9, original italics).

Creative self-expression is generally not a part of a paramilitary organisation’s idea of the ideal emergency service worker. It may be coming into vogue now, strongly associated with problem solving, but without an informative explanation it would be viewed as a potentially destructive force in a critical incident situation. Rampant individuality serves no good purpose on the fireground, rather it endangers the lives of other team members. This tension between team and individual, between leader and creative problem solving by the group, is of rising interest to paramilitary organisations such as fire brigades. There is a small trickle of research papers attempting to address this issue, for example Kendra and Wachtendorf’s paper, ‘Creativity in emergency response after the World Trade Centre attack ’ (2002).
Mudmaps

In quantum mechanics images that appear naturalistic are often far from realistic, and in fact they wear their naturalism lightly, the way a ghost wears its sheet (Elkins, 1999, p.162).

The same could be said of the mudmaps drawn by the Inspectors during the relating of their incidents. They are not representational from a traditional artistic perspective. Rather, their purpose dictates their design and there is a subjective selection of aspects of a particular terrain that will lend the mudmap to being either more reliable, explanatory or detailed, and bearing the end user — me, in mind. To this end some Inspectors wrote clarifying details to explain the signs and symbols they were using; others assumed I would know these already, and still others spoke their meaning while drawing them in. As creators of the mudmaps they demonstrated their aesthetic awareness by acknowledging what I was interested in and allowing this to become the focus.

In this sequential stage of the thesis (Chapter 2) I have yet to provide a mudmap, so how can I expect the reader to know or apply what I am writing about? My expectation, based on multimodal experience, is that most readers having picked up a text of this size will have flicked through and looked at the images prior to reading in earnest. This expectation breaks the ‘rules’ of academic writing and provides a practical demonstration of the problems faced by Incident Controllers on the fireground, in that a mechanistic following of the ‘rules’ may be in conflict with the way they actually aesthetically apprehend the scene in real life.

The mudmaps are enculturated with signs and symbols: the numerical codes for fire stations, the understanding of sectors, the importance of accuracy with the placement of appliances and roadways in relation to one another. Generally, participants adopted the aerial perspective of a draughtsperson. This interpretation of a fireground is quite different from what we might expect of an artist’s
impression of the incident or the news media’s perspective found in photographs and video footage of various incidents.

When at work on the fireground, Incident Controllers also draw mudmaps into their tactical worksheet (see Appendix 1 for an example; the incident is humorously titled ‘Scank control’ as it involved locating a suspected petrol leak). Apart from becoming legal documents, these worksheets are used to visually demonstrate the relationship between the elements on the fireground – the crews, the trucks, the building structures and roads and so on, as a support to their judgement and decision making. These spatial relationships would take more time and be harder to grasp if depicted in words. In a similar, vein Eisner writes:

> We use maps because they display, by a structural analogue, relationships in space that provide a useful image of the world we wish to navigate….they help us to notice and understand a particular environment and our place in it (Eisner, 2002, p.11).

“The nature of the Incident Controller’s workplace requires that they locate, draw and conceptualise information from a variety of sources” (Lloyd-Zantiotis, 2004, p.64). What do the mudmaps leave out? “The feel of the place, its look and colour, what is idiosyncratic about it, its aroma, the lifestyles of the people who live there” (Eisner, 2002, p.11). Ultimately, the depictions in a mudmap simplify the fireground scene for a specific purpose – to add another dimension to the Incident Controller’s spatial understanding of what they have to base their fire attack plan on.
Conclusion

Scientificising the way decisions are made on the fireground is an unrealistic approach to solving fireground problems. I argue that in these complex situations it is impossible for the Inspector not to be somatically and aesthetically involved, and that this is a compelling and important aspect of fireground management, and one that cannot be quantified or measured objectively.

The art of fireground decision making developed in this thesis is about the fluid and uncontainable, the fleeting and sometimes misleading. It is about accessing and acknowledging an aesthetic judgement within, rather than conforming to the visible structures without. Elusive and intangible, it is often difficult to describe, but despite its lack of visibility and explanation there is an aesthetic dimension to decision making on the fireground which scientific language does not easily capture. It is evident, therefore, that science alone will not solve all the problems of decision making in time-pressure situations.

This chapter has foregrounded the importance of a connecting theoretical positioning between art, aesthetics and fireground decision making. It has argued that such a positioning will result in the enriching and heightening of alternative explanations and encourage discourse concerning decision making on the fireground.
Chapter 3: Doing multimodal research: Responding to hazardous materials

The organic whole has characteristics that emerge from, but are not reducible to its parts (M. Taylor, 2001, p.183).

Standard Operating Guidelines provide directive protocols, often in the form of checklists. ‘Responding to Hazardous Materials’ is a Standard Operating Guideline provided for incidents such as chemical spills (NSW Fire Brigades, 2001). I have used the ‘Responding to Hazardous Materials’ Standard Operating Guideline as a blueprint to shape the presentation of the research design, in that each major heading in the Guideline is linked to a major heading in the research design. This serves a number of purposes. It illustrates what a Standard Operating Guideline looks like, and the rightness of fit, or otherwise, that comes from applying a standard checklist to a fast moving, fluid situation. The overall intention is to demonstrate the inappropriateness of strictly adhering to a rigid framework when some situations demand an intuitive abrogation. I found that using the Guidelines as a blueprint fitted like a glove to the research design in some instances, and in others the research design information required contorting in order to ‘fit’.

I am working with the ‘Responding to Hazardous Materials’ Standard Operational Guideline headings; it should be noted that each heading contains a number of checklists and further guidelines not reproduced here. As a precursor, the Guideline and Multimodal Research Design headings are provided in Figure 3.1.
Responding to Hazardous Materials SOG
(NSW Fire Brigades, 2001)

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Figure 3.1: The ‘fit’ of a Standard Operating Guideline

**Conduct a safe approach (Guideline 1) – Entering the case study “zone”**

    The first Guideline is ‘Conduct a safe approach’. This Guideline describes how to enter “the combat zone”, for example a chemical spill. Personal protection is a priority and firefighters are instructed to “assume the incident involves the most dangerous substance” (NSW Fire Brigades, 2001, p.15).

    My “zone” of action was a case study of newly promoted Inspectors within the NSW Fire Brigade. Yin (1994) defines a case study as “an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p.13). I investigated the case of a purposive sample of Inspectors and their fireground decision making as a representative case in order to build theory about aesthetic and somatic awareness in decision making on the fireground.

    Because the connections I wanted to explore were as yet undrawn and barely formed in my own mind, a single case study aiming for an in-depth analysis appeared the best way to bring important features to the fore and theorise about them as a platform for further research.
Theoretically I did compare the participating Inspectors with another case study—that of nursing, as found in the literature. This was the only place where I could locate complex emergency decision making which was directly linked to art and aesthetics. These points of contact formed useful indicators for my further reading and thinking.

**Establish Incident Control (Guideline 2) – NSW Fire Brigades context**

In Guideline 2 the roles of various firefighting personnel involved in the response are outlined. For example, the roles of the Decontamination Officer and the Incident Controller. Each role is provided with a checklist of objectives.

To place the NSW Fire Brigades in context, they are the seventh largest urban fire service in the world, with approximately 3000 permanent and 3400 retained firefighters (NSW Fire Brigades, 2008). Typical incidents responded to include structural fires, industrial fires and incidents, motor vehicle accidents, chemical spills and hazardous materials incidents. Firefighters are required to be multi-skilled in areas as broad as hydraulics, electricity, structural design of buildings, weather, types of fuel, and fire behaviour.

The communities that the NSW Fire Brigades serve, the skills of the firefighters themselves, and the resources they have available, significantly affect the kinds of decisions, policies and practices that are made. As with most organisations, the NSW Fire Brigades function within two clearly defined spaces – its own organisation and the wider community into which it is situated.

Over the years the funding, public perception and available technology of the NSW Fire Brigades has changed the way they operate. The era of an unsurprising and conventional career has virtually drawn to a close in contemporary Western society, NSW Fire Brigades included. The world of work has changed in response to flexible labour market strategies and “insecurity or risk is seen to characterise the contemporary experience of work” (Wajcman & Martin, 2001). On the one hand, the NSW Fire Brigades is an organisation dedicated to the good of the
community, willing to take risks, at least as far as is deemed ‘safe’ and sometimes further. They enjoy a popular public image. On the other hand, they are a paramilitary organisation, engaging with the societal demands of this time and space in history, struggling with issues of gender equality, changing concepts of risk management, leadership and managerial styles, and the ever increasing pressures of economic rationalism. These issues bring with them the need to prove one’s true value and worth within the community, in order to effectively compete for government funding. Each issue is worthy of a thesis of its own.

Developments in the field of fire science and firefighting technology and practice have escalated on an unprecedented scale. There have been dramatic changes in culture (Cooper, 1995), the number and types of fires to be fought, and an expansion of duties associated with firefighters to incorporate search and rescue, motor vehicle accidents and terrorist response, hazardous materials and biological warfare, and the education of the public. The days of simply holding a hose and extinguishing a fire have vanished. Today’s firefighter can expect to be tertiary educated and promotion to the higher ranks is now merit-based and usually requires a postgraduate degree in Business, Public Administration or Emergency Management.

There have been major technological improvements in the design of appliances with respect to their ability to withstand heat, roll over protection, and the use of diesel leading to less fuel vapourisation in responding appliances. There have also been advances in the training and education of firefighters. In Australia there are issues with national compliance and public service training packages, and the ensuing juggle to match competencies; there is also tension between the old ways of training and education and the willingness to embrace the newer technologies, many of which are I.T. based and no longer ‘hands-on’.

Concurrent with these changes is a deep desire within the NSW Fire Brigades to be viewed and understood as ‘professional’. Public conduct and profile have
escalated in importance, and fire services are seen as helping the community in ways that other paramilitary organisations within Australian society do not enjoy.

A major component of work within a paramilitary organisation is concerned with risk. Within a fire brigade, an individual firefighter’s risk perception will be influenced by where they are positioned on the fireground, the orders they are instructed to carry out, and the psychological stress and physical exertion required of them. This complex situation is compounded by the dynamic and changing conditions of the fire itself. The Incident Controller, formulating and implementing the overall plan of incident response, is required to take into account the situation as a whole and make decisions based, as best they can, on their assessment of the entirety of the scene. This is the point my research addresses: that is, how are they making these assessments? What is influencing their perception of the scene?

**Securing the scene (Guideline 3) – Selection of research participants**

In order to secure the scene and ensure the safety of all firefighters, Incident Controllers are required to delineate the sections of the incident and control who enters each zone. The zones are labelled hot, warm and cold:

![Figure 1: Three zone system (combat area)](image)

![Figure 3.2: Securing an incident scene through the use of zones](image) (NSW Fire Brigades, 2001, p.21).
In terms of my research, I have selected a purposeful sample of newly promoted Inspectors who are fresh from all “zones”. They have experience as hands-on firefighters in the hot zone, and operational command and control in the warm and cool zones, previously as Station Officers and currently as Inspectors.

My previous connection through the Inspectors’ Promotional Program enabled a purposive sample, as twelve of the sixteen Inspectors approached consented to be interviewed. Fourteen interviews were conducted in total as two Inspectors were interviewed twice, due to large and interesting incidents which arose during the interview period. To date there are no female Inspectors within the NSW Fire Brigades. I collected data concerning thirty-one incidents occurring within a year of the interviews, but more often within a few months or weeks. Of these I have reported on fifteen in detail and mentioned a number of others in passing.

I considered Inspectors ideal participants for the research as they typically have seventeen to twenty years of firefighting experience, but how could I justify only approaching a previous class and not broadening the sample? First, as a discreet class, the NSW Fire Brigades provided the required ethical consent to go ahead with the research. Second, having conducted previous research with Station Officers within the same organisation and attracting less than twenty affirmatives for interviewing out of a pool of 650 possibilities, I was well aware of the factors prohibiting senior officers from participating in research. In the main, it is the huge workload expectations accompanying middle management positions. It was clear that the only way to proceed would be to approach senior officers with whom I had an established connection. I did not reveal my research proposal until the Inspectors Promotional Program had concluded and all results were recorded. The letters of information concerning the research were kindly addressed and forwarded by the NSW Fire Brigades.
Identifying hazardous materials (Guideline 4) – Data collection

The ‘Identifying hazardous materials (Guideline 4)’ provides a brief outline stipulating how to gather information in a hazardous incident; for instance, identifying the class of chemical by looking at the symbols on the containers or vehicle.

I gathered my information through semi-structured recorded interviews and provided the option for the Inspectors to draw mudmaps, diagrams, timelines and various other images, while relating their selected fireground incidents to me. As a complement, I also collected multimedia images including newspaper reports, videos and other related incident documentation pertaining to the incidents being described. In terms of my data collection I:

- asked open-ended questions
- recorded and transcribed the interviews; collected visual data from the participant, media reports and live footage, photos and videos provided by the participants; in addition I kept a record of my personal reactions and observations written after the interview
- interpreted these data as a whole, i.e. incident by incident
- returned my interpretations, some in the form of conference papers, journal articles and thesis chapters, to the relevant participants for comment.

The kinds of data collected are further elaborated in the next section.

Interviews

I collected and analysed a substantial amount of extended interview texts and images. There were fourteen interviews and they were semi-structured and drew on thematic prompts. The interview process relies on interpretation and judgment and mirrors the artistic process in that it may be “emotional, unpredictable and ambiguous” (Boughton, Eisner, & Ligtvoet, 1996, p. 1). My selection of data has
consequences in that subjective theories are constructed from interviews and verbal data, rather than ‘scientific’ theories (Jungermann, 2001).

At each interview I presented the Inspector with large pieces of paper (ranging from A3 down to A4 in size) and a container of assorted coloured pencils and pens. I requested they draw me a timeline of the incident they were describing and, if they chose, some other illustration, while relating their fireground incidents to me. At times they related incidents not directly involving fire. For instance, hazardous material spills, termed ‘hazmat’.

**Constructing timelines and mudmaps**

Some of the Inspectors chose to draw what they called ‘mudmaps’; all but one drew timelines. Mudmaps, in a very simplified way, are similar to architectural plans in that they are an aerial view of buildings (with the roof off), relevant scenery and the placement of fire appliances and firefighters.

**Media coverage**

Media included newspaper clippings, television news and in-house video productions, personal observations, and various pieces of fire services literature. Although media sources were drawn upon, in many instances I could not make direct reference to these within the text of this thesis due to problems of Inspector and incident identification. Some incidents were just too big and too public to disguise adequately. The participating Inspectors in these cases agreed to the citing of the newspaper reports.

**Research Diary**

I kept a record of my impressions, written as closely as possible to the actual interview itself. This was important as some of the signs and symbols on the drawings required a ‘jog’ of memory in the ensuing data analysis phase.
Assess potential harm (Guideline 5) – Research ethics

Here Guideline 5 advises the Incident Controller to consult relevant experts, for example, a chemical engineer who may be onsite at a factory incident. The “substance’s potential to threaten life or property” is the key consideration.

As with responding to a Hazmat incident, the university ethics approval process is intended to ensure the safety of all participants in the research, and ethical approval was granted by the Human Ethics Committee of the University of Western Sydney (HREP 2004/115). The NSW Fire Brigades agreed to the research and facilitated the mail-out to potential participants.

In addition, the University of Western Sydney ethics application stated that “It should be noted that the research is not a review of the performance of Inspectors and therefore there will be no attempt to question any participant to evaluate their work from the perspective of performance.” In this sense my research identified with Naturalistic Decision research which very rarely makes judgements about decision quality (Yates, 2001, p.21).

Call in resources (Guideline 6) – Research scope and limitations

It is not intended that first respondents to an incident will handle it without assistance...Having assessed the potential harm, decisions can be made about how best to render the incident safe. (NSW Fire Brigades, 2001, p.26).

Guideline 6 recognises that NSW Fire Brigades personnel may require the assistance of other agencies or specialist services in order to complement or complete their response. Response activities are necessarily limited, for example by the availability of equipment, expertise or personnel.

The aesthetic perspective in my literature review is necessarily limited. There are many discourses and dialogues on art and aesthetics stemming back as far as the formalisation of writing. Recognising that I could not hope to do more than skim
the surface of the centuries in a rather linear and surface fashion in preparation for establishing the positional viewpoint from which I have emerged, I simply ‘emerged’ with my position.

Likewise there is the ‘What is art?’ debate, and I am necessarily required to state my position and the factors influencing it, but this alone could comprise an entire thesis. Consequently, I touched on the essential elements and focussed on the most influential in terms of this thesis.

The lack of available vocabulary may also be considered a limitation:

One of the reasons why critics have spoken so inadequately about non-representational painting from Klee onwards is that their language, which was adapted from impressionists or even cubist art, has been unable to find words to describe the interaction of signs in their simplest form, and instead of analysis they have gone on indulging in metaphysical fantasies (Durvignaud, 1967, p.56).

Monitor information (Guideline 7) – Benefits of the research

Once an appropriate response to a hazardous materials incident has commenced, new and existing information must be continually reviewed throughout the render safe phase of the operation (NSW Fire Brigades, 2001, p.27)

Guideline 7 stresses that constant revision of incoming intelligence is essential. Nothing is static on a fireground. Likewise, a new theory of conceptualising decision making in time critical situations, characterised by non-uniform information and contradictory priorities, is essential to an holistic understanding of the decision making process. The benefits will eventually extend beyond fire services to other emergency service organisations such as the police, State Emergency Service (SES) and paramedics. Understanding the importance of somatic and aesthetic awareness should aid us as community members, researchers
and emergency service professionals, to better conceptualise critical incident decision making and ultimately impact on education and training, legal obligations and procedural policies.

**Decontaminate and render safe (Guideline 8) – Data analysis**

Once the hazardous materials are removed or the situation resolved through containment, absorption or neutralisation, the site can be declared safe. Although I do not feel my ‘site’ will ever be declared ‘safe’, the data analysis for this research did necessarily have to end sometime. As Grix suggests, our previous experience influences the research choices we make:

> It is very hard, if not impossible, to undertake any form of quantitative or qualitative research without resorting to some sort of comparison, because most of our judgements are checked against previous experience and knowledge which we bring with us to the research situation (Grix, 2004, p.53).

It is my argument that organises and places the incidents in the data analysis chapters, not their scale or complexity. The approach to data analysis itself was multimodal, incorporating a broad understanding of knowledge sources in the development and maturation of a problem or issue on the fireground. Multimodality is distinguished from formal rationality and informal sense-based rationality in that it approaches art, science and practice as an irreducible whole; a monomodal approach to data analysis would not capture the holistic dimensions of decision making.

There is a strong impulse left over by modernism – the impulse to study artistic expression through establishing types, looking for precepts and repeating patterns, and measuring effects. A multimodal approach deeply embraces the somatic and aesthetic experience in an holistic way, much like a three-dimensional laser light show requires more than one dimension for the full visual effect. It is an integrated
approach in which individual points that are highlighted are deemed distorted and meaningless on their own. Adopting this approach meant that I did not make categories through assembling codes across incidents.

It would have been much simpler to go with the previously established forms of data analysis, such as to code, develop categories, and link categories. In harmony with my holistic approach, however, I did not follow this pattern. This would have been counterproductive as I wanted to retain the integrity of each incident as a whole and to examine it as an integrated structure. Had I employed NVivo to codify the interview transcripts where the Inspectors mention aspects such as the colour of the smoke, their reliance on their sense of smell, sound and so on, I could have written a chapter on each of these ‘elements’ or ‘characteristics’ and said, no doubt, something very valuable. This would not, however, have been an holistic approach to trying to understand intuition and the place of previous experience as a mutually linked, indivisible whole that loses something through dissection and re-assembly.

So how and why did I group the incidents, as surely by doing so I had to group some features in common out of each incident, thus defeating the purpose of an holistic approach? I do not have a definitive answer to this question. Reading through the incidents grouped within each chapter, the reader may feel different arrangements spring to mind. I went with a gut feeling that the overriding characteristic of certain incidents did have something in common, so I suppose in some way this is a meta-theme decided very subjectively by myself. There is no other way around it. In another sense though, I have lived and breathed, read and dreamed, listened and studied these incidents for rather a long time. I know them inside out and back to front, and sometimes ‘better’ than the participant himself. In some ways I can claim to have built up an experience of these incidents and the participants, and in some ways I could claim that my experience, with the action of reflection, has resulted in enough expert knowledge of these incidents to be able to say something meaningful about them when they are grouped in certain ways.
according to my perception. There is no way of substantiating my claim, except through you – the reader’s confirmation or disconfirmation of my decisions for the chapter groupings.

I analysed each incident by reading, thinking and ruminating, and then leaving them alone. I came back and repeated the exercise until I was almost so tired of some incidents I could not bear to look at them for months at a time. Then, triggered by some catalyst, I wish I knew what so I could patent it, I suddenly thought “Now is the time” and away I went. Each incident was well known, but fresh once again. I saw things, made connections that I had not previously made. I reignited old, almost forgotten connections and I started to write train of consciousness about each incident. I could not help but keep the face of the participant before me, as I knew them reasonably well. I imagined their reaction to what I was thinking. I decided to send each of them the recount of their incident with my analysis, for triangulation, but mostly out of curiosity. Most were pleasantly surprised, as they were not expecting quite what they received. The description of the incident was well known to them, but the explanations of their decision making, previously a subconscious understanding, was now explained from an aesthetic point of view. I was expecting they would find it amusing and highly theoretical; rather, they found it marvellously releasing to find in words what they always knew intuitively, but could never actually verbalise for themselves in a way that matched what they were thinking and feeling when making and reflecting on critical decisions. These were great moments of triumph, motivating factors encouraging me to continue on with my analysis.

I admit to feelings of uncertainty regarding the validity of what I have done. It feels too good and too self-indulgent to be ‘real’ and of value. We are so used to ‘perception’ meaning understanding the elements of the whole rather than taking in the whole, that it feels like a backdoor, a not quite ‘ridgy didge’ data analysis. However, in reality it is what each of us does every day of our lives in our ordinary and not so ordinary decision making activities. Like a recipe with varying amounts
of odds, weighting and gut feeling, the balance finely tuned to our life experiences, character and the situation itself.

Keeping a checklist of where I am up to – or not up to as the case may be – in my daily activities is helpful in utilising the predictable chronological passage of time through a day. In my data analysis I wanted to be multimodal, to escape the list, the sequential ordering, the search and matching for codes across incidents. I wanted a multidimensional view of the incident itself, by itself, because I aimed to preserve the connecting arteries that I supposed linked and supplied and refreshed the multimodal activity taking place both within the Incident Controller, the incident itself and within me. Therefore, I did not have precise criteria that I brought with me to the analysis of the data. It is at this point that my research and I are most vulnerable.

What I did bring to my data was concepts – loose, linked and amorphous, the product of my hunches, convictions, prejudices and predictions; the sum total of my life experiences, my own and therefore unique, visual culture – the ether within which I live and move.

Exploring decision making on the fireground from an aesthetic and somatic perspective necessarily drew me into the realm of art criticism as it facilitates a meaningful vocabulary and language. Interpreting my data from the artistic and aesthetic perspective was a deliberate choice:

Successful encounters with art objects and performances offer a set of standards by which to judge ordinary experiences (Jackson, 1998, p.124).

Art criticism, according to Nelson (1977), is a function of our experience: “We see what we are looking for, what we have been trained to see by habit or tradition” (p.11). I used my own judgment to offer explanations. Eisner (1998) claims that “If researchers have no consciousness of what is significant in a setting, it is unlikely that anything subsequent will occur that is of interest” (p.230). As I had no idea
what I would find in the data, I had to let it speak to me. My role was to recognise what was important and be able to justify why:

This way of treating information resembles the work of a critic who cannot know in advance which particular qualities a specific work of art or literature, or music, or dance might display, yet is responsible for recognizing what is important in the work and justifying his or her judgments if asked (Eisner & Powell, 2002, p. 136).

Although I have used the word ‘triangulation’ in places, I much prefer Richardson and St Pierre’s (2005) concept of ‘facets’. According to these writers, the lineal plane provided by traditional triangulation is not sufficient for a multidimensional viewpoint; the three-dimensional metaphor of a crystal with its many facets reflecting and refracting the image, captures the “multidimensionalities and angles of approach” and therefore removes the traditional idea of a “fixed point” or “object” to be validated (p.963). The crystal metaphor aptly encapsulates Multimodal Decision Making in that the decision is the result of the knowing; the knowing is the sense of ‘not quite right’, the coming together of all the disparate pieces of information, constantly changing in the time-pressured environment of the incident ground.

I aimed for an holistic approach, looking at the whole complex system to gain insight into the overall perspective. I tried to avoid the temptation of following the familiar path of breaking into smaller parts, thereby overlooking the big picture, although this did not mean that I did not look at specific variables within the whole.

In the next section I present an incident analysis to introduce the reader to the language and activity of a fireground. It also serves as a foretaste of what to expect in the data analysis chapters of 4 to 7.
Demonstration model: The Liquorland Fire

The Liquorland Fire is an ideal incident for use as a demonstration model for multimodal data analysis as it happened the day before the interview and the Inspector recounts with his vivid mind’s eye the sequencing of events with fire brigade vocabulary. His telling of the incident moves from an uncommon beginning in that he is present before the fire has been reported to triple-0, and he remains onsite until the finish. This provides an introduction to a number of fire-related terms and procedures, plus a few loosely held themes which will travel and gather momentum throughout the data analysis chapters.

The rank of Inspector is one of middle to senior management, operational commander, in charge of at least ten to twenty fire stations. When turning out to an incident and assuming command, the Inspector (or any other rank for that matter) is called the ‘Incident Controller’ and dons a white tabard printed with these words clearly visible. Typically, the incidents an Inspector attends are large and of possible interest to the general public.

The Liquorland Fire Inspector has twenty-one years of experience, mostly in busy Western Sydney fire stations. As he talks me through the fire, which occurred only thirty-six hours previously, he looks at photos taken by the NSW Fire Brigades and now placed on their intranet, as well as drawing his own timeline and printing off an article from the local newspaper.

The Liquorland Fire

At 4:00pm an electrician working on the roof notices a candle burning on a coffee table through the open door of a flat situated above a Liquorland shop. The electrician assumes someone is home. He sees a breeze blowing newspapers on the coffee table.

At 4:52pm the Inspector, turning into his home street at the end of a working day, notices the same flat, this time engulfed in fire. He pulls up and sends a White
Message, meaning he notifies the Sydney Communications Centre of an unreported fire:

Yeah, I sent what’s called a White Message. That’s a message when you notice a fire and no one’s been responding to it.

**White message: First report of an incident**

As a fire appliance speeds towards an incident, the Sydney Communications Centre usually alerts the crew by radio as to how many triple-0 telephone calls have been received, providing an initial indication of the magnitude of the fire. For instance, if the fire alarm in a nursing home goes off and no triple-0 calls are reported, it may be possible that there was a bit of toast-burning going on in the kitchen. If numerous triple-0s are reported, something more serious is likely to be happening.

**Red Message: Request for resources**

In less than two minutes the Liquorland Inspector has ascertained what resources he judges will best mitigate the fire and he sends his Red Message, calling the fire a Second Alarm:

A Red Message tells them (Communications Centre) what resources you need to put the fire out. I’d say I took about one and a half minutes to make the decision, to make it a Second Alarm, which I sent by radio message… The Second Alarm would be for four fire trucks.

**Green message: Fire is out**

When we send our last message the fire’s out, which is called a green message. We always state how the fire was extinguished, like “Two by 38, one pump”, or “Five lines of 70, two pumps”, and that tells you the magnitude of the fire, ’cause it’s the magnitude of the water that you had to utilise to put it out.
An incident always concludes with a ‘green stop message’ at the point when fire attack ceases and salvage and clean-up begin. In a green stop message the Incident Controller summarises the incident response in terms of the loss or damage and the resources utilised. It is not difficult to see how this may be interpreted as a measurable outcome by Incident Controllers, as on the one hand there is the scale of the fire, and on the other are the resources used to mitigate it. Here is an example of a green stop message:

4 Madeup Avenue South Noggin. Manager of Recruit Training Blue. Green stop. Prior two level Liquorland block and tile construction, approximately 20 metres by 30 metres at the bottom level, second level is 10 metres by 20 metres. It was destroyed by fire. It was extinguished one pump and two by 38s. Salvage work is in progress. Power to the premises has been isolated. I require FIRU. 86 Station will be released and 85 Station will go and change shift. 15 Station has been released.

This was read aloud to me by the Inspector from his incident notebook. Requesting FIRU is a call for the Fire Investigation & Research Unit and indicates that the circumstances of the fire may be suspicious; insurance claims will be made. Individual fire stations are identified by their number.

The Inspector knew the nearest fire station to be only one kilometre down the road and anticipated the NSW Fire Brigades arrival within minutes; all the same he expressed frustration at having no resources with which to combat the fire just yet. The first station, consisting of two appliances, arrived within three minutes and followed his instructions to take out two 38mm lines of hose to the flat. One crew dragged a hose up the stairs and when the other appliances arrived, a ladder was put against the awning of the shop and the firefighters scaled the ladder with a hose and attacked the fire through a window of the flat. The Inspector expressed concern over finding the balance between ensuring there was enough water used to
extinguish the fire and not so much water that all the Liquorland stock would be lost due to water damage.

**Line of 38 or line of 70**

The hoses carrying water from the pumping appliance are either 38mm or 70mm in diameter. A 38mm hose is lighter and easier to manipulate; a 70mm hose has a much larger water-carrying capacity, but as it is very heavy and takes a few firefighters to control it once opened up Incident Controllers carefully gauge when to use it. Today’s Firefighters are very conscious of minimising water damage to property, and as the Inspector points out, he wanted to avoid destroying more stock than necessary with the water. Thus the judgement-call for numbers and sizes and placement of hoses is crucial to the fire attack plan, and the Incident Controller’s gauge of their own success in managing the incident.

**Radio channels**

The Liquorland Inspector spent the night agonising over his neglect to dedicate a radio channel for communications between the firefighters and himself. He did not put this protocol in place because it was a localised fire and he could see the firefighters from where he was standing. In other words, it may have been a bit of overkill, but none the less, it was in the ‘rule book’ and as an instructor of new recruits he ruminated overnight as to whether he did the right thing. Drummond (2001) writes of these paradoxical situations where you know what you ‘should’ be doing by the rules, and what your aesthetic apprehension is telling you to do: “When everyone knows what to expect, there is no need to renegotiate the psychological contract every time the parties meet” (Drummond, 2001p.117).

Figure 3.3 shows the timeline the Inspector constructed while relating the incident to me.
Communication

The Liquorland Inspector points out the difference between the colloquial language he used with the firefighters and the official terminology required for communicating and reporting the incident within the organisation. He does this as he is choosing his words to place on the timeline in Figure 3.3. Under “Arrival” on the timeline and in brackets, he writes “stumbled upon” and as he writes he says:

Now remember, I wasn’t called to it, I stumbled upon it (writes), that’s not very Fire Brigades official, but it sounds better. So my arrival time was at 1652.

And a few minutes later:

I’ll put “instructed”, but I find it’s better if I ask. (Figure 3.3: Timeline of Liquorland Fire).
He then realises that the newspaper report we are looking at (Figure 3.4) has “incorrect reporting” in that the tenant of the flat has been superimposed onto the image of the fire, and that the images are taken at different times. Also, the Inspector notes the whiteness and blackness of the smoke to be more accurate in the newsprint version than the online version which he printed up for me. In the photograph, the black smoke that he observed upon his arrival, is already starting to turn white, meaning water was reaching the fire. These are subtleties that his expert eye points out:

’Cause the thinking was I’ve got to get that fire out so I can protect the stock down below because it can go from just a little sort of above-ground unit fire to being a fire that would impact on all the people working in there. There was probably about five people working in there and their wages, that’s what I was thinking in my head, not the actual specifics of it, but more the…It’s going to have a large human impact. A very large financial impact. It was a Liquorland store. The guy told me there was probably about forty grands worth of stock just in there and then you’ve got the wages and whatever that store does for the community. So I thought “Forget the unit, it’s lost. Let’s put it out so it doesn’t impact on that (points to the store) and let’s stop the water from impacting on it.”
The huge cloud of smoke above the store in Figure 3.4 indicates the ‘level of involvement’ of the fire. In some incidents, buildings are described as ‘totally involved’, meaning the entire structure is on fire.

The Liquorland Inspector’s critical reflection over the decisions he made in this incident were heightened because at the back of his mind he was constantly aware that I was to interview him the next day. In addition, being a trainer and a judge of the performance of new recruits, he endured a night of sleeplessness because he did not enact a number of protocols, which at the time he deemed unnecessary, but of which he could see the value upon in hindsight. Finally, he moved the full circle in his reasoning to being happy with his judgement calls, as the whole operation proceeded so smoothly.
Competing tensions

The Liquorland Inspector demonstrated a motivating compassion on a few fronts: initially for the people employed by Liquorland who would have no work if the store was completely destroyed, and later, compassion for the young couple who lived in the flat. Initial anecdotal evidence suggested that the fire was caused by the type of candle used in the preparation of heroin. The couple were already known to the NSW Police, who were not sympathetic to their now homeless plight. The Liquorland Inspector organised the NSW Fire Brigades Chaplain to turnout and offer accommodation. The Inspector reiterated that the woman was a few months pregnant, and it concerned him that they had nowhere to go for the night. He also stated the flat had leaks, reported by parents who were visiting, so it may have been an electrical fault which caused the fire. Because a shop with so much stock was involved, it was important to establish the cause of the fire in regards to insurance. The couple, after seeing their flat on fire, returned to the pub and the Inspector continues to demonstrate concern regarding their accommodation for the night:

’Cause they did lose everything they had, and they were uninsured and they have a baby on the way and I thought if there was a possibility that there was no fault there, there may be some means there for them to get back on their feet, financially, so I wanted that to be investigated.

And finally, when the fire was out a petrol tanker wanted to refill tanks in the service station next door. The Inspector, motivated by compassion for the community says:

’Cause then the community can still function in its normal way, the petrol station gets its fuel, it delivers it to the people.

And we – as soon as that was under control and I was happy that nothing would happen, I’ve got the guys to go in there with sheeting and cover all
the stock, and I handed the till over to the manager because I didn’t want any ethical problems to arise where you couldn’t consolidate who’d been in and who hadn’t been in there. It’s the best thing – if something went missing you’d end up with aspersions on the fireys.

The next excerpt illustrates the tension felt by Incident Controllers when they do not follow the Standard Operating Guidelines. The Inspector feels an inner conflict for having omitted to wear the ‘Incident Controller’ tabard, or specify radio channels. Because he could see all the firefighters, it appeared at the time of the incident to be a bit of overkill, but in retrospect he reinterpreted the situation and came to the conclusion that following the guidelines is good preparation for when larger fires occur. The problem he saw with this was that the firefighters might have thought him a little pedantic and over the top, power hungry or controlling, if he had instituted protocols which appeared unnecessary to the fire at hand. Then he talks himself all the way around again to say:

I really think now that yes, I did it the right way. And it was very effective. And I think if I’d gone down the other process I might have seemed a bit sterile to the guys. OK you pull up, “I’m in control, I’m telling you I’m in control and you’re going to do this and you’ll be on this radio channel” whereas it sort of flowed a little better than that. I don’t know why I did it that way, I can’t tell you, but I saw that’s what needed to be done.

And later he says:

I didn’t state over the radio that I was taking control, because I could see everything, it was all there in front of me, they know I’ve taken control, ’cause I can see it, why can’t they? So I didn’t say that on the radio, I just passed on what I thought they needed to know. But by the fact that I put my white hat on, put my Inspector’s coat on, everyone there knew I was in control, so why did I need to tell them?
That was the downfall, I think I needed to forward that over the radio, and I didn’t put up a communications channel, I didn’t tell the officers arriving to go to channel five ten and I’d talk to them on that and they would have talked to their crews on five-0-nine. But the reason why I didn’t do that was it was a lot closer and personal. As they were arriving they were walking past me and walking up to me. I could see everything that was going on. So it was very localised to where my command point was. So I saw that process and telling the radio as secondary to getting that fire out and protecting that stock. And every second counted. Which I think is still incorrect. More efficiently I think I could have done it at the same time.

V: Oh?

So, maybe I could have been prepared and have the tabards as they arrived and put them on them and have the radio. I don’t know. I was happy with how the operation went, but technically to what we learned in the IPP – I would have failed the exam, because I didn’t do a comms plan, I didn’t state a radio channel to the other officers. But operationally I think the job went excellent. I think the crews worked excellently. No one was ever unsafe. And there was minimal water damage to the stock downstairs and everyone was extremely happy.

And then I started to think later, well is there a point where this protocol, this procedure that we put in place in incident management, when it becomes more relevant than at other times? So I started to think, well I had a very close, personal fire, where people were close to me and the sectors weren’t spread out over a large area, and I could visualise everything and we were in earshot of each other. And I became quite comfortable then with the fact that, yes, I’d made the right decision, because of the fact that a lot of older people resent these tabards, start to think fighting fires by – I don’t know – you put a tabard on and you can put a fire out where as in their culture days,
the only way to put a fire out is to put a line of hose on your back and go in and put it out. These tabards mean nothing.

When people who do not normally work closely together attend an incident, the need for Standard Operating Guidelines is highlighted. The same situation occurs within the mine rescue sector:

It is not unusual for people to meet each other for the first time when they attend a call-out. This highlights the need for standard operating procedures to be adhered to during the training process (Ingham & Ingham, 2009, under peer review).

These reflections on the tensions between a job well done and the acknowledgement that protocol was not complied with are never fully resolved; recognising this is important.

**Situational and aesthetic awareness**

When an Incident Controller sizes-up a fireground preparatory to initiating his or her incident response plan, they are aesthetically apprehending and processing the scene. Firefighters learn to read visually because it is an important means through which they assess risk and communicate with one another. It takes energy to read the intensity of the heat, recognise the smell of various burning substances, look for points of entry and visually measure various relationships such as depth of field, height and the make-up of construction materials. In the artistic domain this is called aesthetic awareness and it is recognised that aesthetic awareness involves every part of the human being (Eisner, 2002). I liken aesthetic awareness to Situational Awareness and size-up in the firefighting domain. By way of illustration, in the following excerpt the Liquorland Inspector uses how he felt as a marker for a critical decision point:
V: So where were the critical spots for the decisions?

Critical decisions for me? When did my heart flutter?

V: Yes

When I arrived and I could feel in my mind what was going to happen, the one and a half minute mark. As soon as I saw that, I had to make a call on what to get there to help me to do it. Now within that time, when the next appliance arrived, I was thinking about how I was going to put it out and what my priorities were. As I said before, my priorities were to get a line of 38 and a crew up the stairs on the eastern side and to see what effect that had on it because I knew we could only get one line of hose to work at a time as the guys were arriving, otherwise they’d be overawed with tasks and then as an extra crew arrived, because it would require a ladder and a hose, to get that to work. And if that wasn’t going to work, I did have a thought in my mind about the 15 minute mark, if this fire doesn’t reduce quickly – because I had those two lines of hose there – I would say that critical failure was going to happen. If the plan didn’t work, well I have to get a line of 70 (writes on timeline). I did think that and I remember that clearly.

Incident Controllers in the data analysis chapters of 4 to 7 demonstrate, as does the Liquorland Inspector, the ability to forecast and generate contingency plans while commanding the situation at hand. This is illustrated by the Liquorland Inspector through his relating of technological (assessment of equipment), somatic (proximity of their physical bodies), and aesthetic (visual imagery and meanings) information to the whole situation in a multimodal and simultaneous way.

Experience

I said “Oh well, I’ll go up and assist you in the fire investigation.” Now we all get a little fire investigation handbook, but I did feel hopelessly incompetent in that field. I didn’t know the process. I knew – I’d studied Kurt’s Law of Fire Investigation (points to bookshelf) but I’ve never done
any fire investigating. I’ve never gone to a scene and investigated a fire. So I was there with a Police Officer, who obviously does a lot of fires with the FIRU. I didn’t know the procedure, didn’t know where to start. I knew how to look at the wires and the rest and in the end – I’ve got his name down here – and I just said “Look I think we are better off waiting for FIRU because I really don’t know what I am doing.” And I think that was because I have no experience in it. I’ve done reading in it, I could never put the reading to the actual practicality. So that’s made me think in the last few days maybe I should go out and do a little bit in that sort of stuff.

A theme developed throughout the data analysis chapters is that on the job experience is necessary to complement ‘textbook learning’. The Liquorland Inspector demonstrates that having read the fire investigation text was not enough to enable him to investigate an actual fire on the fireground.

**Mudmaps and recognition**

No. I didn’t draw a little map – it was there, in front of me. I didn’t need a little map…I live there, I’ve been there for years. I knew everything that was there. I know there’s a lemon house two stories high with a motor car in it two doors down. I know where the automatic shut off valve for the gas is at the service station. I know there’s five shops behind me on the other side of the road, and a hydrant down the road, forty metres to the left. So I knew all that. And that’s stuff that I’ve taken in, looking at it from a fire person’s point of view going up and down the street, but you don’t even know you’re taking it in. I didn’t even know I could spiel that information off to you now.

The Liquorland Inspector did not draw a mudmap during the interview. Rather, we concentrated on photographic images and the timeline. The previous excerpt indicates a depth of visual awareness and observational engagement with the local environment, as the Inspector has stored crucial images, such as the placement of fire hydrants, over time. As a further example, every fire officer who visits my
work building absent-mindedly checks the use-by date of the fire extinguisher located in the corridor, while engaged in a goodbye or hello conversation.

Throughout Chapters 4 to 7 a number of mudmaps and timelines drawn by the Inspectors are reproduced. The Inspectors spoke as they constructed their images, and where the transcript matches a point in the drawing I may indicate this with an arrow. Other images, mostly paintings, will also be included as a way of drawing upon artistic practice in a multimodal explanation of the aesthetic nature of risk perception and decision making on the fireground.

Conclusion

Through the introduction provided by the Liquorland Fire, the uninitiated reader may now have an introductory grasp of NSW Fire Brigades colour codes and fire levels. Pieces of fire-related vocabulary will continue to be used throughout the data analysis chapters, although not as fully or chronologically as found here in The Liquorland Fire.
Chapter 4: Something is not quite right

Introduction

The art of decision making rests not in prescription but in insight. Above all, the intention has been to show that real power is an ability to sense doubt and uncertainty, a feel for the risks and dangers that surround us, and an awareness of our ability to exert control and to predict the future (Drummond, 2001, p.241).

Uncertainty is uniquely encapsulated by fire because it can be friend or foe. The ability to control and harness fire is fundamental to the complexity of a society in which combustion lies at the heart – from cooking, heating, and manufacturing, to cars fired by combustion engines (Goudsblom, 1987, p.457). Contemporary Western societies have very sophisticated social codes of conduct dictating how we ought to behave to prevent the danger of fire and to deal with the outbreak of fire. Usually the overriding principle is caution, as fire is viewed as so dangerous, capricious and uncertain. The intention of Emergency Management Plans and Standard Operating Guidelines (SOGs) is to “convert the uncertainty that surrounds hazards or accidents into the kind of certainty that can be managed” (L. Clarke, 1999, p.6).

When Incident Controllers scan a fire for suggestions as to what is happening they are moving to clarify their uncertainty. This is officially called Situational Assessment in the literature and more colloquially known as ‘size-up’ amongst firefighters. In finer detail it is possible to distinguish between Situational Assessment, meaning a person’s acquisition of information, as opposed to Situation Awareness, meaning a person’s interpretation of the information they have accessed (Strauch, 2004, p.198). I generally use the term ‘awareness’, resisting the temptation to consider these elements individually, in an attempt to retain the entirety of the experience in all its multimodal facets. To this end, there is a sense in which the shapes and colours before the firefighters, sometimes in smoke so heavy and so dense that they have to literally feel the physical...
environment in order to form a mental image, may be experienced in an abstract or surreal way. Multimodal Decision Making is not focused on finding one objective representation of the ‘truth’, but rather on the multifaceted, unpredictable, uncertain conditions which Incident Controllers must address. These situations defy objective description, and as Dewey writes:

The arts are not the sole source of aesthetic pleasure. They are not the only repository of the holistic and unified...Any job well done yields rewards akin to those associated with the production or appreciation of art. Instead of being unique in experiential terms, what the arts offer are but refinements of qualities to be found in ordinary experience (Dewey, cited in Jackson, 1998, p.6).

For example, when you come up for a breath after snorkelling on a tropical reef and someone sitting in the boat says “What was it like?” they are asking you to condense the overriding quality of your experience in a way which encapsulates it without having to describe every single little facet. What they really want to know about is your experience as an entirety, and it is up to you to mention and arrange your response. It is very difficult to talk about this quality, and often we use inane expressions such as “It was great”. We can talk about parts of the experience, we can break it down into what we enjoyed most to least, or we can relate it chronologically. Whatever we do, we can never entirely recapture the immediate vitality of the experience as a whole. Dewey points out that emotions are unifying, they hold an experience together:

We are given to thinking of emotions as things as simple and compact as are the words by which we name them. Joy, sorrow, hope, fear, anger, curiosity, are treated as if each itself were a sort of entity that enters full-made upon the scene (Dewey, 1934, p.48).
My description of snorkelling does not equal the actual experience as I lived it. And so there are places in this thesis where I examine the actual experience, and there are places where I examine the reflection on the experience. And there are places where the two are inextricably intermingled.

In this, the first of four chapters devoted to data analysis, I holistically block in the conceptual understanding of Multimodal Decision Making. Here the artistic dimensions of decision making by Incident Controllers on the fireground are explored through the loosely held themes of uncertainty and ‘something’s not quite right’. A number of images and related incidents are presented and discussed and the reader is introduced to the concepts of uncertainty and crisis communications as they relate to Multimodal Decision Making. Finer details will be magnified in the following chapters. To enlarge upon selected details before blocking in the major themes would cause distortion, as relations between the parts have not yet been established; however, the concepts of Multimodal Decision Making introduced here are no less foundational than those presented in Chapter 7: Complex Incidents.

Incident Controllers work in an uncontrolled environment. Bringing a fire under control, colloquially known as ‘knocking it down’, is a routine part of their work. Although on the surface everything on the incident ground may appear to be progressing as expected, the reality for Incident Controllers may be deep gut feelings and an intuitive subconscious or conscious reading of the signs, prompting them to consider that ‘something is not quite right’. What do they do with this deep-seated aesthetic awareness which often defies verbal description? Act on it? Disregard it? Hold it in check until proven? Share it with others, bounce it around? Is there time and means to communicate any of this in a time-pressured situation?

In the following incident, Quivering Voice, the Inspector makes accurate calls for backup through trusting in his own somatic response and overriding parts of messages he was receiving from the first arriving officer and the Communications
Centre. The Quivering Voice demonstrates that the thread of somatic response is inextricably woven into the fabric of what informs crisis communication. I have reported this incident in the Australian Journal of Emergency Management (Ingham, 2008).

**Quivering Voice**

Early one morning a country Inspector is called out to a factory fire in a town, normally one hour’s drive away. It takes him 40 minutes to drive to the fire, and on the way he busies himself receiving two updates from the Communications Centre and talking by radio to the first arriving officer at the incident. Nothing the first arriving officer said was unusual or alarming. What was alarming, said the Inspector, was the very slight tremor in the officer’s voice. It contained a hint of fear.

The Inspector deduced the incident was possibly more serious than the Communications Centre had so far anticipated. He organised backup appliances, no mean feat considering the distance to be covered by the backup appliances and the country towns which still needed their own fire protection maintained, and the speed at which he was driving. These decisions, maintained the Inspector, were prompted by “the quivering” in the officer’s voice. On arrival the Inspector saw immediately that his call for backup was indeed necessary, because the fire was moving out of control with the possibility of spreading to other buildings.

We pick up the story somewhere along the road as the Inspector is speeding towards the scene, soon after he has spoken directly to the first arriving officer:

So I got the message from the first pump that was on the scene, I could hear in his voice that he was quivering, so I thought “I am not too sure if he is comfortable, I’d better get him some help”, so I rang up Comms and I said “Listen, I know you have got these two trucks coming from A., you’ve got the Rural Fire Service,” I said “you need to send U. up now”. So I made sure
they had got on the road, they were only 20km away. I may have waited another 10 or 15 minutes before I said “Ok you better get G. there” – it’s only another 40 km maybe, I said “get them on the road as well”.

V: This is all while you are in the car?

All while I am in the car driving to the incident, I am building a mental picture of what’s happening, and from hearing his voice, I felt that he was maybe not in control because of the quivering in it.

V: Did you know him well already?

Yeah, I knew him sort of well enough… I could just tell, he sounded like he was in trouble…I felt once I arrived, he more or less – I could feel a weight come off his shoulders, “You’re here now, I don’t have to deal with this anymore, it’s all yours.”

Deciphering between face value and intuitive understanding

As he speeds towards the incident the Inspector is continually readjusting his plan. First, he organises backup from one location, then twenty minutes before arrival he decides to call for even more backup. What precipitated this decision? Perhaps it was his escalating anxiety as he approached the incident. Perhaps the quivering in the first arriving officer’s voice was increasing. What we can say conclusively is that it was not the result of the literal content of the verbal reports, but rather his somatic response to the “quivering voice” and his somatically informed imaging of the scene in his mind. Upon arrival his call for backup proved necessary as the fire was indeed raging out of control, and no effective plan was in place. Multimodal Decision Making acknowledges the somatic awareness this Inspector acted upon – the quivering in the officer’s voice.
The Inspector could have understood the risk factor in scientifically measurable terms: “factory well alight, two appliances in attendance…” and so on. Nothing unusual or odd happening, it is all a straightforward textbook factory fire. If the Inspector had only responded to the words of the message he would not have called for backup while driving towards the incident. In fact, what he responded to was not the information he received as a verbal message, but rather it was the slight tremor in the first arriving officer’s voice. According to Dewey (1934), “In ordinary perception we recognise and identify things by their shapes; even words and sentences have shapes, when heard as well as when seen” (p.119). The Inspector recognised the “shape” in the tremor of the Station Officer’s voice and understood it to mean “not handling the situation well”, although the literal meaning of the words themselves did not. The Inspector’s somatic perception informed his decision to call for backup, overriding the words communicated in the verbal report.

**Crisis Communication requires multiple decisions to be made rapidly**

Figures 4.1 and 4.2 were created by the Inspector as he related the incident.

Figure 4.1: Timeline of the Quivering Voice

According to Tufte (1997), a renowned author, statistician and graphic artist, visual techniques for depicting quantities include direct labels such as the minutes and hours sketched onto the Inspectors timelines; encodings, such as colour
scales; and self-representing scales, meaning objects of known size appearing in an image (1997, p.13). In Figure 4.1: Timeline of Quivering Voice, the Inspector depicts the trajectory of human interventions in his direct labelling of precisely where critical decisions were taken. For instance, upon his arrival he withdrew all firefighters and regrouped them. Somewhere before 12:30 he rotated them and at 12:30 he released a couple of crews, indicating the crisis point was past. Mopping up, fire investigation and dealing with the media all occurred before formally handing the incident over to the Police.

**Mudmaps and timeline**

Gillian Rose (2007) highlights how today’s Western world relies on and values images as a means for interpreting societal issues. She writes about how images “interpret” the world, and that they are never “transparent” (Gillian Rose, 2007, p.2). This perspective provides a good foundation on which to build the importance of the mudmaps drawn by the Inspectors, because each mudmap is drawn with a specific purpose and audience in mind. For instance, the Inspectors drew mudmaps during the interview process as a way of demonstrating and explaining to me what happened. In the course of their fireground work they also draw mudmaps to help determine where resources would best be placed and to provide an enduring record of the incident. They also keep a written record of what occurred and what they ordered, and at what time – although this list usually moves down the page rather than across, as in the timelines they drew for me. One way or another, fireground mudmaps form a record of the incident. Constructed during or after the event, they represent a purposeful depiction of the actual image. If we think of the fireground itself as the actual image, we get another angle on the Incident Controller as artist-practitioner in that they do not create the image they are working with, they react to it and work with it or against it; one way of doing this is to produce a drawing of the incident ground.

What I am investigating is the perception and response of Incident Controllers to a live, moving and threatening image, and what they draw on within themselves to
read and perceive the fire’s next move, its next possible permutation. I argue that this is an aesthetic awareness and somatic response, as much as it is a ‘scientific’ process, in the assessing of risk and consequent decision making. If fire is understood as a moving and live image, it cannot be equated to a video because it cannot be rewound or stopped; add to this that this image demands, by legal obligation, the Incident Controller’s immediate response. Reading the fireground image is what they are trained and paid to do. They have to be able to read the image accurately, and to anticipate its next movement, otherwise they are not fulfilling their role as Incident Controllers.

Figure 4.1: Timeline of the Quivering Voice illustrates the perception that time appears longer during the crucial moments of the incident, and gradually speeds up to ‘normal’ as the crisis point passes; in other words, the measures on the timeline are not spatially equal increments of time. The scale changed in calibration when so much action was packed into the first arriving minutes, and then gradually, as the fire came under control, the measurement of time on the timeline slowed down. Certainly, the somatically informed action during the first arriving moments on the incident ground has an otherworldly feeling about it. The unrelenting bombardment of information from other officers reporting in, the public bystanders and constant requests for information from the Communications Centre, the media and other attending firefighters, is processed and filtered by the experienced Incident Controller into specific, directive communications. If we add the Incident Controller’s own fast speeding thoughts, it becomes clear that if each single request were attended to, the fire may never be extinguished. All Inspectors alluded to or directly addressed the art of sifting and deciphering the important messages to respond to, including their own, amidst the backdrop barrage and noise of the fireground.
**Interpreting and communicating 'reality'**

What principles informed the Quivering Voice Inspector’s choices of design in relation to the mudmaps and timeline? As an experienced firefighter the Inspector was already familiar with drawing fireground mudmaps soon after his initial size-up. Fireground mudmaps have an accepted legal, technological, and practical application and form part of the documentation of an incident which can be called upon in a court of law. They are also considered as an aid to decision making in the deployment of appliances and firefighters.

A distance is created when we draw an image, a distance between us and the object we are drawing. How valuable is this distance to Incident Controllers when considering their plan of action while drawing up the mudmap? What else, previously unnoticed or unperceived, do they now see?

Figure 4.2: Mudmap of the Quivering Voice
Figure 4.2: Mudmap of the Quivering Voice indicates a self-representing scale in which the viewer is able to gauge the size of the shed relative to the various appliances and roads placed around it. The fire is almost the absent centre, indicated by the darker square of black. This is not an intimate, close-up image of the fire; rather the viewer is placed at a public distance and given an idea of the scene in its entirety. Modality is a judgment on the truth or credibility of a visual image (Kress & van Leeuwen, 1990, p.47) and a number of features ‘cue’ modality, such as colour, texture, illumination of light and shade and perspective. Each of these features could be applied equally to the images drawn by the Inspectors as works of art in themselves, and to the somatic and aesthetic experience of Incident Controllers on the actual fireground, as they read the colour of the smoke indicating fire intensity, the texture of burned materials indicating depth of heat, and so on.

In the West there is an expectation that life and property are to be preserved, but not at all cost – the associated cost or risk factor is culturally determined. Hodge and Kress (1988) state that “Social control rests on control over the representation of reality, which is accepted as the basis of judgment and action” (p.147). Reality for the Incident Controller is contingent upon Standard Operating Guidelines as well as cultural norms, and ‘reality’ is represented in their communication and decision making. That is, how far an Incident Controller is willing to risk life and property is not only contingent upon Standard Operating Guidelines, Standing Orders, and the Fire Brigades Act and regulations; whether consciously or subconsciously, Incident Controllers take into account socially and culturally determined values, and these values carry moral obligation associated with risk, communication and decision making.

The fireground mudmap in Figure 4.2 is informed and enculturated with acknowledged Fire Brigades practice. For instance, there are codes representing stations, the understanding of sectors, the importance of accuracy with the placement of vehicles and roadways in relation to one another, and the aerial
perspective of a draughtsperson. Despite this accurate representation of ‘reality’ on the fireground, one would expect an artist’s impression to look quite different. Although both images would record ‘reality’, the very nature of their purpose, the intention for their use, would influence the executor’s communication of reality. Thus Incident Controllers have to be able to read the fireground, constantly readjusting and interpreting ‘reality’ in order to anticipate the fire’s next move, otherwise they are not fulfilling their role. The Quivering Voice demonstrates that this ability is somatically informed, and based as much in reality as it is ‘scientific’ and based on Standard Operating Guidelines.

The perceptions of Incident Controllers on the fireground are multimodal, building an indivisible, holistic understanding of the incident. The ways in which they look are directed by their purpose for looking, and that purpose shapes and modifies their response.

Discussion relating to the Quivering Voice

The technical aspects of fire behaviour may be described in scientific language without difficulty. The indeterminate, messy and confusing problems encountered by Incident Controllers on the fireground cannot be so easily or fully explained. In these complex situations Incident Controllers are visually and somatically informed, relying on an intuitive and embodied reading of the fireground that is difficult to express in the measurable and objective scientific language demanded by emergency communications.

Within the positivist construct risk is assessed and defined using quantifiable and objective language, and then communicated and managed ‘scientifically’. The impulse within us to categorise, sort and delineate is exceptionally strong and through the infiltration of the positivist-scientific perspective we have been programmed to think perception is all about distinguishing these elements. Typically somatic awareness, which is the concept of a decisions-maker during an
emergency as a ‘whole’ body using all their senses to evaluate and act, is not recognised as crucial.

In terms of the fireground, it is standard practice for fire services to plan and prepare for a procedure-based approach to various anticipated fireground scenarios. Contained within these procedures are directives concerned with communications between the fire commander and their crews, the Communications Centre, and dealing with inter-agency communication. There is little, if any, official recognition which acknowledges or incorporates the importance of the somatic response and aesthetic awareness of Incident Controllers.

Recent research in emergency communication focuses on the individual or the team in relation to word-based and verbal communications, the result of radio messages, computer generated or electronically transmitted print outs, and the like. These word-based, verbal and written communications are consequently collated, interpreted and disseminated into further forms of communication (Paton et al., 1998, p.8). Inter-agency communication is a major area that needs to be addressed (Banipal, 2006), and some researchers have proposed multimedia solutions (Nikolic, Savic, & Stankovic, 2007).

In 1997 Enrico Quarentelli, the seminal writer on Incident Command Systems, warned of the challenging aspects of the then increasing move towards using information technology in disaster planning and response. He pinpointed ten potentially problematic aspects. One relates to non-verbal communication, highlighting his concern that an individual’s ability to collect information using non-verbal cues would be weakened by increasing reliance upon technology, resulting in diminished voice and body response. He also warned that this situation would lead to a breakdown in the hierarchical powerbase he sees as necessary to drive an effective emergency response. He stresses that:
Meaningful communication is dependent in many ways on gestures, inflections, body language and affective tones, etc., over and beyond the cognitive symbols involved (Quarentelli, 1997, p.100).

The gestures, affective tones and other non-verbal responses that Quarentelli lists are somatic and aesthetic in nature – that is, they relate to the whole body being involved in the communication process, indicating that words alone are not enough for meaningful communication.

Paton, Johnston and Houghton (1998) observed that meaningful communication in a crisis situation is also non-linear, as “prescriptive decision making, likely to typify routine decision making, is inappropriate for crisis circumstances” (1998, p.9). In recent years crisis communication in the media has moved from a linear model in which network gatekeepers defined details to be released upon the general public, towards interactive technology, thus transforming the general public into a global community. Today, information is continuously reviewed and exchanged through a variety of platforms such as mobile phone communications, blogs, Google, YouTube, and other web spaces which encourage debate (Volkmer, 2008, p.97). This multidimensional aspect to crisis communication, in which geographical, political and cultural borders have been superseded by “spheres” of communication, newly defined by Volkmer as the “culture of spatial reach” (2008, p.97) connects the complex world of crisis communication in the media and, more specifically the fireground, through transcending locally imposed boundaries and providing an holistically integrated perspective.

Decision making by Incident Controllers on the fireground and subsequent emergency communication involves being able to negotiate the competing demands not only of the fire, but of the entire incident ground. This incorporates risk, danger, sparse pieces of conflicting information, and the pressure to communicate rapidly. These elements form the image that Incident Controllers have to mould and shape.
Multimodal Decision Making is holistic in its approach to recognising the importance of visual perception and somatic awareness when contradictory and incomplete information has to be processed quickly. Multimodality is distinguished from formal rationality and informal sense-based rationality in that it approaches art, science and practice as an irreducible whole; a linear, monomodal approach is not conducive to capturing the holistic dimensions of the decision making experience.

**Oil Refinery Fire**

Station Officers and their crews are generally the first fire officers to turnout to a fire. If the incident is large or complex to the extent that it is called at Level 3 or Level 4, that is, six to eight fire appliances are requested by the first arriving officer, the Inspector assigned to that location and constantly monitoring Communication Centre messages, will also turnout to the scene. As a consequence the incidents reported in this thesis are generally of a large to very large scale and the Incident Controller, that is the Inspector interviewed, has usually arrived on scene after the first arriving Station Officer has initiated a plan of attack. There are two points to consider as a consequence of this. The first is that due to the scale of the incidents they are usually very public, meaning they are visible from various vantage points, often affect large numbers of people, and are reported in various news media. Secondly the Inspector, although assuming Incident Control upon arrival at the scene, has to work with the positioning of appliances and crews as placed by the first arriving Station Officer, who is the original Incident Controller. This means that the Inspector often has to work with the initial blocking in performed by someone other than himself.

Having said this, the next two incidents occurred when the participating Inspectors were at the rank of Station Officer. They are provided to give the reader a sense of contrast between the ranks, and both occurred within a year of the interview.
In this recount of the Oil Refinery Fire the Inspector is recalling a large fire he attended while he was at the rank of Station Officer. From his current rank as an Inspector he debates the two ranks and their priorities. As a Station Officer he just wanted to get in there and find out where the remaining pockets of fire were; we are talking here about going underground to where there are fires in unknown locations, rather than standing around on the surface, inactive and not knowing:

We had a big fire at BHP, they had been there all day, and we came on that night shift, and everyone was standing round, ’cause the thing had got to a point where – alright, we didn’t know what to do.

They got the worst of it out, but it was under all this machinery in a tunnel underneath BHP. Um, whether it be wanting to be aggressive or wanting to do something rather than do nothing or whatever…I got to the point where I said “Well, we won’t know unless we have a look…here’s where people are telling you that it might be, but I think we can do something about it if it’s – if it’s simply just here, here and here.” So in the end we climbed down between the machinery with a piece of equipment you can fire like a laser and you can pinpoint a part of a building, shoot the gun at it, and the laser will read the temperature there. (This piece of equipment is called a thermal imaging camera. The Inspector did not use the technical term, but spoke in plain English, most likely for my benefit.)

The reason I look at two separate things, one as an SO and one as an Inspector, is because I look at it from the point of view that too many times I think we make decisions based on procedure.

I have selected this incident and placed it here because it provides an insightful reflection by the Inspector as to how he used to do things, how he used to think. It conveys the sense of urgency that the person in command of a crew on the ground, facing the incident hands-on, feels. There is a deep, instinctual desire to extinguish
the fire. He’s trained for it, he’s ready for it, and he’s champing at the bit to get on
and do it. Now, as an Inspector, he arrives at the scene after the Station Officer
and crew. His decisions are not fresh strokes of paint on a blank canvas, they must
be built upon whatever has previously been blocked in. The appliances may
already be positioned, a plan of attack already under way. Now his mission is to
orchestrate a much larger image, mould far more resources and to appreciate the
bigger picture, not a small sector of it. Now he has concerns that span a number of
different crews and other emergency service organisations. This is a tangible point
in a firefighter’s life – moving from leading a crew, to being responsible for
multiple crews and dealing with issues across agencies. Previously there was
safety in detail, but now he or she must try to understand the larger picture and
think forward, and not be pressured into focusing on one or two details, such as
the last remaining hot spots under the Oil Refinery, responding to the immediate
and losing the big picture.

Another aspect of Multimodal Decision Making, highlighted by this incident and
recurring throughout this thesis, is the tension between what the Incident
Controller wants to do and what he ought to do, as per the Standard Operating
Guidelines. I contend that this is a healthy and unavoidable tension which is
negotiated, but never wholly resolved. In such unsafe and fast moving
environments there are necessarily procedures to fall back upon, and these are
called upon in a court of law if the incident comes into question. Although there is
the way things are meant to be done, the way they are meant to proceed, it is not
always possible to follow Standard Operating Guidelines, and that is why the
NSW Fire Brigades have fairly recently changed from ‘Procedures’, which
implies something you must follow strictly, to ‘Guidelines’, which connotes some
flexibility and the use of individual judgement. Other Australian emergency
service organisations are yet to follow suit and the common terminology within
the emergency services in general is Standard Operating Procedures or SOPs.
As a Station Officer, this senior officer disappeared down into the tunnelled depths below a smouldering oil refinery, located a number of hot spots, and thus enabled the fire crews to redirect their attack and extinguish the last remaining underground fires:

Whether that’s something that’s just been gained over the years, to think well, you’ve got procedures and you’ve got things you can see, and sometimes the decisions you make maybe fall in between.

The tension between what Incident Controllers should do in terms of prescribed procedures, and what their embodied understanding of the incident indicates, is a very real and unexplored area in decision making on the fireground. Multimodal Decision Making acknowledges the tension created by an holistic perception which does not rely on a linear sequence or one aspect or piece of information as the basis for decision making.

As this fire officer experienced, moving into the role of the Inspector involves more than assuming command of greater resources at larger incidents; it involves moving into a mindset which calls upon all past experiences and forming different relationships with respect to the incident, the crews and organisation.

In the next incident another Inspector reflects upon an incident when he too was a Station Officer.
The Open Door Fire

There’s a lot more to do, a lot more to think about, than just the fire (Open Door Inspector).

The feeling that ‘something is not quite right’ may place Incident Controllers in a position of having to distinguish between what they read at face value and what they intuitively understand to be happening. Often, as the following incident will demonstrate, these indications have been passed over by less experienced firefighters.

What happens when the sense that ‘something is not quite right’ conflicts with Standard Operating Guidelines and Incident Controllers have no apparent rational basis for their decision and are unable to generate a ‘rational’ explanation for their feelings? What happens when Incident Controllers have to account for their actions when they are based on an alternative to conventional reading of the incident?

In the changeable and erratic landscape of a fire, uncertainty is a key feature. Various physical media, such as water and foam, can be applied with known reactions, but there are many uncertainties. The wind may change direction, unanticipated substances may become involved emitting toxic fumes, there may arise unforeseen threats to life and property, and so on. Choices between one course of action and another must be made quickly. The fireground is a microcosm of the universe – predictable in some respects, uncertain in others.

The condition of feeling uncertain calls for a process of continuous adjustment – a continual reappraisal of the situation, because a fire will not sit still. Neither does our interpretation of the data for that matter. It arches and stretches, recedes and reignites, and to contain it requires reading its uncertain moves. Moving ahead of the flames, Incident Controllers must use their creative and intuitive understanding to distinguish when ‘something is not quite right’.
And my gut feeling was the door was opened, somebody’s come out and gone back in…It’s just, when you looked at the whole scene, there was something not quite right. Like there should have been – I would have been perfectly comfortable if there was a person out the front.

In this incident, the first arriving officer (the research participant) and crew of three turned out at night to a single dwelling with one front room well alight and the front door wide open. There was no one in the street. The fire attack crew, with a combined experience of two and a half years – that is, not a great deal – immediately set to work with a hose on the front room. The first arriving officer would have preferred a different plan of attack, but as the crew had jumped down from the appliance and set to work so quickly and unbidden, as though this was the only course of action, he hesitated to pull them back. He moved towards the back of the house, noting details about the car in the drive and the well-kept garden, and made a quick deduction that the occupants were elderly. He found the back door locked:

The one thing that I was so worried about, I guess, was that we could see a door open, and normally if you’ve got a door open somebody has run out of the house…it didn’t kind of gel, because there was no one there, but the door was open, and I remember seeing there was a car in the driveway, which would be another indication that there might have been someone home.

The funny thing was when the guys in the second appliance arrived they were going to assist my crew by backing them up with another line of hose. Then I remember specifically worrying about who was in the back of the house, ’cause there was no one, the door was open, it just seemed to me like somebody had opened the door and gone back in.
I think it was just a gut feeling, I kind of knew where the guy would be from the word go.

This is a case where the first arriving officer reads the scene with the eyes of intuitive experience, as though considering a puzzle to be solved. The clues were there for the taking and his gut feeling was that an elderly occupant was trapped at the back door, while the relatively inexperienced crew were transfixed by the fire and working hard at putting it out. The open door was a clue that went unnoticed by them. The participant said the crew “looked at the flames, that bright, that shiny, and hit it with water without kind of going through that in their heads.” The second arriving crew, directed by the participant, located the elderly occupant still alive, but unconscious, lying trapped by a deadlock at the back door.

**Situational Awareness**

Shusterman writes:

> We cannot feel the body alone, apart from its environmental context. So in developing increased somatic sensitivity for greater somatic control, we must develop greater sensitivity to the body’s environmental conditions, relations and ambient energies (Shusterman, 2008, p.215).

I suggest experienced and expert firefighters, such as the Incident Controller in the Open Door incident, have “developed a sensitivity to the body’s environmental conditions” to the point where they ‘use’ it to inform their decision making in time-pressured situations. The younger members of the crew did not have the same body consciousness as the Incident Controller and were totally surprised at his prediction that the occupant would be at the back door:

> You go to a job like this you know, when the guys jumped out of the fire truck, what’s tugging at them is the fire…as soon as they jump out they look and they will just get tugged towards that as a need to get done.
I had a look at the kind of general lay out of the house. It was well looked after, didn’t look like some scum bag had thrown up, like, you know – in the bedroom; it didn’t smell off or anything like that. This had a nice garden…And it looked like an old person’s place as well, you know. The kind of, that kind of oldish sort of carpet, no modifications, well looked after and all that sort of thing.

Another thing that was really bugging me at the time, the flames that were coming out were impinging on what we call a bargeboard, which is like where the gutters fit, and that’s where the electrical connection went into the household. So I was a little bit worried about the fire burning through the timber and then the electrical wires coming down. The wires would have come down pretty close to the fire truck, and also possibly across the hose.

The open door:

So if the door was closed, I would have thought there wouldn’t be anyone home, because with a fire like that they would definitely be awake. Somebody would have got out, somebody would have come out through the back door, out through a window or there would have been other things going on. If you get a smouldering fire, that fills the house with smoke and makes very little noise, that will kill you in bed, but this was a raging fire, you know, like it was making a lot of noise – cracking, popping, all that sort of stuff.

The experience of interviewing the Open Door Inspector provides evidence for the need to recognise aesthetic awareness and somatic response in that, although the actual incident took just under ten minutes and was recounted from just under a year ago, it actually took the Inspector forty-five minutes to describe. Actually, it took him forty-five minutes to describe the first arriving five minutes of the incident. The level of mental and physical activity packed into a ten minute
timeframe on the fireground is astonishing. Multimodal Decision Making is about recognising the artistic, aesthetic processes feeding into Situational Awareness which facilitates these instant and intuitive recognitions. The images constructed by the participant as he recounted the event are reproduced in Figures 4.3 and 4.4.

![Figure 4.3: Mudmap of the Open Door Fire](image)

Red, in any culture, is an attention getter. When I look at the Inspector’s drawing (Figure 4.3) my attention is immediately drawn to the red strokes of ink indicating fire. The physical effect of red is said to be such that exposure to quantities of the colour quickens the heart rate, prompts the release of adrenalin into the bloodstream and engenders a sense of warmth (Varley, 1988, p.186).
Blue, on the other hand, is considered a cool and soothing colour with quite the opposite effect of red. At its very basic, we can understand the antithesis of the red-blue application of colour in Figure 4.3. Just as red raises blood pressure, blue is said to reduce it (Varley, 1988, p.212), analogous to the effects of fire and water. The red and blue lights on emergency vehicles are no coincidence; they have been selected because the similarly saturated hues cause an almost irritating, attention getting effect, when juxtaposed.

In Figure 4.3 the red squiggles indicate a room well alight. There is a car in the driveway. The elderly occupant is depicted as a stick figure lying at the back door, and then later as a figure reclining on his side in the foreground, where the second arriving crew had deposited him.

Although handed a very large sketchbook size page, the Inspector, as did the other participants, drew within an A3 space range. In this particular interview we were sitting at a table with ample room to accommodate the large page. I later realised that the worksheets Inspectors use to record their mudmaps and notes are A3 in size (420 x 297 mm; see Appendix 1).

This is a complex situation in which competing elements beckon the Station Officer for priority. In ‘reality’, crew safety should have been the primary priority, which would mean moving the pumper away from the overhanging electrical wires, but what he did was concentrate on saving the old man who had been deposited at the front of the property by the second arriving crew. His mind was grappling with the very real possibility of falling electrical wires and knowing the ‘right’ thing to do would be to move the appliance:

And I’m thinking “If he stops breathing, we’re both basically ratshit here.”

Also it was tying me up, you know, concentrating on this guy, also tying up the pump driver who really should have been at the back of the pump ready
to pass a radio message. And also we were still thinking about these, these wires we had to shut down and move the pump. I mean, in reality that probably should have been the very first thing we did.

Figure 4.4: Timeline of the Open Door Fire

Time

So, I always think the pace of any job, no matter what it is, changes when you know the life-risk has been removed.

V: And how long till the ambulance arrived?

It was, it seemed, you know that seemed like an eternity, it was probably five minutes.

The time spaces appear evenly delineated, approximately 2.5 cm apart in the original image, but in fact they convey different periods of time, and as with the Quivering Voice, the first five minutes takes up a disproportionate space: three quarters of the timeline.

Down the left hand side of Figure 4.3: Mudmap of the Open Door Fire, the Inspector has listed the procedure he followed, the guide he used in his head. The line between ‘extinguish’ and ‘overhaul’ corresponds to the line on the timeline.
where the ambulance arrives and he considers himself to have moved into ‘classical’ decision making – that is, the crisis point is over. This corresponds to the Liquorland Fire in which the Inspector marks on the timeline where he understands the crisis point to have passed and settles into salvaging what is left of the store. The critical point for Incident Controllers is that moment between the fire receding or escalating. Once it begins to recede they consider the critical point to have passed and that they have gained control over the fire. This point is discussed further in Chapter 8, with the introduction of the Phase Change Model.

The Inspector has classified his decision making in the first five minutes as ‘Naturalistic Decision Making’. As a student of a Graduate Certificate in Social Sciences (Emergency Services) in which I facilitated a subject introducing Naturalistic Decision theory, he was familiar with the term and the theory.

The ambulance arrived at the five minute mark, noted by the Inspector in Figure 4.4 as “felt like an hour”. The elderly occupant was unconscious. The Inspector was unaware if the occupant had made it through the incident, but he did receive a thank you phone call from the man’s son. I found myself constantly surprised at the lack of tied up ends, the incomplete story which seemed a natural part of life for Incident Controllers. Unless they were proactive and telephoned a hospital, or those related to the victim made contact, they very often did not know the human outcome of the fire and generally appeared none too concerned. Their focus is firefighting and the welfare sector is responsible for recovery; this was made very clear in a number of the interviews. In later informal discussions some participants stressed that this kind of detachment is “a mental health survival strategy” and that if they worried over the outcome of all victims they could end up a “cot case”.

“Time matters most when decisions are irreversible” (Bernstein, 1998, p.15). Many decisions made by Incident Controllers on the fireground are “ irreversable” and yet they must be made on the basis of incomplete information. This is why a multimodal approach to understanding how these decisions are made is very
important. A multimodal perspective acknowledges the interconnectedness of the various parts to the whole; breaking the decision into sections and correlating with other incidents would loosen this connectivity.

The Open Door illustrates intuition as a facet of experience, the way experience is integrated into recognising (or not recognising) a situation, its patterns and cues and then acting accordingly. The dynamics of the situation are holistically understood in terms of key recognisable patterns – the car in the drive and the neat garden, are both indicators to the Incident Controller that this house is occupied by an elderly person or people. In this respect the Station Officer exhibited his expertise, perceiving signs his newish crew had missed.

When the first crew entered the front of the house with their hoses, and the second crew smashed down the back door to release the elderly male occupant, visibility was severely reduced. Being sometime before midnight it was dark and the smoke was thick. Ultimately the house was secured by the elderly man’s son, located through an address book which was found by the Inspector. He called the first person he found with a surname matching the driver’s licence of the old man, but in reality there was nothing left to salvage.

**Connecting doors**

Various aspects of the Open Door Fire can be illuminated further by connecting it to the same theme in Australian art. This is the first time in which I draw on a painting to demonstrate the aesthetic connection between art and decision making on the fireground.

The ‘open door’ was a minor theme for early Australian impressionist artists. I located three paintings from this period (1881-1930) and two are reproduced below. The third is by Frederick McCubbin, Home again and was painted in 1884. In all three paintings the open door is on the right. I have included the David Davies painting From a distant land to illustrate that recognisable themes occur in
painting genres, much the same as recognisable fire scenarios occur in firefighting. Each fire and each painting is in some way unique, but also in some way alike. In this case, the paintings all have an open door to the right and they illustrate a recognisable and common occurrence of life for Australian pioneers, such as receiving a letter from home, a tragic death or a home coming.

Figure 4.5: David Davies, From a Distant Land (1889). National Gallery of Victoria.

The painting From a Distant Land by David Davies is interesting because one would imagine a letter from home in this time period to evoke feelings of anticipation, tinged with sadness at the great distance between the reader and writer of the message. In this painting, the open door shows a bright sunny day and the postman ambling off on his horse into an inviting landscape. The colours of the interior are dark and morose, probably reflecting the reader’s mood, but outside the sun is still shining, perhaps suggesting that it is not such a bad country after all.

The bird in the cage hanging over the door appears to signify the trapped state of the reader, as opposed to the postman, ambling off on his horse. Alternatively, the
A caged bird may be purposely placed to break up the rigid rectangle created by the door frame. A triangle formed by the bird cage, the horse and the tree, is balanced within the doorframe. These subtle three ‘points’ create for the viewer an almost subconscious experience of closure, as the invisible triangle moves the eye from understanding the ‘painting’ into a two-dimensional perspective, and with it the feeling of movement and space and distance.

In the next painting, Figure 4.6: John Longstaff, Breaking the News, a body is about to be carried into a house through an open door. What clues are we provided by the artist to become Situationally Aware of the story in this painting? And what similarities are there with the indications that the Station Officer picks up in the Open Door Fire? What signs are we reading in this painting, and how are we reading them? We rarely encounter a woman who has just lost her husband, so how can we suppose that this is what has happened?

Figure 4.6: John Longstaff, Breaking the News (1887). Oil on canvas, 109.7x152.8 cm. West Australian Art Gallery.

A young mother arches her body towards an old man who has important news. Has she been rocking her baby in the chair by the fire? Possibly she has been warned that ‘something is not quite right’ by unusual sounds and activity coming
from the mine, pictured through the open door. It appears as if she intuitively knows what the old man has to say. She would be reading his eyes, the sympathy in his demeanour, with the foreboding sense that there are people waiting outside. We are privy to these signs adding up in her head to ‘something is not quite right’, and the dawning, since her husband is not present and his workmates are, that something must have happened to him.

Longstaff has managed to capture the instantaneous second in which the young mother recognises that ‘something is not quite right’, the moment when her gut is wrenched in an awful knowledge that a terrible event has occurred, even though exactly what has not yet been completely revealed to her.

Her husband’s boots are at the door, but they are not carrying him, three concerned looking miners are. Even though their faces are slightly shadowed we are privy, unlike the woman, to their downcast eyes and our focus is thus drawn to the hint of a white shroud hanging from their load, the suggestion of death. Looking up and through the open door we see the mine, high on a hill, and we are left to suppose that he died in a mining accident, leaving a young wife and baby behind. The little piece of sky is bleak and grey, as is the message of the painting.

Although this painting would have taken some considerable time and thought to construct, it depicts an instant in time, a split second. The wife has not yet seen her husband’s body, being held up longways at the door by the three sombre looking miners and blocked from her view by the position of the old miner in the room. It appears that he is the eldest, if one is to judge by the whiteness of his beard, and he is about to break the tragic news. As the young wife and the elderly miner each have a hand on one another, perhaps he is a relative, an uncle or father? Or perhaps simply his age and the situation give him permission to lay his hand on her. I have always imagined that in the next instant she will be sobbing on his shoulder.
With our viewing of this painting we have time to adjust, to think and reflect, and even discuss; for me it has been a process of years as this painting has been hanging in the West Australian Art Gallery since I was a child. I remember standing in front of it and being moved by the almost visible emotional wave that is just beginning to sweep over the young woman. Its direction is perceivable, from left to right with the woman’s movement, and from right to left with the miners’ movements at the door, and meeting in a wave at the centre with the two main figures. When she steps through the open door she will never be the same again, her life has been changed forever.

In contrast, the Incident Controller in the Open Door has to read his open door scene in a much quicker manner than us, and make up his mind about its meaning in split seconds. He has no time to linger, he must act immediately and within three minutes he has another crew at the back of the house, dragging out the old man. Deadlocked doors can be quite frightening.

What creates a feeling of uncertainty, that ‘something is not quite right’? I suggest, whether in art or fire fighting, it is the violation of expectancy stirred by a contravening of what was to be likely in the normal progression of events. From the niggling feeling that ‘something is not quite right’, to the violation of expectancy, uncertainty demands a response, usually falling within the shape of a decision. Incident Controllers are multimodal in their perception of the fireground, and Multimodal Decision Making provides an holistic approach to understanding how they negotiate uncertain conditions.

In Figure 4.3: Mudmap of the Open Door Fire, the conventional mode of fire attack which aims to drive the fire out of the building is evidenced by the placement of fire hoses and water flow, as opposed to what occurs in the next incident, the Double Murder, where the fire is driven into the house, creating the possibility of causing more damage. The Double Murder incident occurred two months prior to the interview.
The Double Murder

In the Double Murder incident, a relieving country Inspector attends a house fire in which one male victim has been located and one female child is still considered missing. A five-year-old boy has escaped through the toilet window. By midnight when the Inspector arrives, the fire is out. As the Inspector surveys the burnt male body poking out of the rubble in the lounge room, behind a sofa and under a window, he knows intuitively ‘something is not quite right’. He decides not to damage the scene any further, and calls off all activity until sunrise, by which time the Fire Investigation Research Unit (FIRU) will have arrived. It turned out to be murder – the dead man had been beaten, shot, and the house set alight by accelerant in two places.

Reading through newspaper reports I learned that the deceased girl was four years old, and the five-year-old boy suffered burns to 30% of his body, mainly his face. One man, found at the scene, was taken into custody for further questioning.
At the bottom of Figure 4.7 the Double Murder Inspector provides a visual explanation for ‘flashover’; this phenomenon occurs when a high enough temperature is reached for the self-combustion of gases and materials in an enclosed space, here depicted as pink and yellow particles.

In Figure 4.7: Mudmap of the Double Murder, the Inspector has distinguished between the three occupants of the house through the use of colours and numbers. One body, the man behind the sofa, is lying under a window he could easily have smashed in an effort to escape the fire. Instead, his hands lie limp at his side. People burned to death, due to the action of fire on flesh, have their arms up in a boxing position called the pugilist pose. This indicated to the Double Murder Inspector that ‘something was not quite right’.

Figure 4.7: Mudmap of the Double Murder
The little girl is depicted in the hallway and we are left with the impression that she is on top of the door rather than underneath it. The little boy has a line of escape following him through the toilet window.

The two endpoints of the pink line indicate the places where accelerant was poured. The Inspector, surveying the scene at midnight, recognises that the seats of the hottest part of the fire are not where he would have expected had the cause of the blaze been a routine house fire, triggered, for instance, by an electrical fault.

**Scanning for suggestions**

The Inspector describes how each emergency service agency reworked the scene in a desperate effort to locate the little girl. Despite their best intentions they were effectively destroying the crime scene, although none of them realised it was a crime scene as they had not read the signs as the Inspector did a little later, at midnight:

> But I guess it’s like one of those things where they think someone’s in a cupboard – you go to the fridge and you keep opening the fridge and you close it and you open it and you close it and you open it, magically hoping they will re-appear, rather than pull back and go wait. Because they turned over every bed, they opened every cupboard, they emptied every single draw of every article of clothing, thinking that the kid might be hiding in there. When where she was, was under a pile of rubble and they had literally been walking over the top of her.

> …So that’s where we need the SOs, the officers to, to contain their level of arousal, step back and, and really be more systematic about it. Just taking a stand back sort of stance with it, sorry, stand back posture, capture and taking it all in.
Along a similar vein, Goudsblom (1994) writes “At present, even more than in the past, the control of fire itself requires control” (p.215). Fire is dangerous even when it appears harmless. The dying embers of a factory may flare suddenly. Firefighters have learned how to control fire and some of this control is likely to be the result of their learning to control their own fear. Their power over a fire may be conceived as power over their own fears and anxieties, and according to Cooper (1995), the control of fear forms a foundation for the development of the culture of the hero.

That something is perceived as ‘not quite right’ at times places emergency personnel in a position of having to distinguish between what is read at face value and what is intuitively understood to be happening. Or, conversely, reading the indications that may have been passed over by the less experienced. The Double Murder Inspector reveals his experience in commanding complex incidents by his ability to stand back and survey the scene and critique it as a whole. The positioning of the researcher, the artist, and the firefighter, to their work at hand is important in the formulation of decisions determining the overall direction of the scene before them.

**Controlling levels of arousal**

The Double Murder Inspector talks about controlling his “level of arousal” in order to stand back and make steady mediated decisions which are not based on panicked reactions to the horrifying burnt wreckage of lives before him. Often this kind of stance is interpreted as emotional neutrality. I suggest it indicates multidimensional ways of knowing, that emotion is central to understanding, and that knowing takes on a variety of forms, exhibited in this case by the decision to hold off all activity until daylight.

Smith (2002) writes about the two extremes of high emotion and the sense of routine:
When responders perceive the incident to be highly unusual, dangerous or emotionally charged, they often experience tunnel vision. Tunnel vision occurs when responders focus on one aspect of the situation and lose sight of the overall incident. On the other hand, if the responders perceive the incident to be routine, they may go on autopilot. In either case they become oblivious to their surroundings and thus are at the mercy of the incident (M. Smith, 2002, p.14).

Finding the point of balance between the complacency of the routine in an emergency and the tunnel vision created through being emotionally charged is a function of experience. This area has not been widely researched, and I maintain that the ability to hold emotions in check and simultaneously act on them indicates expertise, both in art and in decision making on the fireground.

In art, the fresh vitality of an expert hand leaves a painting dripping with suggestion and nuance that must be read; some action is required or demanded on the part of the viewer. In artistic terms, interest may be measured by how long an image holds a person’s attention. One way to dissuade interest is to overwork something to such an extent that the life is scrubbed out of it. The contrast has been swallowed up. An overworked scene is dull, lifeless and boring, and even the most inexperienced viewer can sense this to some degree.

An innocent life is lost as the result of her father’s underworld dealings and people with murderous intent. A suspect is apprehended at the scene. There is a sense in which the enormity of the emotion – the emotion of the firefighters searching for the girl – takes first place above everything else: above good firefighting; above “proper incident command” and search and rescue; above “crime scene preservation”. There is a sense in which the unbridled passion to rescue a young innocent life overworks and blurs the scene. Overworking in the artistic sense is read as a sign of professional immaturity, called ‘potential’ and enacted as emotional activity and energy.
The visual organisation of the artwork is the smouldering, blackened, twisted burnt-out house, roof collapsed everywhere except above the kitchen, smoke staining and charring, the heat of embers. This is a familiar scene to the firefighters, albeit not on this magnitude on a regular basis. What made the difference? The emotions invoked by a young life at stake.

This is a scene of desperation as the firefighters looked repeatedly for the girl in places they had already been numerous times before. They overworked and overworked the scene, but the life was already gone. They were not going to find it. These emotion-driven actions essentially polluted and further destroyed the scene. They tainted and dimmed the signs, the original pointers to what had happened. In the words of the Inspector:

Forensic investigators hate this, but if you imagine CSI, the show where they do all the bullet patterns and they stick little red-like straws in the bullet holes and the straw points back to where the gunman fired the gun? In my own mind I’m constructing all these little pointers to say the fire, you can see, you can tell where the fire came from. So where it came from you just back sequence. So you go well, this is where it came from, where did it come from before that point? And then where did it come from before that point? And you try to plot backwards from the outside pointing back in to where the seat was, so there’s all these little red straws, if you like, telling me to look here, look there, go back, look for other indicators.

The red straw, the aesthetic signal of this scene, is the unseen – the girl. The thought of her death through smoke inhalation or burning and the instinctual search and rescue for survivors, are powerful passions pushing these firefighters beyond their usual standard procedures.

According to the Double Murder Inspector another approach was possible:
Now, probably it would have been more appropriate to implement ICS initially, have a room searched in a rapid manner, in a primary manner, have it thoroughly searched, and then close it off and go “nah, they’re not in that room” and then working back from the least damaged to the most damaged, realising if it was done more systematically, it would have been realised that she was probably buried under the rubble, and if she was buried under the rubble, she was dead. So, the debris could have been searched with bars to poke, because a body will, will push back. A lounge will push back, but a body will push back also.

**Distorted and disturbing**

The initial Incident Controller attending this fire had never witnessed a dead body as a result of a fire. It is unlikely that he would have known that a burnt body is spongy and pushes back like a lounge.

They found the male early on in the fire fighting, they found him early on because his head was sticking out of the debris, charred as it was and unrecognizable, you could tell it was a human, human head.

The image of a dead body is disturbing. In Australia television stations are obliged to give warnings concerning disturbing images. A burnt body is also distorted; disturbing and distorted. The deformed, twisted body, the textual surface of burned, unrecognisable faces, the distortion of heat…or gunshot?

What the body does is it takes on what they call a pugilist pose. All the tendons pull up and the arms come up in front as if you’re a boxer. And his arms were laid down by his side. And I said to the cop “Ah, Mac, he is not right, he is not right, there’s something not right!” and Mac's gone “His arms, the arms thing?” and I’ve said “Yeah, there’s no pugilist pose, there’s no pugilist pose. This looks really, really suspicious”, and this was at midnight.
Distortion generates emotion because our feelings are quickly aroused by any departure from the normal, especially in the case of the human body (Feldman, 1992, p.175). If we are honest in describing the research process, any form of reporting, including scientific reporting, has a special emphasis (Eisner, 1981, p.8). Distortion may be the result of adding in, just as much as from leaving things out. While I was thinking about distortion and the agony of the little girl being engulfed by smoke and fire, Munch’s painting of The Scream scudded to the forefront of my mind.

Figure 4.8: Edward Munch, The Scream (1893). Oil, tempera and pastel on cardboard, 91 × 73.5 cm. National Gallery, Oslo.

Munch wrote down his motivation for this painting, and in the year he painted The Scream he began a futile love affair which ended in a nervous breakdown:

One evening I was walking along a path, the city on one side, the fjord below. I felt tired and ill…The sun was setting and the clouds turning blood-red. I sensed a scream passing through Nature; it seemed to me that I heard the scream. I painted this picture, painted the clouds as actual blood. The colour shrieked (Plumb, 2006, p.64).
There is something deathly about the person screaming in Munch’s painting, and the repetition of the sky patterns intensify the dramatic effect of ‘it’s all too much’, the pain, the suffering is like a dull ache pulsing repeatedly, not going away, to the point that the person is covering their ears in an attempt to block it all out. Feldman (1992) maintains that “Through one painting we encounter all the anguish of existence” (p.172). Similarly, it could be said that through the Double Murder “we encounter all the anguish of existence” – the treachery of murder and the loss of innocent life; the overwhelming emotion, almost a Munch scream, first by the little girl, and then by the firefighters in their desperate and repeated effort. In the words of the Double Murder Inspector:

So the girl opens the door and becomes immediately engulfed in fire, in that when she went down, her hand was closed as if she had been grabbing a handle. It was when we excavated the debris, her hand was in the immediate vicinity of the remnants of the door handle; she had her other hand up over her face, palm outward as if she’d been protecting herself. The bottom rung of the door was underneath her, the top rung of the door was on top of her. So it was as if she opened the door, the flame engulfed her and she fell forward into the door, as it was combusted by the fire.

Throughout the interview the Double Murder Inspector reconstructs the entire scene – this is one ghastly snapshot of it. He reads the signs, the hand clasping the door, the palm outward. This was an active person caught by the heat and smoke, evocative of the scream Munch heard and then painted.
Post incident debrief

Viewing art, looking at it critically and thinking about it, is hard work. It takes physical, mental and emotional effort and this activity can leave a person tired, exhilarated or frustrated. Whatever we get out of it, the practice of looking is not an inactive, passive activity:

Art is not merely an imitation of reality or a diversion. In contrast to amusement, which invites relaxation and placates with illusion, art demands an intensification of energies and deepens vision (Gilbert Rose, 1980, p.27).

When Incident Controllers look at a fire, such as at the Double Murder, there are similar processes in the apprehension and processing of somatic signals as a person looking at an artwork. It takes energy to read the intensity of the heat, recognise the smell of various burning substances, look for points of entry and visually measure various relationships such as depth of field, height and the composition of construction materials. In the artistic realm this is called aesthetic awareness and it is recognised that responding to art works involves a somatic response involving every part of the human body (for example, Feldman, 1992; Weisman, 1970). As introduced in Chapter 1, in the firefighting world this same experience is called size-up and Situational Awareness (Beresford, 1993; Endsley, 2000).

In the Double Murder the firefighters, motivated by possible life loss and in a hurried and unthought out effort, begin hosing from a position which forces the flames back into the house – not good firefighting according to the Double Murder Inspector. The evidence of this tactic is read easily by the Inspector, who looks at the smoke and water-stained walls and the hose damage in the garden and immediately reconstructs the fire attack prior to his briefing by the first arriving officer. An experienced art critic or artist will be able to look at an artwork and immediately reconstruct the way it was created. Many artists from all periods of history have gone to great pains to ‘cover their tracks’, so to speak, making it
deliberately difficult for others to see how they performed certain actions. For example, they may lightly and carefully blend their brushstrokes. Firefighters are also trained to ‘cover their tracks’ – that is, to leave as much untouched and undamaged as possible and therefore leave as little trace of their raw activity as possible.

This recognition by the Inspector of the signs and his reconstruction of what had occurred to produce them, is not dissimilar to the kind of organisation of somatic responses taking place when we put our minds to really looking at a painting, in that there is a need to concentrate our attention, recognise forms as familiar or not, make something out of what we are looking at, and make comparisons with something we may have seen previously.

In response to the scene before them, the inexperienced retained firefighters and the permanent firefighters almost appeared to have panicked – they directed their hoses into the house through the quickest, but not the most effective angle; they searched too many times; they forgot the training they had received only a week previously. What does the Double Murder Inspector do? He talks about “stepping back” and devising a plan designed to follow through systematically.

The firefighters were very despondent, feeling somehow it was their fault the little girl was not rescued. Response times in the country are slower than the city due to the greater distances to be covered. According to the Inspector the little girl was possibly dead before the appliances even left the fire station.
Conclusion

Any decision that involves uncertainty implies the possibility of failure (Drummond, 2001, p.268).

Uncertainty is a recurrent theme in the literature on risk (Bernstein, 1998; Botterill & Mazur, 2004; Gardner, 2008; Lupton, 1999). There will always be variable interpretations of an image and a transmutation of meanings through different times and spaces. For example, a political poster on a subway wall may be read for its message; however, a collection of many different political posters in the rarefied atmosphere of a prestigious art gallery may engender quite a different experience, far removed from the original intent of the creators (Ingham, 2002). Wherever the place, whatever the time, the degree of uncertainty in our response to an image is an indication of the extent of our connection with the work. This point of connection is initially individual, but it is also collective, as we engage in a process of looking for indications and reminders in order to understand, with eyes coloured by our own emotional as well as collective experience. When we address images there is “a continuous adjustment as we scan them for suggestions on how to proceed and for confirmation or disconfirmation of our response” (Podro, 1998, p.vii).

When faced with uncertain situations, sometimes our response is to do nothing, at other times it is to wait for more information. This demand for a response when the situation is uncertain is integral to both art and firefighting. The uncertainty inherent within the landscape of an emergency calls for a process of continuous reappraisal. Choices between one course of action and another must be made quickly. Despite its lack of visibility and explanation there is an art to decision making in dynamic time-pressured emergency incidents. Scientific language does not easily capture this dimension and science alone will not solve all the problems. This chapter demonstrates that Incident Controllers are basing their decisions on something other than what is scientifically verifiable by measurement and calculation. They are visually perceptive and somatically attuned to employing
non-verbal skills in order to understand the fast-moving image before them. They are making decisions and communicating rapidly using information gained through visual perception and somatic awareness that at present is little acknowledged because it is so difficult to recognise, describe or explain.

Through blocking in the aesthetic awareness of Incident Controllers making decisions on the fireground a number of connections have been drawn between the seemingly disparate fields of art and firefighting. One of the connections is the importance of non-verbal processes and somatic response. The lack of attention to this area in firefighting is partially explained by the difficulties encountered when attempting to verbally express a non-verbal process, thereby losing some impact in the process. McKim (1980) puts it this way: “Creative thinkers…abandon language when the occasion demands, and enter into other modes of thought” (p.28). There are a number of things to be aware of when moving between thinking and language. For instance, the as yet unformed ‘idea’ may be deformed or corrupted through expression in the verbal words of language. From the outset, investigating the ineffable posed a conundrum for me as a researcher. It is no simple matter trying to communicate the kinds of knowledge that are usually ascertained through direct observation. Lloyd (2007) calls this “embodied knowledge”:

The body plays a central role in the generation of meaning by providing visual clues about roles and practices, which lead to the establishment of shared vocabularies and meanings that facilitate embodied knowledge (p.189).

The small recognition given to aesthetic awareness on the fireground may be the by-product of a society which places greater value on ‘scientific’ knowledge, i.e. that which is measurable, repeatable and the seemingly objective truth, over ineffable, somatic and aesthetic awareness. Decision making and the experience of Incident Controllers is not a disinterested or dispassionate activity. It does not
conform to the scientific model of objectivity. It is emotionally charged, even if those emotions are carefully monitored.

Multimodal Decision Making is decision making in highly complex, time critical situations based on an holistic range of inputs and perceptions. Visual perception and somatic awareness inextricably link and constantly inform communication and decision making in crisis situations, facilitating the anticipation and recognition of discrepancies and variations as the crisis progresses.

Chapter 4 introduced the concepts of uncertainty and crisis communication as integral to Multimodal Decision Making. In Chapter 5: I would have done it differently, these themes are further developed in relation to the expert gaze and the tensions of balancing anomalies and discrepancies with the Standard Operating Guidelines.
Chapter 5: I would have done it differently

Introduction

The focus of this chapter falls on dissonance and the handling of anomalies and discrepancies. What happens when an Incident Controller is confronted with a fire in which there are a number of competing features vying for his or her attention? At times they are not the only decision maker involved, and the way the incident pans out may leave the Incident Controller with the feeling “I would have done it differently”. Experts do not always agree.

Despite the contention over what makes an expert, there is a general agreement that he or she is able to generate more options than a novice, who may only see one approach, which is more often than not rule-guided (Bonner, 2001). So what is it that processes and activates experience into the professional practice of an expert? How are experience and expertise differentiated? Most of us can think of someone who has been years on the job, performs it well enough, but who is not an expert in the truest sense of the word. What is the correlation between a gathering of experience on the one hand and the transformation to ‘expert’ on the other? Why is it that an accumulation of experience does not necessarily equal expertise?

To tackle these issues, in this chapter I continue blocking in, drawing on somatic response and aesthetic awareness as fundamental to decision making on the fireground and artistic practice. In the next incident, the Glass Factory Fire, an Inspector experiences a kind of cognitive dissonance when confronted with a basement of rising molten glass and a group of disheartened and unenthusiastic firefighters. There is a sharp contrast between the urgent need of the moment and the lack of eagerness in the firefighters. The Inspector feels an inner conflict as he wants to shake the firefighters out of their complacency, stretch and reinterpret the rules a little, and ‘get on with the job’. This incident occurred on Christmas Eve.
Glass Factory Fire

During the day of Christmas Eve a transformer in a glass factory explodes. The scene is responded to by the dayshift of the NSW Fire Brigades. They work all day then leave, assuming that the pumps which push water through the thermoses to keep things cool are still working. In fact, they are not. The emergency power had not kicked in and the thermoses were not being cooled. Consequently, by 10:00pm on Christmas Eve the thermoses exploded. Molten glass raced out of the pipes and into two metre deep basins which were especially designed for this sort of thing, but by the time the Glass Factory Inspector arrived the basins were overflowing and the basement was rapidly filling with molten glass.

Later, after the application of water by the firefighters, it also became apparent that the pumps which push the cooling water out of the basement and into a dam were not working either. The basement began to fill with water, which started to rise through the floorboards and into the factory itself.

Ultimately it took five crews (approximately twenty firefighters) two and a half hours to bring the situation under control. They worked in rotating shifts. The conditions were extreme, although I have inferred this through two references made by the Glass Factory Inspector. These concern the reluctance of the firefighters to participate, and the speedy rotation of the crews. The conditions were not elaborated upon in great detail by the Inspector. Rather, his concern lay with the lack of firefighter enthusiasm to engage with the task:

And other guys are saying “I’ve just come out” (from fighting the Basement Fire) and that was like an hour and a half ago; well, they just sit around bludging.

I studied him. If you pointed to him on the street and asked “What does he do for a living?” I would say an occupation that demanded authority, physical strength and a
military type haircut. His demeanour was of someone used to being obeyed, who demanded to be approached with respect. I said:

V: So it was just like molten hot glass?

Yeah, way hot. It was like honey. So WG was the first Inspector there and I was the second. I pulled up and I said “What do you want to do?” and he said “We are having a few problems getting blokes.” And one thing that shitted me there, we had – and this happens a lot – is the motor drivers on pumps say “I’m the motor driver, I can’t do anything” and their pump’s just parked.

In the Glass Factory we see the Inspector focussing upon one element of the scene, which is the lack of cooperation he is receiving from the firefighting crews. They are “bludging” and neither he nor the crews are happy. The greater part of the interview is devoted to crew problems. The Inspector appears not in the least overwhelmed by the scale or proportion of the incident. Like many participants, he was completely focused on the present; in his recollection he appeared unconcerned with the molten glass:

The glass plant? No, it was not a problem – it was just that two hundred tonnes of molten glass filled up the basement.

This incident brings to the fore the level of confident expertise the Glass Factory Inspector has at large incidents. He appears relatively unconcerned by the molten glass which topped the basins and began to fill the basement. He is more concerned with personnel problems and getting firefighters to work in alternate roles to their original designation. For instance, in their job description pump operators are supposed to stay with their pumping appliance and not depart from this designated role. This “shitted” the Inspector, as he could see things that needed doing and a competent person virtually standing idle. This Inspector was willing to break with protocol for the sake of an expedient and effective response, deeming it safe for the
pump operator to abandon his or her post for a more active role. The pump driver appears to have refused.

The Glass Factory Inspector displays the evidence of an expert in that they are usually not overwhelmed by the scale or horror of the incident, but rather concentrate on what can be done in response. Expert practitioners are generally not waylaid by emotion, shock or helplessness (Linley & Joseph, 2006). They are certain of what needs to happen, and as with the Glass Factory Inspector, may feel frustrated when the people who could do it appear to be not pulling their weight because they are holding fast to the ‘rules’. According to van Leeuwen (1999), “In public (in the workplace, for instance) only people with a large amount of cultural power are allowed to make or break the rules” (p.5). As senior officers, Inspectors have “large amounts of cultural power”.

Ann Bonner (2001), in an investigation into the practice of dialysis nurses, describes the expert nurse as a “boundary rider”, negotiating the Standard Operating Procedures and breaking them when necessary with the tacit support of doctors, who sign off on their decisions after the event, thus legally covering the nurses. The expert nurses in Bonner’s study took huge risks in that they would be found culpable if something went wrong, or if a doctor refused sign off as though it was their own decision, but the nurses were expert enough to trust their own judgement and more concerned with immediate patient well-being than being found culpable if anything went wrong as a consequence of breaking the ‘rules’. This is comparable to the expectations of the Glass Factory Inspector who wants the pump driver to endorse his risk assessment and cooperate by working outside the officially designated boundary lines and ‘rules’.

Some “problems and solutions are irreducibly complex” (Hodge & O’Carroll, 2006, p.12) and the problem facing the Glass Factory Inspector cannot be simplified by pointing to the ‘rules’ or the Standard Operating Guidelines. The Glass Factory provides an example of how the scientific approach to decision
making is reductionist, diminishing the complex down to the simplest form, and in these situations Hodge and O’Carroll (2006) turn to the concept of ‘fuzzy logic’:

Its inventor, Lofti Zadeh (1986)…recognised that extreme complexity does not go away just because it is hard to think about it. He distinguished ‘crisp’ (precise, definite) categories from the ‘fuzzy’ (imprecise) categories he felt were usually better for dealing with complexity. He proposed a general principle: the more complex and dynamic a system or condition, the less relevant or meaningful are precise (‘crisp’) categories. In other words, if things are very complicated you will struggle to understand them if you fall back on rigid, precise categories. Indeed, such rigid thinking can cause new unforeseen problems, making a difficult situation worse. Simple, crisp thinking in these circumstances is not only useless, it is dangerous (Hodge & O’Carroll, 2006, p.8,9).

In a chapter titled “The vengeful onslaught of sludge”, Merrell (1998) writes “In a word, fuzzy logic reveals the sludge inherent in linguistic practices” (p.243). The usefulness of thinking in terms of fuzzy or imprecise categories increases with complexity. In this regard, I like the way Hodge and O’Carroll have employed the word “dangerous”, because it applies directly to the Glass Factory. The ‘crisp’ solution would be the pump driver’s decision to stick to the Standard Operating Guidelines and stay by his post. The ‘fuzzy’ approach would be for him to move into a more complex relationship to the incident with the aim of contributing in a more multifarious dimension to its resolution. By staying with the rules, the pump driver is legally correct and covered, but he is also “making a difficult situation worse” and the Glass Factory Inspector did “struggle to understand” the pump driver’s decision.

Experience may be exhibited in composed cool-headedness and a purposive demeanour when there is limited time to accomplish a feat, whether it be the drying of the plaster in a fresco or using watercolour paint on a warm windy day, or when
facing a basement full of molten glass; expertise is exhibited in a composed approach to the time-pressured situation. This does not necessarily mean a slow reaction, but rather it means a mediated and unpanicked response.

Spaces between words

Figure 5.1: Jan Davidsz de Heem, Still life arrangement (1640). The Louvre, Paris.

Figure 5.2: Henri Matisse, Still Life (1917). A visual interpretation of de Heem’s painting. MoMA, New York.
I suggest that what the Glass Factory Inspector sees is comparable to what Matisse saw when he looked at the seventeenth century Dutch still life painting by Jan Davidsz de Heem. Matisse did not see the photo-perfectionism, he was not waylaid and preoccupied with the realism and he disregarded the traditional values and rules of representational painting. Instead he cut to the core, went straight to the stark outline of the incident and the balance between all the competing elements of the scene. Rather than reduce the ‘crisp’ categories of representation down to a photographic representation, Matisse embraced the essence and reinterpreted it to expose the composition’s true structure.

What would be considered a crisp or fuzzy category in an artistic sense, and can this perspective be found in the Glass Factory Fire? In a kind of selective vision that focuses in on the lines and the raw elements of the image, undeterred and not sidestepped by the awesome splendour of the representational image, the Glass Factory Inspector sees straight through to the structural elements, gets the essence of the image and wants to go into action with a plan that nobody feels very motivated by; in essence, breaking the ‘rules’. He wants the pump driver to cooperate, to respond to the urgency of the moment, and forsake his safe post and get into the action where the Inspector sees his skills will be put to greater use.

**Neither seized nor subdued**

In Figure 5.1 Still Life Arrangement, de Heem employs the background depth of darkness to guide the viewer’s eyes towards the contrasting images of lute, fruit and cloth. Matisse is neither seized nor subdued by any of this and in his abstraction of de Heem’s work he leads the viewer’s gaze to the very edges of the canvas, exposing the true balance of the compositional lines of perspective and making it plain and obvious to the viewer just what holds the structure of de Heem’s image together. This is what the Glass Factory Inspector does when he takes in the scene at the Glass Factory Fire. Burning molten glass, the central image, heat and lack of breathable oxygen the sensation, he takes us to the edges of the image and exposes the true reality of what is holding it together, the bare elements, stripped of their
camouflaging finery or horrific heat. Undaunted by the majesty of the imposing (the realistically painted still life or the immediacy of the fiery molten glass), the Glass Factory Inspector draws us to the very core of the problem, which for him at this moment is inadequate available personnel.

The Glass Factory Inspector sees into the deep recesses of the incident, that it is easily controllable (that is, easily diagnosed by his experienced eye; an easily understood painting despite the complex interrelationships of balance and design). He sees to the heart of the matter and strikes out for a solution that is unpopular because it breaks the rules in that he wants people to leave their safe posts and participate in an action that, strictly speaking, is not their responsibility nor within their job description.

The action of abstraction is displayed in the decision making of both the Glass Factory Inspector and Matisse, in that they are selecting the bones, the framework of the image, and in a sense discarding anything else that is just ‘window dressing’ and there to look pretty. They are allowing us in, as viewers, to understand the workings behind the scene, the balance and arrangement of the still life; the arrangement of the personnel at the glass factory.

The Visual Thesaurus (Thinkmap Inc., 2007) defines abstraction as “The process of formulating general concepts by abstracting common properties of instances.” This is similar to simplifying the details of a drawing or painting so that all that is left are the fundamental concepts of shape and form, thus laying bare the basis of the design. This is precisely what Matisse has done in his Still Life.

In computer science, abstraction is a mechanism and practice to reduce and factor out details so that one can focus on a few concepts at a time (Illingworth, Glaser, & Pyle, 1991, Oxford Dictionary of Computing).
It is not difficult to see how this technological understanding of abstraction could apply to decision making by Incident Controllers on the fireground. Bombarded with information from all fronts they are constantly reducing and selecting the pieces of information to which they will attend from those which will not contribute to the resolution of the incident.

The perception of an experienced Incident Controller in an emergency situation will not, and can never be, the same as a novice. Typically the difference consists in the approach. The experienced Incident Controller fields and makes sense of the multitudinous incoming, sometimes conflicting data while the novice looks for instruction or relies on guidelines or procedures (Bonner, 2001, p.187; Lloyd, 2007, p.193).

**Clothing Factory Fire**

An illegal sweatshop constructed under a car-park and with no standard fire safety features is going up in flames. The Inspector interviewed is in the role of Fire Investigator and turns out at the fifteen minute mark. There are already six fire stations responding and an Incident Controller has been appointed. The part of the incident described here is characterised by a conflict in judgement between an experienced Fire Investigator (the participant Inspector) and an Incident Controller who is planning his fire attack according to the ‘rules’.

So I went in on top of this fire and went and had a look at all these units. There were three in a line, had a look at all these units, and started to see some cracking in the concrete. So I sort of measured it and then went back and said, “We’re getting some cracks”. And then I came back and had another look and I could see that they were expanding a little bit, but, I still believed that it was structurally stable enough to go in and put it out. Then came the difference between what one could consider to be intuitive understanding. Once I said to the Incident Controller that there’s cracks in the concrete he said “Oh well, we’re not going in.” I said “Look it’s four hours rated. It’s
made to crack. That’s how it releases its stresses. It cracks along certain lines. It doesn’t necessarily fail, but all the reinforcement and various things – it will crack, but it won’t necessarily fail.” But he didn’t have that fire engineering background – like I’ve done something like working with various companies and seen tests on this type of concrete. I knew what it would do. I knew it wouldn’t fail. And in the end the fire went on for another four hours. Seven hours, actually, the whole fire, and it still didn’t fail. So we could have got in there and put it out.

As Lloyd (2007) notes, “The discourse of firefighting is rendered through the fundamental construct of safety” (p.196). In the Clothing Factory Fire we see a conflict in determining what is safe and what is risky, in terms of the cracking times of concrete. Helga Drummond (2001) provides a description neatly illustrating the same situation, and which could also be described as a ‘fuzzy category’ although she does not use the term itself:

Ambiguity means capable of more than one meaning. Scientific approaches to decision making see reality in black and white. In this view a given entity is either one thing or it is another. Something is either an act of resistance or of compliance. It cannot be both. In contrast, the art of decision making involves recognising that compliance can also involve resistance (p.69).

It is not only “scientific approaches” which view reality in “black and white” – personnel within the emergency services tend to do the same thing. In fast-paced environments where decisions of life and death are made rapidly, decisions must be communicated without ambiguity, leaving no room for doubtful interpretations.

The Clothing Factory Inspector read the colour of the smoke and realised the fire attack was not effective:
Because reading the fire will tell you a lot about what’s burning – the colour of the flame, the colour of the smoke, pressure, intensity of the smoke. All of this tells us what is burning. You can pick whether it is hydrocarbon, whether they’ve poured fuel around. We look at the security of the premises – what’s locked, what’s not locked. I can talk to the first arriving fireys, find out what they kicked in, what they busted open, what was already open. And your witnesses really are important – who is watching the fire? If it’s a deliberate fire by an arsonist, he might be in the crowd. They like to light fire and watch.

Black is as dark as you can get. Very few places are totally pitch black as there is usually some light around to determine just how black is black – for example, a dark night is never as dark as a completely enclosed room – but this is the darkness confronting the firefighters at the Clothing Factory Fire. In this kind of fire the visors of firefighters may be so darkened with soot that they are unable to see other firefighters only a metre away. This is the thick, tangible blackness of smoke and soot, a screen so dense in colour and vapourial thickness that it may as well be a solid wall.

It is the colours of smoke emitting from burning materials that the firefighters must read and anticipate. From the perspective of the Clothing Factory Inspector, the firefighters kept pouring water onto the fire, but the colour of the smoke did not change as he would have expected, rather it was still burning strongly and there was trouble locating the seat of the fire. The dissonance created by this unchanging smoke colour, the violation of expectancy (put water on fire and the smoke turns a lighter colour) was discomforting and alarming to the Clothing Factory Inspector:

And you could see that the fire was not going out because the smoke wasn’t getting any less, it wasn’t getting any lighter, as one would expect smoke to do. It was just staying the normal, nasty, black colour.
Black is understood as ‘nasty’. The word also reflects the violation of expectation – the smoke was not getting any lighter.

In the next excerpt the Clothing Factory Inspector actually defends the actions of the Incident Controller, even though he would have initiated a different plan of fire attack. He understands the Incident Controller to be constrained by recent OH&S requirements and thus hindered from doing the ‘real’ work of a firefighter – extinguishing the fire – but, says the Clothing Factory Inspector, I would have done it differently, I would have gone in and put it out:

    He’s a very experienced Incident Controller actually. And he was making decisions a lot on what we were telling him, and he’s been in a long time, a very experienced officer. We have the equipment, we have the breathing apparatus, we have the thermal imaging cameras, we have the gear that will allow us to do that job. And I think we should’ve gone in and done that job.

Here the Clothing Factory Inspector is acknowledging two different plans for resolving the incident, but he would have done it differently if he had been given the go ahead. He recognises the difficulty of the decision facing the Incident Controller – whether to risk the concrete collapsing and compromise crew safety, or to let it burn and play it safe. In a sense he views the choice as a binary: stay put or move in, black or white, not an ambiguous mix of options.

As a personal observation, I have noticed from conversations and reading student assignments on emergency decision making that many are very ‘black and white’ in their perspective on life. There is a predictable resistance every year as they struggle through their sociology assignments, argue with the lecturer (not myself), with one student repeating Introduction to Sociology three times in an effort to convince his lecturer of another viewpoint to what he perceives as the ‘grey’ interpretations of ‘the truth’. I have watched others simply surrender to the ‘rules’
and comply with the subject requirements, putting aside their personal understanding and regurgitating the required viewpoint in order to pass the subject.

I think a part of the explanation lies in the experience of these students. They are predominantly professional emergency service personnel with finely honed decision making capabilities in time-pressured incidents. They are experienced in situations where a ‘yes’ or a ‘no’ has to be issued very clearly and without tones of indecisiveness, because anything else may lead to confusion. Theirs is a life and death world, where a blurry, indistinct command could result in a mismanaged incident leading to dire consequences. Encouraging these students to acknowledge in their assignments situations of ‘perhaps’ ‘maybe’ and ‘in most instances’ brings anxiety on their part, as they see this greyness as a weakness for precisely the same reason we value it in academic writing – they are accustomed to making definitive judgement statements of the kind postmodern academics avoid. While in the postmodern world truth is relative and socially constructed, in the firefighting arena truth is predominantly perceived as objective, and there is an expectation that it can be described and stated objectively.

In the following excerpt, the Clothing Factory Inspector uses the word “clouded” to mean a blurring of judgement capability:

I think things like the OH&S Act have clouded what would be normal risk taking judgements which say “Yeah, we need to get in there and put that out”.

Interestingly, clouds, whether of smoke or precipitation, are usually some tone of grey. Grey is the colour of spent fuel, ash and it also “suggests confusion and a loss of distinction” (Varley, 1988, p.178). In English we talk about nothing being ‘black and white’ meaning ‘absolute’, but various shades of in-between. Similarly, the Clothing Factory Inspector perceives a “clouding” of the situation as a result of OH&S legislation which has lead to indecisiveness and indistinctness on the fireground.
Spatial fluency

‘Fire’s On’ was the catch cry to run for cover as the blast was about to happen at the making of the Lapstone Tunnel in the Blue Mountains, NSW. In a letter to Tom Roberts in 1891, the artist Arthur Streeton described a misfire in which a man died, and to his painting entitled *Fire's On*, he added the body being carried out.

I selected *Fire’s On* because I knew it was concerned with an accident in a tunnel, reminding me of the Clothing Factory basement on fire. Both places are dark and uninviting, and it is difficult to see what is happening underground.

Streeton selected Lapstone Tunnel to paint, for reasons he describes to fellow artists Tom Roberts and Fredrick McCubbin in letters dated 1891. In part of his letter to Fredrick McCubbin he writes:

The ganger cries “Fire, fire’s on!”; all the men drop their tools and scatter and I nimbly skip off my perch and hide behind a big safe rock. A deep hush is everywhere – then “Holy smoke”, what a boom of thunder shakes the rock and me. It echoes through the hills and dies away ’mid the crashing of tons of
rock, some lumps fly thousands of feet sometimes and fall and fly everywhere among the trees (Splatt & Burton, 1978, p.70).

For miners in 1891 and equally applicable to firefighters today, there is a running towards the incident ground, despite the risk, because lives are in danger. As the Clothing Factory Inspector says:

Our guys have a really different perspective when somebody is trapped. They’ll take way greater risks than they would if it’s just property.

Streeton, sitting on his rock opposite the tunnel as a premature blast goes off, describes the scene in a letter to another artist, Tom Roberts:

The next shift comes toddling down the hot track with their billies, and I commence to discuss my lunch and tea (of which I consume over a quart every lunch), and now I hear ‘Fire, fire’s on’, from the gang close by; rest my billy on the rock, take out my pipe and listen for the shots, with my eye watching the bright red-gum yonder. BOOM! and then rumbling of rock, the navvy under the rock with me, and watching says, ‘Man killed’. He runs down the sheltered side, and cries, ‘Man killed!’ Another takes it up, and now it has run through the camp. More shots and crashing rock, and we peep over; he lies all hidden bar his legs – and now men, nippers and 2 women hurry down, a woman with a bottle and rags. All the shots are gone but one and all wait and dare not go near. Then someone says the last hole was not lit, and they raise the rock and lift him on to the stretcher, fold his arms over his chest, and slowly six of them carry him past me. Oh, how full of dread is the grey, mysterious expression of death – ’tis like a whirlpool for the eyes. Blown to death twenty yards from me and, as a navvy said, it was an ‘’orrible sight’. By Jove! A passing corpse does chain your eyes, and indeed all your senses, just as strongly as love” (Croll, 1946, Letter to Roberts, 17 December 1891).
Streeton depicts the figures in his painting as dwarfed by the huge majesty of the mountain side. They appear as ants, moving around above the tunnel in a small swarm, almost invisible in the Fire’s On reproduction of Figure 5.3. The figures on the freshly created track are a little larger and more visible.

Mining was, and still is, a dangerous occupation. These days there is comprehensive OH&S legislation in place to reduce the number of deaths and injuries in workplaces. For firefighters there are related Standard Operating Guidelines, Standing Orders, and the Fire Brigades Act and other relevant legislation. These advances can at times inhibit action, and at other times protect action. As Lloyd (2007) found, the policies and procedures of the “institutional discourse” are challenged and interpreted by the practice of expert firefighters in that:

The community may present a version of professional practice that challenges the institutional discourse, because information is drawn from experiences of experts in everyday workplace situations (Lloyd, 2007, p.193).

As the Clothing Factory Inspector realised, learning to negotiate these “discourses” provides the key.

**Entering the experience**

_Certainly people are able through drawing to represent aspects of their experiences that cannot be recounted verbally (Pink et al., 2004, p.7)._  

There are problems associated with researching aesthetic awareness and somatic and intuitive response, whether it be a response to an image in an art gallery or on a fireground. The understanding that the visual can easily be portrayed in written form or that the textual can simply be translated into diagrammatic form, is problematic (Doloughan, 2002). According to Schneider (1996), “Although
something is always lost in translation, even in the same medium, still more is lost when a work from one medium is translated to another” (p.xiv).

In an ethnographic study of scientific practice, Latour and Woolgar (1986) researched how ‘facts’ are constructed by observing life in a research laboratory over a period of two years:

One interesting aspect of the exploration of reflexivity is that our writing is conventionally constrained by the use of report-like formats. Reports encourage a reading that reflects an understanding of the ‘facts’ and that is straightforward and reports the actual state of affairs. There is a place for this kind of reading. Reflexivity is thus a way of reminding the reader that all texts are stories (p.283, original italics).

The title of the book Visual literacy implies that “seeing is somehow like reading” claims W.T.J. Mitchell in a chapter titled ‘Visual literacy or literacy visualcy?’ (2008, p.11). Mitchell makes the point that we may think learning to read is much more complex and difficult when compared to learning to see. He turns this idea around and maintains that we need to see in order to learn to read (2008, p.14). As the Clothing Factory Inspector comments:

Well, to my mind there’s only so many things you can write in a book to say how you do something. There’s lots of unwritten things that you don’t, you can’t, really articulate well into words. But it’s just the vibe, the feeling, the way you do something and you can’t, I don’t think you can teach people out of a book how to lead.

The technical aspects of fire behaviour may be described in scientific language quite easily, such as concrete being “four hours rated”. Having said this, firefighters are not primarily focused on an objective representation of the truth, but rather on the unpredictable, uncertain conditions which they must address to be effective. The Clothing Factory Inspector had an independent view based on
intuition and a greater level of scientific experience, which is a paradox – that better science can be part of intuition. His call was accurate in that the concrete lasted, indicating his wider scope of judgement.

**Motor Repair Factory Fire**

In this incident the Inspector interviewed recounts the fire of the night before, in which he thinks he could have done a better job. He muses about whether this was due to tiredness, the fact that he was being relocated the following week, or whether it was his inexperience with the Incident Command Vehicle. The fire was extinguished in good time, everything happened as prescribed, but he feels he lacked full control of the incident, “felt over my depth”, even though it was not a large fire.

It occurred in a factory which was in an area well known for wrecking-yards and tow trucks, where many suspicious things occur. The fire turned out to be arson, and two aerial appliances and a number of stations were responded. After a time a few of the stations were sent home. The Motor Repair Inspector was not happy working with the Incident Command Vehicle, and mentions he had no training with it and he felt it removed him from the incident and put him into a mode of having to follow procedure, resulting always feeling a step behind what was going on.

He compares this factory fire with a job he had previously described and says:

There are times where, and I don’t know the reasons – whether it be like being tired, or being in a different mindset or whatever, but I don’t think I ran last night’s job – which was an easier job – as well as I ran this one. Last night, just little things, procedural things, didn’t happen. So again I then seemed to be playing a little bit of catch up procedurally and the decisions therefore didn’t flow as well.
In Figure 5.4: Motor Repair Factory Fire, the Inspector indicates the placement of four pumpers and one aerial appliance with the letters P and A. I have indicated the roller door and the front door with red arrows. He writes the first arriving officer’s comment that there are “numerous exposures threatened” and that the factory is “well alight.” Within the transcript his concern is directed towards the adjacent factories which are now under threat because of the advancing fire. The Incident Command Vehicle is parked on the road at the front of the factory, designated ‘OC’ for ‘operational command’.

Without the commentary provided by the Inspector, the mudmap could be perceived as an uninteresting drawing. Importantly, what it does do is display the decisions the Inspector made, that is, to fight the seat of the fire (information he never verbally indicated in the interview). Visually we can understand his fire attack plan by the placement of appliances which concentrate on extinguishing the original fire, rather than letting the building burn down and focussing on protecting the surrounding exposed factories.
Mudmaps and realism

Drawing is not a handskill that some are born with and some without. Drawing is essentially a way of looking at and seeing the physical world, of mentally translating it, and recording it. It is a system of decoding three-dimensional visual messages and coding them into two-dimensional visual messages. It is information based, not skill based. Without having observed appropriate information the drawing will be wrong (Loftus, 1983, p.vi).

Imitating the way something looks as accurately as possible, from an artist’s point of view, is generally referred to as the ‘realist’ style. Small children in contemporary Western societies strive to make accurate copies of the world, gradually learning what adults recognise as reasonable and sensible imitations of reality. For many people art is about accurate representation. The advent of photography called this into question, but realism remains an attractive and popular artistic style. Why is this so? According to Feldman (1992), “Psychologically, the imitation of reality represents an effort to control reality” (p.124, original italics).

Extrapolating this idea into the realm of Incident Controller mudmaps and drawings constructed at the time of the incident (see Appendix 1: Tactical Worksheet – Hazmat) a number of observations can be made. To begin with, the mudmaps are not entirely representational. Although they accurately depict the layout of buildings, appliances and crews, they are not originally intended for viewer enjoyment or appreciation. The purpose of their construction is more scientific than anything else – they are important in that they lay down evidence in a visual fashion, act as an aid to decision making, and as a record of the incident scene. Mudmaps are representational for a purpose. Signs and symbols are used to convey meaning in a kind of in-house shorthand. From this perspective they are closely aligned to the ‘scientific’ representations of invisible processes, such as electrons and neutrons in diagrams discussed by Elkins (1999). Elkins argues that despite the legitimising discourse of ‘scientific fact’ accompanying diagrams in science textbooks, they are still interpretations of reality by artists with a story to tell. I propose that it is the same situation with the mudmaps drawn by the Inspectors.
Connected to the idea of depicting ‘reality’ is the understanding that:

We think we are less likely to be the victims of chance in a world we cannot understand if we make images that are good enough to replace pieces of reality – pieces of the world we must deal with (Feldman, 1992, p.124).

The Motor Repair Inspector must deal immediately with the “reality” before him. As an aid to decision making, the mudmap provides a spatial arrangement which assists his judgment through seeing the relation of one part to another, and encapsulating the entire scene, not simply what is in direct physical view.

In the mudmaps we are not invited to admire the artistic skill of the Inspector. Why are we so often drawn to the appearance of reality and to passing judgement on it in artistic endeavours? Perhaps it is because we are continually matching up what we see with what we already know.

Now when I got there it didn’t appear that the whole lot was alight, just by looking at it, just by the amount of flame…And they were fighting defensively mainly because the electricity was still alive…And there were flashes and everything else like that… and it ended up they had it very quickly under control…so it was like a single storey, but with a mezzanine at the front which is the offices…had the signs that the place had been torched.

The Inspector continues his reading of the signs indicating the cause of the fire was arson:

There was a gated front, there was a hole in the fence…and the front door was opened, like there was a roller shutter door there (points to drawing), but the front door was actually opened. And then there was a lighter on the ground out there, two lighters on the ground out here, and it looked like a
trail where accelerants had been poured…you know, like it burns and it leaves a trail?

The Fire Investigator actually turned up at the same time as myself, so he went straight away, as the fire’s active, and looked for those sorts of things. That’s where I believe he found the hole. It was common knowledge that the front door was opened at that stage, and he possibly found the lighters and then, when we all went in and had a look – that’s when the trail was evident.

**Multimodal perception of what is important and what is irrelevant**

How do you know what to look for if you have never seen it before? The untrained eye will often pass over indicators that stand out like a glaring beacon to someone with previous experience in a similar situation. The selection of what to depict and the choices about how to do it are informed by determining what is important and what is irrelevant. On the fireground the important aspects are the structures, the placement of appliances and crews, the direction of their fire attack and the names given to the various sectors, the wind direction and any other salient features used to determine a fire attack plan. Symbols for these elements form a visual shorthand which means the map can be constructed and read with speed, as the practised eye knows what to look for. And so in Figure 5.4 Motor Repair Factory Fire, the relatively simple looking mudmap indicates much more to the experienced practitioner than to the novice, who may be perhaps interpreting a mudmap for the first time. Van Fraassen and Sigman (1993), in a book about representation and realism in relation to science, write: “Even in supposedly simple cases of representational works of art and scientific theories we must inevitably admit that interpretation plays a crucial role” (p.73).

In the interview the Motor Repair Inspector says that a “certain” decision needed to be made as to whether the fire attack plan would be to save the original factory, or to let it burn and concentrate on not allowing the fire to leap over to other factories, described as “numerous exposures”. He wonders if the call for four pumpers and
thus the turnout of the Incident Command Vehicle was “overkill” as the fire was contained in a relatively short timeframe, about one hour. As previously mentioned, the accurate call for backup resources is a large part of an Incident Controller’s own appraisal of his or her success.

In retrospect this is a fairly straightforward incident, but the intense pressure of assessing the situation and deciding between allowing the original factory to burn down while protecting other exposures, or conversely putting maximum effort into saving a factory caught in the grip of an already serious fire, is a sombre judgment call. A number of factors were taken into consideration by the Motor Repair Inspector, including the wind direction, the level of personnel and appliances, and the contents of both the burning and surrounding factories.

**Feelings of detachment**

The Inspector says he didn’t “feel” as good as he had about a previous job, even though it went well. He said he felt a “little behind the eight ball” in terms of calling the shots, and he attributed this to his remoteness from the incident through having to use the Incident Command Vehicle. The Incident Command Vehicle would have turned out once his Red Message was received requesting four pumpers and an aerial appliance. It is worth bearing in mind at this point that the Inspector is newly fledged and he admits to having no training specifically concerning the use of the Incident Command Vehicle. In fact, at one stage he says, “I’d feel much happier just running this from the back of my car.” This is how Inspectors usually work – from the back of their four-wheel drive vehicle, which is equipped with a number of items they use constantly in incident management. In the following excerpt the Motor Repair Inspector explains how being curtailed in his somatic and aesthetic assessment affected him:

> The Incident Command Vehicle turned up…Once I went from there and I went around a corner where I couldn’t see anything… I was only receiving information off the operator in the Command Vehicle. Like, he’s now taking
the messages from everyone and passing them to me, so I just seemed removed and I don’t think – to me I lost from that point of view…I don’t have any previous experience of any trained structure or any sort of command vehicle, so, I think I got a little bit lost. So this, this seemed a bit too removed once we got away from there.

The job was over reasonably quickly and the fire was actually, probably well and truly, if not out, virtually nonexistent, just spot fires at one end, within an hour. The job dragged on because of asbestos issues with the roofing.

Within the incident command structure of emergency service organisations there are various levels of command with attenuate decision making capability and expectation. Despite the differences in terminology across Western countries there is a clear pattern of:

**Operational command**: At the coalface; for example, firefighters with hoses (Crichton, Lauche, & Flin, 2005, p.117).

**Tactical command**: Command post set up at the incident, away from the hot zone.

**Strategic command**: Command post set up well away, perhaps many hundreds of kilometres from the incident; this is similar to a ‘war room’.

Decisions on a large scale are made by strategic command. These may involve other agencies, and meetings are usually held under tight security. After organising a pass and being accompanied by a senior officer, I have been in an incident command room. A great deal of technology is available, for example, satellite imaging of the incident, direct lines of communication to key people, authority to disconnect vital services affecting large sections of the community, the capacity to mobilise the Australian Defence Force and so on.
The Incident Command Vehicle of the NSW Fire Brigades is designed to mirror this strategic command post. The ultimate aim is for a contingency command post in the event of a natural disaster or a terrorist attack destroying the original buildings, hence the Incident Command Vehicle is a portable strategic command post equipped with the most modern technology available. Once operating from inside this vehicle the commanders usually do not emerge to walk around the incident and gather firsthand data. They rely on incoming intelligence and make decisions accordingly. Further down the ranks there can be a bit of dissatisfaction at this approach, for example, the Motor Repair Inspector’s use of “overkill”, as it removes the commanding officers, first from the dangers and uncomfortableness of the incident ground, and second from face to face discussion with those at the coal face.

**The Incident Command Vehicle**

If an Incident Controller stands looking at the front of a building from a distance, he or she views it in relation to the buildings on either side. Walking around the building helps them to size-up the sense of the space that it occupies, ‘feeling’ the building with their body consciousness, their somatic awareness, which includes their eyesight, informing the perception of building and space. If they were above the building, perhaps standing in a cherry picker or an aerial appliance, they would have a different view again. Physical proximity and distance contributes to the aesthetic awareness of Incident Controllers on the fireground. The question is one of effectiveness – where would they be the best placed to aesthetically perceive the situation and be most informative and reliably aware of what is happening?

The Incident Management System or Incident Command System as it is known in the NSW Fire Brigades (IMS/ ICS) is a tool for marshalling pre-identified and pre-assembled resources to respond to an emergency or disaster (Perry, 2003, p.405). According to Brunacini (2002), author of the firefighter’s stalwart friend Fire Command, an Incident Management System must be routinely used to avoid difficulties with spasmodic implementation. This may explain the description by...
the Inspector “as a bit of an overkill” when referring to the turnout of the Incident Command Vehicle to the Motor Repair Factory Fire, in that perhaps every opportunity for ‘practice’ is seized.

The Incident Command Vehicle forms another contender for the attention of the Incident Controller on the fireground, as reports are directed between three entities: the Incident Command vehicle, the Incident Controller on the fireground and the Communications Centre.

In Figure 5.5: Inside the Incident Command System in situ, an Incident Controller studies the whiteboard displaying a detailed mudmap. He rests a foot casually on a seat, so as to provide a steady knee on which to rest his arm and hold up the Communications Centre telephone. His red ‘Incident Controller’ tabard is not fastened on one side and his face (here blurred) is set in concentration, studying a two-dimensional image of the incident, which is in fact right outside the door of the vehicle. His white helmet sits on a small table, white indicating the rank of Inspector. Another Inspector is walking towards a number of computers displaying online information. The van is well lit and there are no windows visible from this perspective, taken from the back of the van where a door is located.
The small indicators and signs of the incident are not visible to the commanders in the Incident Command Vehicle. For example, a cigarette lighter left on the ground (possible evidence of arson), would not be visible to them. In the vehicle the Incident Controllers receive information second-hand as they are removed from their own firsthand somatic and aesthetic perceptions. Shut off from the immediacy of the incident they have to purposefully access a remote range of information.

The skills required by commanders in the Incident Command Vehicle include the ability to read and construct two-dimensional artworks. They are mediating through an art form in which they have received little or no formal training. Their level of response is mostly technical as they are physically removed from the scene; by necessity it is linear and perhaps mechanistic.

Scientific technology (such as the Incident Command Vehicle) could actually create risk when used inappropriately. That is, the Incident Command Vehicle may be utilised at incidents too small to require this level of intervention, thus complicating the response by initiating unnecessary procedures. For example, the Motor Repair Inspector said:

As a matter of fact I nearly thought it was a bit of overkill. Because the Zone Commander turned up, the ICS vehicle turned up, and I actually said to the second Inspector when he turned up “I’d feel much happier just running this from the back of my car.”

The senior officers involved in strategic decision making would be informed by previous experience. After all, officers do not achieve this rank without years on the job. Just how long ago their at the coal-face experience was, may vary from officer to officer, but the point is that in the control room, whether it be in the back of the Incident Command Vehicle or in the Control Tower, they must rely on second-hand information, secondary data. The on-the-spot sensory input and aesthetic awareness
of the Incident Controller on the fireground is mediated through verbal Communications Centre reports, satellite images and whiteboard mudmaps. This technification of information may very well be necessary and an advantage for strategic planning, but in terms of Multimodal Decision Making and non-verbal Situational Awareness and risk assessment of a scene, it may be counterproductive.

Multimodal Decision Making holds all the loosely related tendrils and strings, some closely related, some distantly tweaked and pulled, in an interrelated and complex weaving, impossible to unravel into single threads and ethers. The patterns created shift and move with each decision, but the essential elements remain intertwined. The skill of the expert is evident in the manipulation of this image towards a speedy resolution. Waiting too long, or making the ‘wrong’ call can result in a knotted mess, which to unravel means backtracking and sidestepping and being diverted from the core problem. Delicately slipping and shoring up the various threads means being able to predict what will happen to the whole when one part is manipulated. Inexperienced hands, following a rigid and inflexible set of manoeuvres, may precipitate knots of resistance.

**Christmas Day Bushfire**

_Taking an image seriously, then, also involves thinking about how it positions you, its viewer, in relation to it (Gillian Rose, 2007, p.10)._

Gillian Rose, in the context of visual methodologies, talks about the various locations of visual research and their specific practices, such as a studio or a street. Rose writes:

> These different locations all have their own economics, their own disciplines, their own rules for how their particular sort of spectator should behave, including whether or not they should look, and all these affect how a particular image is seen too…These specifications of practice are crucial in understanding how an image has certain effects (Gillian Rose, 2007, p.11).
The location of the Christmas Day Bushfire was idyllic. Two groups of people were being accommodated at a Christian Convention Centre over Christmas: a group of slightly intoxicated Australians, and a group of Asians with varying commands of English. As huge bushfires raged across New South Wales one crew of four firefighters found themselves protecting people and property in a life-threatening firestorm descending upon the Christian Convention Centre.

Reproduced below are a few of the messages sent by the Christmas Day Bushfire Incident Controller:

1710 hrs. Red Red Red. Both complexes are encircled by fire…caught in clearing and donning SCBA and using water for self protection…maintaining people in main part of complex. Require as much assistance as we can get. (SCBA = Self Contained Breathing Apparatus)

1717hrs. Red Red Red. Unable to retreat. Caught in fire storm. Pumper overrun. Assuming defensive position. As fire passes will resume firefighting. No members reported injured at this time.

The Christmas Day Bushfire Inspector wrote his recollections of this fire and provided me with a copy. The following is an excerpt:

At 1710 as the firestorm hit I was giving some final instructions to Firefighter S. We turned to see twenty metre-plus walls of flame roaring towards the Complex. As I ran to my position at the main dining room I observed some of the timber cabins further west combust as walls of flame began to move through the Centre. Some cars caught alight around their tyres whilst others ignited spontaneously…extreme conditions included strong hot winds, intense heat, poor visibility due to the thick smoke, and flames everywhere. At one stage part of the fuel store exploded sending a fireball and debris high into the air. Nonetheless hose lines were kept on the buildings and surrounds including the large LPG tank (via a line tied to a dumpster) as the fire moved
through. At times the hose lines were used for self protection. Firefighter W. reported later that when the fire hit he could see, from inside the dining room, flames many metres high approaching the buildings and trees alight. At the height of the fire the dining room windows blackened and started to crack and smoke started to permeate the room. Firefighter W. did a fantastic job keeping people calm and controlled, in what must have been a frightening situation for them. After checking on Firefighter S. it was noticed that a small fire had started on the roof of the dining room despite our protective hose lines. I informed the people inside that I needed Firefighter W. to assist outside for a while, but that everything was still OK. Firefighter W. then commenced a direct attack on the roof using a line of 38mm hose…This attack continued for a while but appeared to be making no headway. Firefighter D. and I periodically checked on the welfare of the group inside, who were now being looked after by their group escort. It was obvious with each visit that they still appreciated the reassuring words and/or presence of a firefighter, but when smoke and then fire started to appear from a vent inside the room, panic set in and people started running in every direction. Once again they were calmed, informed of what was happening and what we would do next, then quietly led into a grass clearing under the protection of salvage sheets and hose sprays. Another head count was conducted. Even though the worst had passed, the heat and smoke were still harsh with many of the group being affected. Firefighter W. used a spray to keep them protected from the heat and to disperse as much smoke as possible. An internal attack was commenced on the dining room by Firefighter D. and I with one 38mm hose, but despite our efforts the fire could not be controlled and was moving rapidly through the roof. Because of the rate of fire spread, the danger of collapse and the lack of resources it was decided to exit the building and fight the fire defensively…Further messages including sitreps and red messages were sent at different times during this period but none appear on the Fires111 Incident Log at Wollongong Communications, more than likely due to transmissions being interrupted by the severity and magnitude of the fires that afternoon…as the
day wore on conditions improved to where the people no longer needed to be hosed.

Here a very under resourced Incident Controller faces a life-threatening bushfire. Trapped in an isolated location with one pump and three other firefighters, all egress routes are blocked and the lives of over a hundred people, mainly Asian with little or no English speaking ability, are his priority. He places his “weakest link” firefighter into a building with eighty-eight people and instructs him to keep the people calm and reassured. Another thirty people are placed in a similar building. The Incident Controller and his two remaining crew stand outside and hose the buildings down. The following is a portion of his interview transcript:

In the end the building that had the eighty-eight Asians in it, it actually caught alight within a minute, despite our best efforts of all two of us – it actually caught alight and I had to then put them outside the building in amongst the smoke and flame. Most of the flame, a lot of the flame had gone through by then. So this was what was in the back of my mind, and it’s not just training, it’s just things you see like messages from the Rural Fire Service, about you know “stay inside” and everything else like that; but then we had to put them outside once it caught alight, and hose them because it was still extremely hot and there was a lot of smoke. So we stood outside and hosed them rather than the building. And we lost the building and it ended up five million dollars worth of damage.

We were there for 4 hours on our own and then we were there for another about 10 hours, we were there 14 hours all up, that was Christmas Day.

The judgement of the Christmas Day Bushfire Inspector was built upon his experience: a blend of repetitive exposure, training and study. Each Incident Controller’s judgement may be different, but in a debrief situation there is a
commonality of understanding around what was generally done well and what could have been done better.

In the same vein, people immersed in art are able to examine an image and compare it with many others, and make a pronouncement. They each have an opinion, and there will be differences between experts, but eventually there is a commonality of general agreement that a work of art will go down in history, there for posterity, enduring through centuries. These judgements are always being reviewed and re-examined in the light of the present moment. There is a general understanding, mainly when looking at older images, that some work is just plain mediocre and other work is meaningful and brilliant. Many art galleries and museums proudly hang what previously may have been considered totally worthless artworks. These shifts in popular opinion demonstrate changing aesthetic values with the passage of time.

The Christmas Day Bushfire Inspector felt a very real tension between following the ‘rules’ and keeping the people inside the buildings, or acting on his gut feeling – that they would have more chance of survival if taken outside the buildings. These ‘rules’ change with time, usually in response to the recommendations in a Coroner’s report or a Royal Commission. Each large scale Australian bushfire reignites debate over the best procedures to follow.

**Standard Operating Guidelines**

Hodge and O’Carroll (2006) apply the concept of fuzzy logic to the complexity of Australian culture and border security. The concept of fuzzy logic is easily transferable to the complexity of the fireground where Incident Controllers are faced with a myriad of previously discussed factors such as conflicting incoming information, time pressure and ambiguous goals. The experienced Incident Controller has assimilated the Standard Operating Guidelines and no longer needs to think them through in a mechanistic, linear fashion. These directives do not disappear, they “morph into forms that are dynamic rather than rigid, organic rather
than mechanistic, complex rather than simple” (M. Taylor, 2001, p.41). Requiring Incident Controllers to rigidly adhere to the Standard Operating Guidelines could in fact be counterproductive, an understanding recently recognised by the NSW Fire Brigades in the re-wording of Standard Operating Procedures to Standard Operating Guidelines. This fine tuning of nomenclature provides Incident Controllers some leverage of interpretation. Rather than being provided with a rigid procedure to follow they are now to consider them as guiding principles to inform their decision making. Standard Operating Guidelines move closer to a fuzzy logic approach in that they “capture the contradictions which really exist in a situation, without being forced to one or the other half-truth” (Hodge & O'Carroll, 2006, p.34). The term ‘Guidelines’ gives Incident Controllers some measure of cover for their judgement which may conflict with organisational expectations:

**Standard Operational Guidelines**

*Standard Operational Guidelines* replace *Standard Operational Procedures* and are designed to give firefighters instructions, information and guidance about actions at operational incidents.

All firefighters must follow the instructions in the *Standard Operational Guidelines*. Because it is not possible to predict all the situations that may occur, some of the instructions give firefighters the ability to use their initiative to manage an incident on the basis of risk and opportunity within a safety framework.

Incident Controllers are responsible for the actions taken at an incident. Anyone who operates outside the *Standard Operational Guidelines*, or in contravention of direct instructions contained in the *Guidelines* may be called upon to justify their actions to the NSWFB and, possibly, to the Coroner or the courts.

Station Commanders must ensure that all crews are aware of the contents of *Standard Operational Guidelines* and that they are incorporated in station training.

Figure 5.6: Extract from Standard Operating Guidelines.

In complex and dynamic conditions the more precise the criteria the less relevant or meaningful they will be for purposes of control (Hodge & O'Carroll, 2006, p.27).

Although the context here for Hodge and O’Carroll is border security and the Australian response to refugees, the concept of ‘fuzzy logic’ is illustrated by the Incident Controller making decisions on the fireground. There is evidence in the transcripts to support their notion that if Incident Controllers firmly adhere to a rigid set of rules, which would include the Standard Operating Guidelines, Standing Orders, and the Fire Brigades Act and legislation, the situation may actually deteriorate. It takes experienced expertise to negotiate the competing demands of the Standard Operating Guidelines and the complex issues arising on the fireground. Managing this situation to effect a successful outcome indicates the expert – that is, someone who can negotiate the competing demands of legislative requirements and of the incident scene before them, and hold them in tension, rather than pursuing the rigid, formulaic and prescriptive pathway of Standard Operating Guidelines alone. The converse, discarding the Standard Operating Guidelines, is equally as destructive.

Hodge and O’Carroll write that “Tolerance is a fuzzy category that has limits built in” (2006, p.50). Although their context is in relation to ethical and moral principles, the concept of tolerance as a category of fuzzy logic may also be applied to the decision making of Incident Controllers on the fireground. How long do they wait before summoning more resources, issuing an evacuation call, ordering crew members off a dangerous structure, or ordering an expensive resource such as foam or an aerial appliance? The length of time they are willing to tolerate the situation is a function of previous experience and the learned guidelines. Breaking with either of these facets, or allowing themselves a little leeway of tolerance to the demanding situation, falls within the boundaries of fuzzy logic and complexity theory by the impreciseness of the nature of the situation. A crisp and clear route would not cut a swathe through the complexities
of the fireground. In fact, trying to simplify the situation may complicate it further: “not to be understood or resolved by a rigid use of a single, simple, invariable solution” (Hodge & O'Carroll, 2006, p.50). Along similar lines, Fay (1996) writes:

Facts don’t speak for themselves; nature is never encountered in an unvarnished way; experience, sensations, and other perceptions require a priori conceptual resources in order to occur (p.204).

Standardising the decision making process is useful from a strategic, military and paramilitary point of view because a model can be constructed, applied and taught. In terms of standardisation in art education, Eisner writes:

When a public loses confidence in a group to get a job done, it reduces the group’s discretionary space and prescribes solutions it believes will work. It then monitors the performance of those who are to implement policy and measures the outcomes of the work that they do. By prescribing goals and methods and measuring student performance, the profession becomes accountable. Standardisation is thought to reduce ambiguity and uncertainty. The aim is to create an efficient and effective system that will produce the results desired. At least, as the saying goes, the public will get what it paid for (Eisner, 1994, p.7, original italics).

The same situation is found with decision making on the fireground, where standardisation is applied specifically to “reduce ambiguity and uncertainty”. In the Christmas Day Bushfire any hint of ambiguity or uncertainty on the part of the Incident Controller may have resulted in a less well-executed plan and a less than desirable outcome. One artist who painted without much ambiguity is Russell Drysdale.
Depicting a bushfire

Russell Drysdale (1912-1981) formed the head of a new community of artists who took up the baton of Australian art from Streeton, Roberts and others of the Heidelberg period. Most of Drysdale’s contemporaries were busy painting scenes reminiscent of Streeton and Roberts – idyllic Australian impressions of pioneering hardship with much use of blue and gold, emphasising the prosperous and growing towns and cities of Australia. Drysdale’s paintings provide a contrast of sunburnt and desolate coal black outlines against wide skies. If people are depicted they are dwarfed by almost empty man-made structures.

Although in Figure 5.6: Bush fire, Drysdale is presenting the charred remains of a homestead, one can imagine the charred remains of the Christian Convention Centre would have looked similar. Blackened, burned almost beyond recognition, one can almost smell the stale smoke and feel the grit in the air. In his painting Drysdale has portions still smouldering.

Figure 5.7: Russell Drysdale, Bush fire (1944). 62 x 77 cm. National Gallery of Victoria.
In Drysdale’s painting the bushfire has passed, leaving charred embers. We know it was a bushfire as the rest of the landscape is burned and black, the suggestion of a few distant and denuded tree stumps breaking the horizon line. What we do not know is whether the occupants survived. These days many people are familiar with the message of the NSW Rural Fire Service, alluded to previously by the Christmas Day Bushfire Inspector:

During bushfires, lives are most often lost when people make a last minute decision to flee their homes on foot or in a vehicle…Late evacuation exposes people to the dangers of smoke, radiant heat and falling debris and can lead to blocked roads further endangering evacuees and impeding access for emergency vehicles…Research indicates that a well prepared home is often the safest place to shelter from a fire front (NSW Rural Fire Service, 2008).

The Christmas Day Bushfire Inspector says he was mindful of these directives and tried to put them into practice, but ultimately he decided to evacuate the eighty-eight people from the location of the conference dining room and hose them down outside while the fire passed over. Somehow he knew the building would not be safe, that it was going to catch fire and burn. This ‘somehow’ is what Multimodal Decision Making is concerned with. Despite his ‘somehow’ knowing, it still went against his training to order people to move outside a building during a firestorm. The discord and tension between what he had been trained to do and what he felt he must do, was extremely intense. The Inspector was holding the NSW Rural Fire Service directives and his prior training in one hand, and in the other was his multimodal knowing that they would be wrongly applied in this situation. He felt an inner conflict which was created by having to decided between acting by the ‘rules’ and swinging with his intuitive understanding of a better alternative. The tension created by the strong distinction of alternatives is also depicted by Drysdale through the juxtaposing of discordant colours, with the skeletal structure of the homestead providing a strong contrast against the creamy sky.
Bush fire is an almost alien landscape where we fight to recognise points of connection with the charred remains – was that a chimney? A fence? The painting is familiar as a burned out house, but the elements are almost burned beyond recognition, so what is it that we are recognising? Drysdale’s Bush fire depicts a cruel and merciless situation to which the unseen victims no longer belong. There is a kind of disquiet to the destruction as we are detached from the reality of this scene, yet closely connected to it by our own stories and experiences of bushfire.

The only guarantee the artist has of success depends on the extent to which he can make a group of people believe in him and respond to his work; he cannot then, be indifferent to the values of that group (Durvignaud, 1967, p.29).

From the perspective of an arts-based framework, the Christmas Day Bushfire Inspector was very successful in “making a group of people believe in him and respond to his work”. His ability to keep the victims calm and move them to safety is a tribute to the way he accurately gauged their level of fear and the reassurance they needed.

Understanding that intuition is a function of experience and based on reflection strengthens the argument for an integrated understanding of aesthetics and science in the development of a multimodal understanding of decision making on the fireground.
Conclusion

Our lives teem with numbers, but we sometimes forget that numbers are only tools. They have no soul (Bernstein, 1998, p.7).

As demonstrated by the incidents in this chapter, the world of the Incident Controller appears to be dominated by orders, for example, Standing Orders, Standard Operating Guidelines, OH&S legislation, orders from senior officers and Safety Officers, and Codes of Conduct. The mandate is to save life and protect property. To do this Incident Controllers must constantly analyse and make judgement calls on the risks inherent within both the situation and their planned actions. These orders and risk analyses are considered ‘scientifically’ verifiable. That is, they are about measuring and being able to verify numerically. The cracking time of concrete and the angle of a tilt-slab wall as in the Clothing Factory Fire, the rate of wind acceleration to fire movement in the Motor Repair Factory Fire, calculations of flashover, backdraughts, and so on. Organisationally, what is valued are measurements and verifiable figures, how much water, how many hoses, what size hoses.

Incident Controllers shape reality through their actions. This kind of ‘reflection-in-action’ is articulated by Schon (1983), who described it as thinking about doing something while doing it, rather than reflecting on it after the event. In ‘reflection-in-action’, Incident Controllers would use a theory (for example, put water on fire and fire goes out) to initiate an action. They also add to and develop the theory when things do not shape out the way the theory predicts; for example, the fire does not go out. They add and develop the theory while the action is occurring, “drawing on intuitive knowledge, then incorporating the new knowledge into their personal knowledge base for use in future intuitive actions” (P. Rose & Parker, 1994, p.1008). Intuition in nursing is also called “personal knowing” and “clinical judgment” (P. Rose & Parker, 1994, p.1007 & 1008 respectively). Reflection-in-action intuition is recognised in nursing as integral to facilitating the actions of nurses when they find themselves in previously un-encountered circumstances. It
“is important in enabling nurses to respond to new situations creatively, using imagination and abstract thinking” (P. Rose & Parker, 1994, p.1008).

Transposing the concept of reflection-in-action to decision making on the fireground, if an Incident Controller cannot articulate a rationale for his or her decision it does not mean that it is an irrational decision. The lack of measurable vocabulary is not justification for dismissing a decision as irrational. If the action of firefighting is dehumanised and the theory of firefighting “is not related to the context, then actions become mindless repetition which becomes self destructive” (Jarvis, 1992, p.176). According to Rose and Parker (1994, p.1009), “It will be practitioners acting in this way who, whilst they may have extensive knowledge, will never become experts. Carper (1992) succinctly describes this type of knowing and the conceptual framework upon which this thesis rests:

This pattern of knowing is knowledge of that which is individual, particular and unique. Esthetic knowledge requires the active transformation of what is observed, through the experience of subjective acquaintance, into a direct, nonmediated perception of significant relationships and wholes rather than separate, discrete parts. Esthetic knowledge is the comprehension and creation of value and meaning from both generalized abstractions and concrete particulars. It enables us to ‘go beyond’ what can be explained by existing principles and theories and to account for variables that cannot be systematically related or quantitatively formulated. It is interpretive, contextual, intuitive, and subjective knowledge. It requires synthesis rather than analysis (Carper, 1992, p.77).

There is a large and established body of literature demonstrating that perception is a cognitive process. As with Carper, I argue that firefighting is not a disinterested, dispassionate activity; rather it is suffused with emotion, and is therefore an aesthetic experience, and the ‘two’ areas, cognition and aesthetics, are mutually
linked and actually cannot be separated. The understanding that one can exist without the other, or that one can study only a part without considering the whole, is an example of the deductive nature of the positivist approach to enquiry.

In a recent article Hodgkinson, Langan-Fox, and Sadler-Smith (2008) present a detailed literature review of intuition from the psychological perspective. They write that “the concept has been used in a haphazard and fragmented manner” (p.8). Naturalistic Decision Making is mentioned only in passing, with reference to the emphasis on intuition and the selection of experts as subjects. They conclude with a “legitimising” of intuition as a “subject of scientific enquiry” (p.19).

Their findings indicate that contemporary Western societies are becoming increasingly dominated by the necessity to understand and perceive intuitively. For example, a quick Google search demonstrates that the word ‘intuition’ has been claimed by Information Technology where websites are evaluated on their ‘intuitive’ design – meaning the degree to which the first-time viewer can move around the site without having to read a help menu or follow instructions. That is, people are relying on previous experience to negotiate new and unfamiliar websites.

Contemporary Western societies are increasingly designed and negotiated with the expectation that participants will intuitively negotiate the indefinite and uncertain terrain where there are no guiding ‘standard operating procedures’ but rather feelingful impressions and intuitive understandings and expectancies. The ideas of the positivist understanding of rationality, logic, objectivity and emotionless deduction and calculation have been superseded in academic theoretical discussions, but this is not as evident in the practice of firefighting. Multimodal Decision Making demonstrates that firefighting is not only an art and a science, but that these two realms of understanding are mutually linked and inseparable.
In the opening of his book The arts and the creation of the mind (2002), Eisner states his aim as “to dispel the idea that the arts are somehow intellectually undemanding, emotive rather than reflective operations done with the hand somehow unattached to the head” (2002, p.xi). Considering firefighting as an artistic practice necessarily implies that the practice of firefighting has aesthetic qualities and features. What are the implications for this in terms of decision making on the fireground? For a start, the way we think and talk about the context of firefighting can be ‘reconceived’ – at the moment it contains a technical rationality that moderates and tempers our understanding of risk and our consequent decisions.

Lipshitz, Klein, Orasanu, and Salas (2001b, p.387) define “true experts” as “persons with demonstrably superior performance in specific domains.” Just how that experience is demonstrated is the subject of continuing debate. Distinguishing an expert as someone who recognises something as unexpected or out of the ordinary has been well documented in the field of critical care in nursing (for example, Bonner, 2001; Katims, 1993; LeVasseur, 1999; P. Wainwright, 2000).

In terms of decision making on the fireground, I argue that expert practice involves the ability to reflect on one’s actions, learn from them and alter response as a result. The accumulation of experience, by itself, is not of much value. The catalyst is reflecting on the actions and decisions made, and modifying responses when next in a similar situation. According to Clarke (1986):

> Intuitive knowledge can only be obtained through reflection on the performance of the action every time it is carried out, in order to build up a theory of predicted responses (p.3).

At times intuition does not manifest as conscious recognition. Rather, it may come as a surprise and is challenged in our minds in various ways, and labelled the “ah
Klein’s definition of intuition is “the ability to make decisions by using patterns to recognize what’s going on in a situation and to recognize the typical action script with which to react” (Klein, 2002, p.13). Klein’s understanding of intuition is therefore linear. I would maintain that rather than “recognizing” and “indicating”, it is important that a definition of intuition includes a sense of transparency of all the elements indicative of immediate perception, not necessarily key patterns. My understanding therefore goes beyond Klein’s, in that I embrace an holistic understanding of intuition more aligned with Eisner and Powell’s “ah ha” moment (Eisner & Powell, 2002) than with recognising key patterns. For Klein, experience comes first and then intuition. However, this linear progression does not explain individuals who have many years of experience, but who prove incompetent on the fireground. I argue that experience is important, but it does not guarantee anything. Eisner and Powell’s “ah ha” moment provides a more useful approach as it enables intuition, rather than rational order, as enabling judgment. What is missing from Klein’s definition is creativity. This is why I draw on the world of art – to better understand the creativity of the decision making process, quite apart from a linear model understood through psychology, whether the psychology of art or of decision making.

In this chapter the idea that ‘I would have done it differently’ has been illustrated through the Glass Factory Inspector who would have had the pump operator contribute in a more active way, the Clothing Factory Inspector who would have sent firefighters in to fight offensively, trusting his experience of the cracking time of concrete, and the Inspector at the Motor Repair Factory Fire who would have preferred to work from the back of his vehicle rather than the Incident Command Vehicle. The Christmas Day Bushfire Inspector did do it differently, and led the victims to safety outside the building.
Chapter 6: Something just clicked

Introduction

What we understand to be risk is a product of competing discourses that are historically, politically, socially and culturally contingent ways of seeing (Vahabi & Gastaldo, 2003, p.84).

I don't know what even made me start doing it, it just all, something just clicked. And like the, after the initial “Oh shit, what am I going to do here?” you think oh, you're the one that’s got to do it, so, all these things have to come together (Basement Fire Inspector).

Here I present a lengthier introductory section than previously encountered in the data analysis chapters. The concepts of risk and representation are enlarged upon as a scene-setter for the incident analyses of Chapters 6 and 7.

Risk

In the Medieval Era risk and danger were understood in relation to fate, destiny, magic and the gods. These were variables considered largely out of human control. Contemporary Western societies understand risk as measurable and calculable, and thus controllable (Beck, 1999; Douglas, 1992). Some of the obvious outcomes of contemporary perspectives on risk are a sense of vulnerability and the ensuing rise of the insurance and surveillance industries (Baker, 2002).

The positivist-scientific perspective of contemporary Western society is best understood as an attitude towards knowledge in which risk is unrelated to social and cultural practices, it is simply a calculation of probability (Lupton, 1999). This perspective is based upon the idea that it is possible to analyse and describe risk objectively. It then follows that risk can be managed and controlled, leading to a culture of blame for risk taking behaviour, and a devaluing of intuitive understandings (Vahabi & Gastaldo, 2003).
The modern perception of risk has informed our global understanding of free choice, and the ability to choose and decide is now fundamental to contemporary Western societies. The way risk is perceived, measured and understood has direct influence on the way countries provide for their populations in their health systems, impacts on individuals in relation to the levels of insurance and family planning, and is at the centre of the modern market economy. These decisions are considered important and placed high in the arena of public debate. What of art and aesthetics? How important is the way we understand art, beauty and aesthetics to our risk perception and decision making processes? Are art and aesthetics merely add-on features that enrich our lives occasionally, or are they fundamental to the quality of our existence? Why is there a colossal emphasis on the expert and the scientific, and a dabbling interest, if you are willing and have the time, with the artistic and aesthetic? When considering these issues in relation to risk assessment, does the positivist-scientific paradigm adequately explain the way Incident Controllers assess risk and make decisions on the fireground? The dominance of the positivist perspective is experienced when a person’s decision making does not conform to the expected norm, which generally involves weighing up a choice between two or more discrete options (Dowie, 1993). The person who cannot provide a logical basis for their decision is likely to be referred to as irrational or uninformed (Vahabi & Gastaldo, 2003, p.245). I argue that although knowledge about the incident is necessary, it is not the only influence on the Incident Controller’s decision making.

As a social anthropologist, Mary Douglas introduced discussions of risk into Cultural Theory. Two of her works (Douglas, 1986, 1992) specifically address risk and blame and why various social groups have different fears. Describing her main tenet, she writes:

The argument to be developed is that the institutional filter through which risks are perceived imposes a consistent distortion upon the
probabilities…the institutional lens obscures the risk issues (Douglas, 1986, p.92).

In terms of viewing risk through a “lens”, in the West there is a strong expectation that life and property are to be preserved. Transposed to decision making on the fireground, this means recognising that the extent to which Incident Controllers are willing to risk life and property is not only contingent upon Standard Operating Guidelines and statutory obligations. Whether consciously or subconsciously, Incident Controllers take into account socially and culturally determined values. Their risk assessments are filtered through various socially and culturally acknowledged practices and it is not possible to make risk assessments separate from them. Their decision making can be understood as socially constructed interpretations and responses that take into account a society’s cultural values and belief systems. This is a multimodally integrated understanding of risk because it recognises the impossibility of divorcing and separating the various veins and tissues that make up the whole. Multimodal Decision Making endeavours to hold the incident, in its entirety, up to the multifaceted light of data analysis.

Most people could answer the question “What is the public role of science?” without too much effort. It is the realm of the expert and the specialist. Its role is to validate, prove, provide evidence, objective facts and truth. It explores our beginnings and perhaps our ends and it is mostly indisputable, except by experts with further proof and experimentation, and it forms the basis for many policy decisions. Conversely, it is also the place of increasing cynicism from the public as the role of the expert undergoes a few changes in the postmodern arena because science has moved from “the production of knowledge by experts” to something resembling its own institution (Delanty, 1997, p.4).

In relation to this thesis, one impact of the West’s heavy reliance on the positivist-scientific perspective is that Incident Controllers are encouraged to believe there is such a thing as objective truth and that impartial decision making is possible. In
addition, there is an underlying assumption made by emergency service personnel and the public alike that if the risk is known, it will be acted upon in a logical and rational manner. Interestingly, according to Drummond (2001), knowing what the risks are may actually encourage risk taking because it stimulates a sense of “feeling in control” (p.129).

As previously touched upon, despite the understanding common in many academic arenas that truth is subjective and socially constructed, most of the Western world continues to view reality through the positivist paradigm. Fire services, both within Australia and the Western world in general, would identify with the possibility of objective truth. The fireground is a complex place of competing priorities and one way to deal with complex cross-over issues is to clearly delineate between black and white ‘absolute’ situations, thus enabling an objective viewpoint. Many professionally employed emergency management students find the grey area of uncertainty created by the postmodern perspective of socially constructed knowledge incredibly frustrating. They communicate in binaries such as yes/no, go/stay, life/death, offensive/defensive, and as mentioned in Chapter 5, they find the language of ‘perhaps’, ‘possibly’ and ‘maybe’ very uncomfortable. In terms of a fire service this leads to the understanding that there can be such things as impersonal reports, controlled observation, and impartial assessment.

Within the positivist framework reality is understood to exist independent of human perception and cognition; it is there to be discovered and what is valued most is what is labelled ‘true’ or ‘objective’. This perspective values a linear flow of parts that make up a whole. Taken to the extreme, a hypothetical example would be a person who believes what is printed in black and white text, as opposed to their own full-coloured embodied experience. This perspective is also evidenced in the expression ‘by the book’, meaning ‘to follow the rules’. These are common colloquial expressions demonstrating a social and cultural understanding of ‘right and wrong’ in terms of ‘black and white’ and absolutes. The arena of the arts, by contrast, easily acknowledges a combined and colourful image of art and science:
The world as a set of structured systems does not divide into the two territories of scientific and artistic vision. Rather, both our scientific understanding and our artistic grasp of the physical world exist within a common structure of motivation, communications, and knowledge (Kepes, 1965, p.vii).

The “artistic grasp” of the Incident Controller involves balancing the tensions between being seen to be taking too many risks on the one hand, and overreacting and playing it safe on the other. A practical illustration of this tension is the point at which Incident Controllers request extra resources, as socially and culturally they measure each other’s and their own ‘success’ by the size of the fire proportionate to the resources they have called for.

**Representation**

Representation of an object involves producing another object which is intentionally related to the first by a certain coding convention which determines what counts as similar in the right way (Van Fraassen & Sigman, 1993, p.74).

Within verbal language there is a basic coding convention of ‘art grammar’, but in terms of analysing the visual, it does not fit as neatly as one might suppose. This vocabulary is useful for generating language to talk about the visual after the event of apprehension, but in terms of the actual experience as a moment in time, it proves inadequate. Writers such as Feldman (1992), Knobler (1980), Ocvirk, Stinson, Wigg, Bone, and Cayton (1994) and Kepes (1967) speak about visual grammar, as I also do at times, but there are two separate issues to be clear about. One is the experience itself, the actual moment of apprehension; the other is the reflective description after the event. In the second instance the ‘grammar’ of art is delivered in words such as line, form, colour and perspective (Ocvirk et al., 1994). In the actual moment, words are not the medium, or at least not the only medium, of the experience. And it is here, at this point, where the importance of aesthetic
awareness needs to be highlighted and to which Multimodal Decision Making most aptly applies.

The same issue of realising that there is the experience and then there is the reflection after the experience is apparent when firefighters are debriefed after a major incident. In a debrief situation there is time to reflect on what happened in a logical, linear and verbal fashion, and this is generally what happens. Some people are adept at verbal language and are able to make their experiences very clear:

Verbal language is a distilled and concentrated form of experience. It can communicate insights and conclusions representing a vast amount of empirical, or trial-and-error, effort (Feldman, 1970, p.1).

The problem, from a multimodal perspective, is that without the pressure of time and associated limitations, the approach taken in reflection is likely to be rational and logical. Applying logical and rational approaches to understanding decisions made under time-pressure, when this was not the predominant mode of judgement, could pose a conundrum if this situation is not acknowledged. The use of a rational approach to understanding decisions made in time-pressured, information sparse incidents could lead to what Latour (1987) calls facts that are constructed scientifically, leading to “successive defence lines”:

The transformation of linear prose into, so to speak, a folder array of successive defence lines, is the surest sign that a text has become scientific (Latour, 1987, p.48-49).

Introducing a multimodal concept of decision making and developing an appropriate aesthetic language specific to emergency response could go some way to redressing this situation.
What Incident Controllers can perceive in a moment in time – lines, colour, shape, force, volume – cannot be said in a moment in time. Their speed of aesthetic perception is much faster than their ability to describe in language, no matter how adept and proficient at verbal communication they are.

When Incident Controllers put together their experience and begin to formulate it in some way (for example through practice, trial and error, or once-off events), they are, in effect, making sense of the world and trying to understand it. In this way the next time they see these same or similar things, they have a better idea of what to expect. Similarly, art is not the same as simply looking, or the same as visually perceiving something. Art is about recognising what another person has done with the way they have seen, understood and portrayed the world. It is in these moments that the visual images of art are powerful in their ability to present human experience in its various shapes and forms. We value the way artists have seen the world and shaped their response in various media, so that we can share their experience and in this way create our own unique experience. We hardly recognise the value of these kinds of aesthetic responses in the arena of emergency management, although the situation within the broader context of the world in general is changing:

Increasingly, an argument can be mounted that a literate person in contemporary Western cultures is, first and foremost, someone who is able to recognise, read, analyse and deploy a variety of visual genres and mediums (Schirato & Yell, 2000, p.166).

Contemporary Western societies are generally language based cultures. When we read we move from top to bottom, from left to right. We may skip words and portions, but we move linearly through the text, piece by piece, or phrase by phrase, to gain our meaning. We do not ‘read’ an image in the same way. We do not start at the top and move along horizontally until we reach the bottom right corner. Instead we see the image as a whole. We may not gain the full import
immediately, but we have an immediate, holistic effect from the experience of the entirety that cannot be mirrored by reading a passage of text. For one thing, there is a time difference. The slow build up of the objects in a room, for example, brings to mind Dorothy Lessing’s description of her childhood nursery (1995, p.18-39). Every comb, piece of linen, scent, toy and person is carefully described in intimate detail from a child’s perspective. We understand the scene as it is built incrementally and at length before our mind’s eye, gathering a sense of the sounds, smells, and scale from each additional piece of information. If we were to look at a photograph or a painting of this scene, or a few seconds of film, we could have grasped the essence of it in an instant. We may not yet have captured the tiny details, but it would none the less help us frame the whole.

There is a sense of nearness and completeness with viewing an image. Pursuing this thought is not a judgement on language and an elevation of art; instead it is intended to understand the aesthetic experience as larger than the linear progression of words, although language is a part of the aesthetic experience. We are so enculturated in the way language works that we quite naturally transpose this understanding to visual images and aural and tactile sensations. Books with titles such as Visual literacy by Elkins (2008) may contribute to confusing this issue (although the content of the book does not).

What we perceive depends partly on what we have been taught to perceive. The Inca child in the Andes is unable to recognise, unless taught, that the pattern of dots on photographic paper constitutes his or her picture; the child does not know how to “see” the photograph (Gilbert Rose, 1980, p.25).

When we learn to “see” and to speak our native language we imbibe, along with the words, a meaning about the nature of experience and our social and cultural beliefs. When combined, we have our ‘worldview’ and a sense of what is reasonable and acceptable for us. These understandings form the basis of our communication and are thus a great asset to possess. When we talk to each other
we do not have to go back to square one to explain every detail, as some things can
be just assumed and taken for granted as common knowledge. This saves a lot of
time, as much of what lies underneath our words can then remain unspoken,
already accepted as a ‘given’ within our community. On the down side, what we
take as understanding in common we can hang on to, as though it cannot possibly
be changed, as though there is no other way of looking at the problem. When
trying to find another perspective on a matter, these commonsense ideas can get in
the way making this a difficult process. Transposed to the fireground, the Incident
Controller could be thinking “But I’ve always done it like this, and it always
worked before.”

Multimodal Decision Making embraces an holistic, “multifaceted” perspective
such as described by Shusterman: “The living, moving body constitutes a
multifaceted, complexly integrated, dynamic field rather than a simple, static,
linear system” (2008, p.208). Along with linear progression in reading comes a
linear understanding of the sequential progress of time. This is partly encouraged
by the fact that it does take time to read a passage of text, and time is regularly
measured in chronologically linear progression. Authors can skilfully use the time
taken to read a passage to build a sense of suspense, drama or action for their
readers. Sentences may be short and clipped, giving a sense of movement, or they
may be long, sensuous and descriptive, giving a sense of space, length, and
languidity. When viewing an image, especially a fireground, the time taken to
‘read’ is measured and felt in a considerably different way. “We perceive time as
both circular and linear; it consists of both constantly recurring, never ending
cycles and of separate moments of change, both of which we call time” (Gilbert
Rose, 1980, p.11). Rose also makes an interesting observation on the cultural
interpretation of sound and space:

The differing emphases on sight, hearing and smell by various cultures have
led each to develop and inhabit a different perceptual reality. Hall (1966)
remarks that in contrast to the acoustic sensitivity of the Germans and the
Dutch (who need double doors and thick walls) the Japanese (who have only paper walls) screen out acoustic stimuli and are undisturbed by the quantity of sound. In the West we perceive and have a multitude of names for objects, but, unless trained in the visual arts, we tend to overlook and lack a vocabulary for the spaces in between. In Japan, spaces are perceived and revered (Gilbert Rose, 1980, p.28).

Are there “emphases on sight, hearing and smell” which are officially recognised in the decision making of Incident Controllers on the fireground, or are these aesthetic and somatic awarenesses only subconsciously developed and relied upon? This chapter explores a number of incidents in which the embodied response of the Inspectors is exhibited in terms of heightened levels of risk awareness as they assess the fireground situation. The decisions they make are influenced by dangers to their lives and the lives of others, and in three of the four incidents, the exhilaration of finally being Incident Controller at a large incident.

**Basement Fire**

The basement of a building under construction is on fire. The unfinished building is about four or five levels high. It is night and the smoke is so black and so thick that the Inspector is forced to turn his car around to find another entry point to the scene. This is his first major incident as an Inspector and he suspects a gas cylinder, or something similar, is the cause of the blaze:

The smoke was horrendous, we had to evacuate 500 people surrounding the building…so we had the police there, we had the media there. And I didn’t really want to go crazy and make it a 3rd or 4th alarm, because I didn’t want to use the management team, because I wanted to, like, maintain control of the incident, because it was my first one. If it had got to that stage where they were required, I certainly would of called. But I spoke to all the guys, then got them together and said “Look, this is what we’ve got here, are we enough? Can we rotate crews and we’ll just manage it ourselves?” And
everyone’s like, “Yeah, no worries”, everyone was happy to do that. So it all ran really smoothly.

The smoke was awesome…travelling down the street I had to stop, I couldn’t see. Then I had to go around the other way…Can’t see for the smoke…you could hear the fire, it was like a broken gas main, well, that’s what it sounded like to me… and the flames were roaring up inside, plus all the smoke. So I just sent a message saying it was a possible gas main failure, so we needed the gas, the utilities to come and have a look. And then we had trouble getting access into where it was…it was under construction so it was open….and you could lift up like a manhole cover and you could look down, you could see the flames, but you couldn’t actually get into it, the smoke was that bad and because of the structural instability of the place we weren’t sure, even though it was concrete, we didn’t want to go committing crews into, like, an unfinished structure.

With zero visibility, the Basement Fire Inspector gauged the smoke to be “black” against the already dark night. It is uncommon to have complete darkness; a windowless room would be darker than the darkest night. There is a sense in which black connotes “weight and solidity” and darkness “space” (Varley, 1988, p.178). Firefighters are accustomed to low or zero visibility. They are trained to search rooms systematically while blindfolded, by feeling their way around walls in a well-rehearsed procedure. The thick darkness of the night confronting this Inspector was very thick and heavy indeed, enough for him to decide to turn his vehicle around and find another entry point.

**Listening for change**

In this incident, sound is the Basement Fire Inspector’s strongest link to the fire’s progression, the determiner of his assumptions and the greatest asset to his understanding and decision making. Sound, and the great blackness of the night
and the smoke. Here sound has moved from one of the periphery informers of his decision making to the very core:

There’s a roar, it’s like a jet engine. That’s what it was like. So, as soon as I got there, I went “Phew, gas main!” I said to LG who was the Station Officer, “Is this near a gas main?” And he said, “Yeah, some sort of gas thing”. And he couldn’t see either, but he knew. So, it turned out to be LPG cylinders and also acetylene and all that sort of thing, downstairs stored.

The Basement Fire Inspector was listening for a change; he was trying to detect the dynamics of the sound, the colour of the sound, somatically registering its source. Because the shape of the sound is static it is also familiar to him, fixed in his head from working at the NSW Fire Brigades State Training College where gas explosions are used to train recruits. He is himself trained to respond to certain sounds as various gases behave differently when subjected to fire.

They didn’t explode, well, maybe a couple did, but the big ones didn’t. There was a gas main down there as well. That was ruptured, like it was only a plastic gas main. So the heat, the fire started down there, must have burnt through the gas main, which fed the fire on top of the cylinders and copped a few acetylene cylinders.

We had to get the gas company in, they had to do emergency repairs so they had to turn the gas off, somewhere, remote to where we were, but they knew where the points are, so they could do that. Once they turned the gas off, then we just had all the cylinders to deal with. But it went for about – to about 5 or 6 in the morning. And we were still there for like 3 or 4 hours. …When they train, there’s a big gas pipe and it makes a really loud noise, you can hear it from here (State Training College, Alexandria). It’s like a jet engine. You know, like – have you ever been past the jet base and heard a jet
engine? From a distance, that’s what it sounds like. It’s just a roar, because it’s gas under pressure, and it ignites and expands.

…it’s an advantage to realise what the problem is, because then there’s the danger of exploding gas cylinders. What sort of gas is involved? How else would you put the fire out if you can’t stop the leak?

Then you’ve got the problem of gas, just flowing. So then you’ve got to think about all the surrounding areas, all the ignition sources, so gas is a real problem, it’s better to let it burn, until they can turn it off.

**Sound dependence**

The dependence upon sound to determine what was happening and what plan of fire attack the Inspector would decide upon characterises the Basement Fire incident. The noise of the fire was so loud that the Inspector had to shout above the roar to be heard. A volume of sound in this range creates a demand for attention (van Leeuwen, 1999, p.156-187). It mediates all the ensuing actions and it remains the one tangible thing, apart from the “black smoke”, which links the Incident Controller to the progression of the fire.

In the majority of incidents sound is a sub-strata adding to the confusion of the Incident ground. The static messages coming across the radio, the shouting of crew members to one another, the roar of the flames, neighbours screaming to know what is going on, communications messages blaring, the motors of pumping appliances chugging away and so on. On the incident ground Incident Controllers must distinguish between the sounds to which they need to pay attention, and the sounds to consciously block. This is necessary first to avoid sound sensation overload, and second, to magnify concentration and attention towards the sounds that are most valuable to decision making.
Responding to every sound stimulus would result in a dissipation of focus and a slowed and inefficient response rate for decision making. The ease with which an Incident Controller can screen and select the important sounds to the decision making process is a demonstration of experience and expertise. It is common practice in the scenario based training of Incident Controllers for candidates to be bombarded with an overwhelming volume of noise stimuli in order to foreground what to expect, and to provide practice in distinguishing significant incoming sounds.

The droning repetition of the gas leak on fire, the loud and steady roar of the flame, provides a rich medium of knowledge, information and expression. The sound is a language the Inspector recognises. He is familiar with its nuances, he understands its implications, and in this incident he values it as a guide to understanding and solving the problem.

The roar of the gas leak could be described as monophonic, like a Gregorian chant. When the sounds of shouting, appliance engines and the crashes of burning structure hitting the ground are added it could be called polyphonic. I imagine this sound would not be harmonious or pleasant, but rather it would engender a demand for attention to silence it. It was not an enjoyable sound for the Basement Fire Inspector as it heralded a serious threat to life and property and ultimately five hundred people were evacuated. The tempo of the incident is fast, urgent and unrelenting. The Basement Fire Inspector is listening for change, but in this case it is a sound that is either on or off. It does not subside gradually. When the gas is turned off the sound slips away quickly.

Patterns in art are like riffs in music. Riffs are repeating patterns in a musical score, recognisable ‘hooks’ which take the listener to a familiar and anticipated place. They are the note sequences that sometimes get stuck in your head, even if you really do not know or like the words of the song.
The tonic note of a scale is the first note and namesake of the scale. It is the place around which all the other notes revolve, the place of resolution. It is the note you can guess is coming at the end of a musical phrase in a song or a symphony. In the Basement Fire the sound of the burning gas is the tonic around which all other sounds revolve. There is a dissonance created by the other tones creating an unstable and discordant sound in need of a resolution. The end of the Basement Fire symphony is signalled by the act of turning off the gas main.

Mondrian’s Broadway Boogie Woogie, with its blocks of solid colour jumping in dissonance and palpitating in movement, creates a rousing abstract image of streets hopping to a boogie woogie:

![Figure 6.1: Piet Mondrian, Broadway Boogie Woogie (1942-1943). 127x127cms. Museum of Modern Art, New York.](image)

The punctuation of larger squares amongst ordered ‘streets’ of squares within squares gives the impression of a map of streets and buildings. Juxtaposed primary colours increase the effect of the squares moving. To enhance this effect, try staring fixedly at one of the squares for ten seconds.
Boogie woogie rhythm is played in the bass range of a piano, while the right hand creatively tinkles and trills on top of the rhythm. The concept of creativity in disaster response is seeing a trickle of innovative writers. Kendra and Wachtendorf (2002) wrote about creativity in the response to the attack on the World Trade Centre, and Weick (1998) likens jazz music to organisational improvisation in that:

Improvisation is composing in real time that begins with embellishments of a simple model, but increasingly feeds on these embellishments themselves to move farther from the original melody and closer to a new composition… improvisation is a guided activity whose guidance comes from elapsed patterns discovered retrospectively (Weick, 1998, p.548).

Similarly, Bonner (2001) uses the metaphor of playing in a symphony orchestra to illustrate the progression of novice nurses to the position of expert in her thesis, Producing the magnum opus: The acquisition and exercise of nephrology nursing expertise. Another writer who uses the music metaphor to make an aesthetic connection is Kraut (2005):

Jazz is, after all, a deeply expressive form, and this suggests that formalism does not tell the entire story (p.5).

Primary colours are attractive and state vibrancy and life, in contrast to the subdued tones of pastels. There is an almost tartan effect as one glances quickly across Broadway Boogie Woogie, but closer inspection reveals nothing could be further from the truth. Despite the predictability of the squares and the uniformity they create, the pattern is uniquely complex and not a repeating one. If we attempted to paint the ‘next section’, it would be recognisable by colour and shape, but ultimately unique; it could not simply be a repeat. What the Basement Fire Inspector did was recognise the shape of the sound. He had not heard it on this
scale before, but there was enough about the ‘coloured squares’ for him to deduce that it was an ignited gas leak.

Planning and creativity work in concert to produce effective improvisation. The new social arrangements that emerge following a disaster and in response to an evolving crisis situation cannot be divorced from previously existing arrangements (Kendra, 2002, p.5).

The idea of being unable to break apart the elements of the whole, but understanding them as transformed and reshaped, is in a similar vein to the work of van Leeuwen in his book Speech, music, and sound (1999), where these three artificially separated essentials are drawn back together into a multimodal communicative theory. This resonates with the perspective from which Multimodal Decision Making arises. That is, there is a complex interrelatedness of the parts to the whole and trying to disconnect various pieces ruptures the integrity, leading to the leaking and seeping out of the important connecting aesthetic essence.

**Bank and Flat Fire**

_We are in a job that involves taking a risk_  
(Bank and Flat Fire Inspector).

Here an Inspector reflects upon an incident which took place while he was a Station Officer. A flat above a suburban bank is fully involved with fire, as is the bank. People on the street are screaming that a man and a woman, both local alcoholics, are trapped inside the flat. The Liquorland Fire presented a similar situation and possibly readers may feel a developing sense of their own Situational Awareness, and an increasing ability to imagine some of the possible decisions facing an Incident Controller at this point.
On arrival the senior officer dons his Breathing Apparatus, grabs an inexperienced young firefighter whom he does not know, climbs the outside stairs and moves into the burning flat. Once inside he sees that the only real escape route is through the door, as all the windows are barred. Smoke increasingly obscures their view as they proceed with a routine search. This involves separating and each taking a wall with the intention of meeting in the middle and exiting together:

And it had been the culmination of a really busy week. We’d had fire after fire after fire that week. We’d had a fire every day. It was the busiest week in my career. It was our last night shift and it was basically well alight when we turned up…Anyway, I got out of the truck and the woman says “They’re definitely in there. There’s people in there. You gotta get them out!” and starts screaming at me. So I put on a breathing set, and my blokes were putting on breathing sets at the same time, but there was already another truck there and there was a young bloke, he was not long in the job, say twelve months or less. And I said “Right, you come with me, and we’ll go in.” So I really didn’t know him and he really didn’t know me, so I really didn’t know if he was good or bad or indifferent or how he was going to work. And what I didn’t do – because of how quick it was, I didn’t put my flash-hood on. So I remember running down this top landing (points to drawing) – and this started to really burn the side of my face. And I remember thinking to myself “you forgot to put a flash-hood on”, but there was nothing I could do about it and it was really starting to burn me and I thought “This isn’t good, I really don’t want to be here”, but you can’t turn around and say it’s all too scary. So I kicked that door in and started in and started to go in and do a search. We could kind of see, but it was starting to get smoky. So we did the proper left hand turns…and I remember seeing the windows are barred at the front. So we had a bar window there and a bar window there (drawing), ’cause I went in – and this must have been intuitive – ’cause I thought “If that gets blocked, I’ll go out the window on the landing”…I remember going in, seeing the bar window and going “Oh shit!”
and I remember going up to the bar window thinking “Can I kick this off if I have to?” ’cause I really thought we wouldn’t get out of there. We did the search. I remember we actually sort of, he went one way, I went the other way, we met in the middle and he was – I still remember him looking at me with his eyes like dinner plates, waiting for me to say something. How are we going to get out of here? He was really good, like he sort of stayed with me and did all the right things and I was really shitting myself. I actually thought “I’ve just had a baby. I’m not going to die here. I want to get out of this.”

Presented in Figure 6.2 are two images drawn by the senior officer. Unlike the mudmaps presented to this point, these are captured from street level, rather than an aerial view. The word “fear” is written next to the place where he first realised he was missing a vital piece of his Personal Protective Equipment:

![Figure 6.2: Side and front views of the Bank and Flat Fire](image-url)
Be afraid, be very afraid

The mudmap in Figure 6.2 is expressive because it depicts the personal elements of their disaster: the door, the barred window and the spray of water that saved them. The senior officer was afraid for a number of reasons. To begin with, there was no safe exit route from the burning flat. In addition to this he had left his flash-hood behind, and now he realised he did not want to die in the fire. People’s lives were at risk: the alcoholic couple presumed to be in the flat, the lives of the senior officer and his young partner, plus the long-term quality of life for the senior officer’s young family. He freely admits to feeling fearful that he was not going to make it out of this fire:

You know why I was really scared? Because my baby was not long born.

Faced with his own mortality, something he is accustomed to and actually enjoyed in the past, the senior officer thinks of his newborn baby and decides he wants to see this new life grow and develop. A new motivation quickens him to realise it is imperative to leave the building alive. He does not deliberate about whether to turn back and retrieve his flash-hood (which looks a bit like a nun’s old style wimple) because if there were people trapped in the flat they would definitely perish in the interim. Not having the correct equipment creates a tension, because his mandate is first and foremost safety for himself and his crew, but his priority at this moment is saving lives, not losing them. He feels he can not turn back and risk losing the people trapped, so he continues on with the mission.

For firefighters, much of their working day is occupied with repetitive, mechanistic activities. These may consist of drills, routine activities such as testing smoke alarms in a nursing home or delivering presentations to school children, writing reports and general cleaning duties at the fire station. For this senior officer, entering a burning building with an unknown quantity who was working mechanistically as a result of multiple drills and training exercises, his trust had to lie and depend upon the “young bloke” and his adherence to routine training prior
to the incident. It is unlikely the “young bloke” had found himself in a similar situation before this moment. At this stage of his career he is likely to have been assigned routine jobs such as operating the pumping appliance, locating water sources and running out lines of hose. Lloyd (2007), writing on information literacy and firefighters, demonstrates that the acquisition of textual and routine skills is not enough to train a firefighter in that “Becoming information literate in the workplace requires experience with social and physical modalities as well as with textual information” (p.181).

The “young bloke” followed his training closely and also trusted the senior officer to get them out alive. One wonders, had this young firefighter known just how fearful his senior officer was, to what extent he would have felt the same degree, or more, fear. He showed absolute trust by working to the rules and not panicking, watching for directions, and even though he was “looking at me with his eyes like dinner plates, waiting for me to say something”, he displayed complete faith in his senior officer’s expertise to get them out of the situation, rather than trying another tactic himself. Did he have any alternative tactics to consider, besides panicking? As a junior firefighter with less than twelve months on the job, perhaps not.

It is easy to see how the word ‘courage’ applies to firefighters – entering a burning building at great personal risk, facing extreme heat, danger, and uncertain conditions. Panic by the junior firefighter would have endangered both of them, and this is what was being alluded to by the senior officer. The young firefighter was an unknown quantity, untried, untested. Would he go to pieces in a real fire, and himself require rescuing? According to Drummond (2001), “Experts… contribute to the air of certainty by using their mystique to legitimate plans” (p.113, original italics). Relying on their partner is a huge component of firefighting practice, and the more reliable and tested a firefighter, the more confidence their partner can have in them.
Creative activities must be performed under increased time constraints and in environments that have higher degrees of ambiguity. In both disaster and non-disaster periods, the generation and implementation of novel approaches to a challenge can result in positive or negative outcomes. Therefore, improvisation is most successful when existing structures and planning are in conversation with creativity (Kendra, 2002, p.5).

The senior officer was certainly in an environment with a “high degree of ambiguity” as he negotiated the flames and smoke in a desperate search for the two suspected victims. He was caught between doing his duty and wanting to save his own life. The tension between saving himself and saving someone else was compounded by the responsibility of the untried young firefighter who entered the blazing flat with him. No matter how hard firefighters may try to believe it, no incident stands alone or is disconnected from the wider circle of their lives and the community.

**Personal protective equipment**

Personal Protective Equipment is commonly referred to by the acronym ‘PPE’ in contemporary Western fire services. It refers to protective clothing and equipment, such as uniforms constructed of fire-retardant material, boots, gloves, flash-hood and helmet. In relation to utilising Personal Protective Equipment, the artist Sidney Nolan has immortalised Ned Kelly’s armoured helmet. The homemade armour was meant to protect Ned Kelly from the Police. Sidney Nolan’s grandfather regaled him as a youth with firsthand accounts of chasing Ned Kelly through the Australian bush, himself being one of the police officers (Tate, 2004).

Within the Ned Kelly series Nolan uses Ned Kelly’s armoured helmet to convey his message. Sometimes we see blankly through the helmet to the landscape beyond, sometimes we see startling eyes staring directly at us, and sometimes we see a golden glow emitting from within the helmet. In Armoured Helmet (1956),
the situation is reversed and we actually see from within the helmet for ourselves, looking out onto the world.

Kress and van Leeuwen (1990) in their book Reading images write about how the eyes of figures within images either look directly at the viewer “demanding” a response, or they look in other directions, creating the “offer” to participate further: “In pictures which ‘want something from the viewer’ one or more pairs of eyes looks directly at the viewer” (Kress & van Leeuwen, 1990, p.27).

Armoured Hemet is one in a small series of works painted by Sydney Nolan (the rest of which I was unable to locate) after he was appalled by the Soviet invasion of Hungary. In a strange kind of paradox, Nolan’s Armoured Helmet presents the viewer with a mirrored periscope-reflection of a face, which, had the eyes been there, would have “demanded” a response from us as viewers. Since the upper part of the face is not visible, we are in a sense “offered” the opportunity to look further and see from within the helmet as if we were Ned Kelly. Ned Kelly was supposed to be powerful, but sitting within Sidney Nolan’s portrayal we feel his vulnerability.

Figure 6.3: Sidney Nolan, Armoured Helmet (1956). 122x91cm. Tate Gallery, London.
The senior officer at the suburban Bank and Flat Fire was faced with his own vulnerability, his own mortality. This confrontation prompted him to think of the things on this earth with which he did not want to lose connection, especially his newborn baby and his responsibilities as a husband and father.

On Sidney Nolan’s mind as he painted Armoured Helmet was the Hungarian uprising in 1956 and according to the Tate Gallery, where the painting is displayed:

News reports recorded that, during the conflict, the Hungarians tried to stop the tanks by smashing the periscope mirrors in which could be seen the reflections of the drivers’ faces. Moved by such accounts Nolan invested the image of the helmeted Ned Kelly with this additional significance (Tate, 2004).

The senior fire officer looking through the protection of his own helmet saw the barred windows. I have selected Armoured Helmet because it connects with the idea of placing ourselves within the helmet of the senior officer and seeing through his eyes the barring windows and bleakness of his prospects. Although the painting is a reflection on an experience, by placing ourselves in it we may find a small sense of the actual experience, looking in the first person, so to speak.

One of my first-person experiences of such a view consists of sitting in the back of a shipping container, outfitted in Personal Protective Equipment, sharing someone’s Breathing Apparatus and with a fire hose in my hand: in other words in a very controlled fire environment, at the NSW Fire Brigades State Training College. I felt exhilarated, but also fearful. The heat from the few small pieces of wood in the corner radiated throughout the container as we crouched low, waiting for flashover to occur. I felt the heat through my gloves and was swept by a sense of disbelief that people could enjoy doing this for a living. In a way, as I did, Sidney Nolan understood Ned Kelly in the ‘first person’:
Nolan came to use the image of Kelly as an everyman adaptable to a myriad of situations. Nolan described Kelly as a rebel reformer but the image could be transmutable to any circumstance, in situations as diverse as symbols for a national hero to being a vehicle for political commentary, as in Hungarian Uprising (1956) (Lynn, Mollison, & Nolan, 1989).

Having absconded from the army himself, Sidney Nolan identified with Ned Kelly as a fugitive from the law. He portrays himself as misunderstood: “Nolan like this Kelly figure has also been a hero, a victim, a man who armoured himself against Australia and who faced it, conquered it, lost it…ambiguity personified” (The Bulletin, 29th December, 1962).

Ned Kelly was not invincible, and as the senior officer realises, neither is he. Facing death, as with the Christmas Day Bushfire Inspector, is a life-changing experience. Values and motives are called into question and as the near-death experience sharpens their focus on life, they experience a form of knowing which moves beyond verbal description to a convincing aesthetic understanding which galvanises their response.

There are many ways of knowing. Dewey’s understanding that Art is experience (1934) means that art is not something that happens apart from mainstream life – it is life and experience and it is concerned with formulating experience into images that endure for others to experience.

As closure for the reader, the senior officer and junior firefighter escaped the burning flat. The doorway entrance did become engulfed in fire and despite working on another sector, a second senior officer recalled his crew to spray a stream of water, affording quick passage to the two trapped firefighters. He did this without request, his own experienced eye detecting the immediacy of the situation. Without this teamwork the participant senior officer and his young offsider would surely have perished.
**Aesthetic awareness and Situational Assessment**

What Incident Controllers call upon within themselves to assess the situation is a key concern of Multimodal Decision Making. Within Naturalistic Decision Making, Situational Assessment is a technical rationality, despite the use of the word ‘intuition’. I write this because within Naturalistic Decision Making intuition is investigated through a positivist framework involving categorising and coding. Although this exposes important information, it also impacts on the outcome in such a way that the intuitive element largely escapes from the dissected body, like blood running wordlessly onto the ground. Multimodal Decision Making recognises that there are features involved in the recognition process which are non-verbal and aesthetic in nature and which resist breaking apart and being removed from the whole. Verbally describing this poses a bit of a conundrum that may never be fully resolved, however recognising it is at least a beginning.

The concepts of Situational Assessment and Situational Awareness resonate strongly with the emergency services and defence forces of the Western world. They have been quick to adopt the terminology, although definitions vary somewhat from organisation to organisation (for a comprehensive list of definitions see Beringer & Hancock, 1989). Although the specific focus for Beringer and Hancock is aviation, once again the practitioner’s viewpoint has been articulated by researchers and academics. In contrast, Foster (2006) writes on Situational Awareness as an experienced police officer with terrorism in mind, and his principles appear transferable to the fireground. He focuses on the “predictive element” and lists “three levels”:

Situational awareness has three levels – perceiving critical factors, understanding those factors and finally understanding what those factors will cause to happen in the near future (Foster, 2006).

I suggest Foster’s three areas of ‘perception, understanding and prediction’, are not only one way of describing a practitioner’s viewpoint of Situational Awareness,
but also provide an example of organisational enculturation into the positivist-scientific framework. This leads Foster to categorise an aesthetic experience with not only a list, but also by using words which are culturally acceptable pseudonyms for aesthetically apprehended senses and emotions. In reality what he is hoping to explain in his article is a non-verbal, somatic response to a risky emergency situation, but his available package of culturally acceptable vocabulary is a limiting feature. This is a paradox repeated over and over in the Situational Awareness and Naturalistic Decision Making literature. Multimodal Decision Making recognises that an artistic framework engages with a vocabulary more conducive to articulating non-verbal aesthetic apprehension.

NSW Fire Brigades Station Officers have at least nine years of experience in firefighting, and are organisationally recognised as having enough experience to lead a crew and command an incident. The Station Officer at the Bank and Flat Fire slipped up with the flash-hood incident, but his situational appraisal proved accurate – he and his young partner would be fatally trapped without outside help. Although the young firefighter knew they were trapped, he expected his senior officer to create a workable solution, one that he himself could not generate at that moment in time. Lloyd-Zantiotis (2004) terms the novice-to-expert transition as “acting as a fireman and being a fireman” (p.93, original italics). The young firefighter, as a novice, was “acting as a fireman”.

The Bank and Flat Fire highlights the original signifiers of risk over and above the original risk assessment. That is, the risk ‘formula’ does not take into account the complexities of real life. Of what help is it in this situation? Would the Station Officer be thinking in numerals anyway? I doubt it. He sees the barred window and realises he is in trouble; he includes the value of human lives. The ‘rules’ simply failed to apply in this situation. In a time-critical situation Incident Controllers cannot rely solely on information packaged in a linear way.
In the next incident, a fire in a supermarket, we again see the contrast between the enthusiasm of inexperienced firefighters coupled with their lack of expert judgement and the steadying cool, calm demeanour of the attending Inspector.

**Supermarket Fire**

*It’s not my job to provide adventure training for young fireys*

*(Supermarket Fire Inspector).*

In this incident the Supermarket Fire Inspector describes a “textbook” fire in which a building constructed in the 1970s is going up in flames, and his plan is to stay defensive and let it burn. The foodstuffs would already have been spoiled and he guesses the insurance company would rather rebuild than repair, so he holds back approximately sixty firefighters who are desperate to get into the building and extinguish the fire. There is a strong smell of burning food and the noise is deafening as cans of hairspray, tins of food and other goods explode like fireworks, while the entire contents of Liquorland release their corks. Two aerial appliances had been called in and four or five stations were already attending when the Inspector arrived and took over as Incident Controller. Ultimately about twelve stations attended.

Throughout the interview the Inspector emphasised that although it was a large and spectacular fire, he saw nothing really exciting in this one as it was a “textbook – surround and drown” incident. He says his major concern was keeping the firefighters defensive and preventing them from entering the burning building with its tempting pockets of fire. As all life was accounted for he saw no need to risk his crews’ lives in a potential building collapse, despite their enthusiasm to rush in and fight the fire offensively.

In Figure 6.4: Mudmap of Supermarket Fire, the Inspector depicts two aerial appliances in Sector A with the symbols ‘AP’ and ‘ALP’ and three pumpers in Sector B. Four pumpers are also located in Sector D, (the D looks a little like an
‘A’ on the left hand side), but these are not included in Figure 6.4. The Inspector selected an orange highlighter to show the seat of the fire at the front of the supermarket. He has also indicated aisles and checkouts within the building.

![Mudmap of Supermarket Fire](image)

Figure 6.4: Mudmap of Supermarket Fire

**‘Spoil-sport’ decisions**

Contemporary Australian firefighting procedures require crew safety as a priority, meaning firefighters are trained to move offensively into a fire when life is threatened or when there is a possibility that property could be saved without high risk to their own lives. Consequently, Incident Controllers will withhold their crews from entering a blaze such as this, unless there is more to be gained than simply extinguishing fire sooner rather than later.

Watching the supermarket burn, the Supermarket Inspector imagines the council, as well as the insurance company, thanking him for his decision. It was obviously not a popular or pleasant building to start with and it appears no one on the fireground questioned his decision.
Instead, the point of contention was his “spoil-sport” decision to keep all firefighters out of the building, commanding them to fight defensively. This meant that firefighters had to stand some distance away, directing their water flow through the large smashed windows, until a proper safety inspection could be conducted towards the end of the incident.

The Supermarket Inspector’s decision to fight the fire defensively, and to, in effect, let the building burn to the ground, did not cause contention, but holding back less experienced and very enthusiastic firefighters from entering the building did. In this contention he describes himself as a “narky Inspector” and adds his justification “It’s not my job to provide adventure training for young fireys.”

Conflict and contention

Conflict and contention only flare up when there are decisions to be made, whether they concern a public situation such as a fireground incident, a personal life-choice such as which house to buy, or, as in the following case, how the National Gallery of Australia allocated their entire purchasing budget in 1973. As it happened, they selected Blue Poles, a very large and controversial twentieth-century painting by American artist Jackson Pollock. The painting is dated 1952, and Pollock died in a car accident a few years later in 1956 (Landau, 2005, p.247).

Figure 6.5: Jackson Pollock, Blue Poles, Number 11 (1952). 212.9 x 488.9cm. National Gallery of Australia, Canberra.
When the National Gallery of Australia purchased Blue Poles it set a then world record price paid for the work of a twentieth-century artist (National Gallery of Victoria, 2003). According to the information provided on the National Gallery of Australia website, some of the contentions, besides the huge price tag included:

- the role of art and politics, the validity and global impact of the Abstract Expressionism, as well as questions surrounding the purchase of the painting as a signifier (for the Whitlam Labor Government) of modern nationhood (National Gallery of Victoria, 2003).

There are points of convergence between the saga of Blue Poles and the Supermarket Fire. To begin with, the Supermarket Inspector demonstrated meaningful communication through expressive lines in his mudmap of the fire, and in this sense he is Pollock-like.

Blue Poles could be described as a dialectic between order and chaos, which is also a fairly accurate description of a fireground. At first glance it may appear to be in complete chaos, but with a measure of experienced apprehension the chaotic movement of the scene begins to fall into an even and predictable tempo.

Continuing the points of convergence, the Inspector draws the sector lettering on his mudmap upside down, for my benefit, sitting on the opposite side of the table. This ambidextrous approach displayed by the Supermarket Inspector is not unlike Pollock, walking over his canvas and experiencing his work from every angle.

Another similarity is the use of personal descriptors; Jackson Pollock was nick-named ‘Jack the Dripper’ while the Supermarket Inspector describes himself with the fire brigade cliché “narky Inspector”. Both have a slightly derogatory feel, which situates them ‘on the back foot’ during their ‘incidents’.

Jackson Pollock is largely understood as an artistic hero of the twentieth-century. The Supermarket Inspector, while originally considered a spoilsport by the
young firefighters who wanted to dash in, may eventually be viewed by them with respect, as they gain their own experience and look back to this fire and his level-headedness towards their own safety, with an understanding that his decisions were grounded in responsibility and experience.

Blue Poles is a large, spectacular and very busy painting. Despite its title it has the red and yellow feel of an abstract fire in the colours, the movement of the squiggles and spirals of splashed and dripped paint. The blackened blue poles, somewhat resembling burnt trees, were applied when the background underneath was dry, discernable through close inspection of the paint. There is a sense of movement in this painting and it is quite startling how Pollock has managed to create this sensation through the almost uniform application of paint; there is no central point and nothing to indicate where to begin and where to finish viewing this painting, yet underlying the static blackened poles is a dancing weave of red and gold, moving in unison and mimicking a fire’s wavy, kinetic energy. The blackened blue poles are static points which, when concentrated upon, serve to enhance the background movement effect and increase the awareness that the poles are motionless while the background is moving.

Similarly, the columns in the Supermarket Fire provide assistance – the Inspector can watch the firefighters move into the fire as the large windows outlined by the columns provide a viable place from which to view their progress as they move into the building when the fire is almost spent and he finally releases them to enter. The Supermarket Inspector describes this scene as follows:

V: So, what is it like inside a burnt out supermarket?

It’s kind of pretty black, and there’s a lot of stuff melted and it’s all hanging down, and it smells like food. Laughs…smells like bad cooking! You know, the whole place had wafts of burnt apples and Bordeaux wine, so yeah, kind of a smelly job. So, yeah but, the other good thing by us letting guys go in up to this row of columns was we had big plate glass windows here, so while
the guys were inside, we had other guys out here who could keep them within visual distance, which is a lot safer.

A new era

Pollock used the shattered glass of basting syringes to heighten the effect of the paint on his canvas. The shattered windows of the Supermarket and the shards of glass from the basting syringes contribute to the overall effect of the images.

In 1947 Pollock wrote of his technique:

I continue to get further away from the usual painter’s tools such as easel, palette, brushes, etc. I prefer sticks, trowels, knives and dripping fluid paint or a heavy impasto with sand, broken glass and other foreign matter added (Pollock, 1952).

Throwing paint or letting it drip from a stick signified a new era in paint application. No longer was a paint brush the only mechanism for applying paint – now anything from a car crusher to a rifle could become a tool, and this meant that the size of images increased. In the Renaissance period it took a studio of apprentices to paint the backgrounds for such large pieces (Vasari, 1550;1986).

Pollock’s friend and patron, the artist Alfonso Ossorio, said of Pollock’s career:

Here I saw a man who had both broken all the traditions of the past and unified them, who had gone beyond cubism, beyond Picasso and surrealism, beyond everything that had happened in art...his work expressed both action and contemplation (National Gallery of Victoria, 2003).

The Supermarket Inspector has “broken all the traditions of the past, and unified them”. He embodies the new attitude of the fire brigade, which is crew safety above all else. The driving force and list of priorities has changed dramatically since the inception of the NSW Fire Brigades over one hundred years ago, when
they were owned by insurance companies and extinguishing the fire took precedence:

**History of Sydney Fire Station**

The Metropolitan Fire Brigades (MFB), the precursor to the NSW Fire Brigades, was established on 14th February 1884. MFB headquarters was operating from the old Insurance Brigades Headquarters in Bathurst Street (NSW Fire Brigades, 2007).

The ‘property above all else’ perspective is still noticeable in commercial films being made in the USA, the most recent being Ladder 49 (Russell & Colick, 2004). In this film nothing changed in the way the fire was fought because one firefighter went on ahead, risked and lost his life, to see further into what was happening with the building on fire. In fact, other lives were jeopardized in trying to rescue his. This occurrence is uncommon within Australian fire brigades, reflected in a significantly lower death rate of firefighters. The USA has approximately 100 firefighter deaths per year (Burton, 2007, p.37), while Australia has approximately 2 deaths per year (National Occupational Health and Safety Commission, 1999, p.10). This is a rough comparison of figures and does not take into account comparative details such as staffing levels, the number of fires responded to and so on; it nonetheless demonstrates that overall there are remarkably fewer firefighter deaths in Australia.

**Spectacular and impressive**

Blue Poles is painted on an exceptionally large piece of Belgian canvas, which is highly prized by artists and very expensive. Its sheer size makes it spectacular:

both the artist’s dripping, splashing and pouring of paint onto the work’s surface and the scale of the painting itself, clearly reveals the highly physical aspect of Pollock’s technique (National Gallery of Victoria, 2003).
The scale of the Supermarket Fire was also large. There is something spectacular about a gigantic image. The sheer size of something is often its most impressive feature, whether it is a natural formation such as the Grand Canyon or the grand scale of a painting. The scale of the fire excited the less experienced firefighters, but it had little effect on the Supermarket Inspector, who described it as just “a bread and butter – surround and drown textbook exercise.”

Incident Controllers who want to extend their experience involve themselves in fireground experiences which challenge their emotional and intellectual understanding, requiring increased energy and effort, and which eventually generate an experienced and trained perception. After a while they may find themselves viewing a large and spectacular fire, such as the Supermarket blaze, and feel a little blasé about size and scale, concentrating instead on the degree of difficulty in planning the fire attack.

The Supermarket Inspector’s Situational Assessment prompted his adamant conviction that there was nothing to be gained by sending firefighters in to extinguish the blaze. He made this particular judgement easily, and so called it a “textbook” incident. His words belie the fact that he still had many decisions to make. He had over sixty firefighters to deploy and many appliances to position; he had to deal with the media, various community representatives and road closures. These pieces of information were not raised by him in the interview, but the scale and location of the incident indicates they must have taken place. This could be viewed as the subconscious evidence of the expert, in that he minimises these components because he knows he can deal with them; they are known variables.

The Supermarket Inspector’s confidence in encapsulating the whole incident in the word “textbook”, contrasts deeply with the desire of the young firefighters who wanted to get into the structure and extinguish the fire. The less experienced firefighters had read the “textbook”, but were unable to ‘read’ the fire. Lloyd-Zantiotis (2004) describes the “formal information site”, which includes the
“textbook”, as “deposits of information that relate to the technical, operational and administrative procedures” (p.84). These gave the less experienced firefighters the skills to follow directions, but learned in isolation they leave a gap which only experience in fighting a real fire can provide.

The Supermarket Fire Inspector calls himself a “spoil sport”, yet he recreated the energy of a young firefighter in his mudmap. He identifies himself as a “narky” Inspector, but he can look with the perspective of the young firefighters. He is able to balance authority, empathy and control, having been in similar situations many times previously, building up layer after layer of experience. He has the empathy to see himself through the young firefighters’ eyes and their desperate desire to get inside the building, but as an Incident Controller and responsible for their welfare, he is also able to understand from multiple perspectives. The less experienced firefighters can see only one perspective – their own. Like Pollock, they are impulsive and willing to take great risks, perhaps because they are not fully aware of the consequences. For Pollock, ‘happy’ accidents did not threaten his life. The excitement of seeing what might happen, the sense of rushing in and trying something new was in the air. For the Supermarket Inspector, he has seen it all before. This enables him to stand back. For the young firefighters and for Pollock, it was still, in a sense, an experiment.

Rather than drawing parallels between the perceptions of the firefighters, the Incident Controller and Pollock, I argue that the aesthetic quality of their experience is not simply similar, but the same. It is engaged with and developed to a high degree within the Incident Controller, who can coolly control his perceptions to inform his decision making in a multimodal capacity. The stimulus of the scale, the tools to hand, and the colours available, nourish an aesthetic awareness in the bodily experience of both artist and firefighter alike.
House Alight

A house on acreage in the country is reported alight with a possible person trapped. As the relieving country Inspector heads towards the scene he sees a huge orange glow on the horizon and immediately wonders how a house fire could fuel such a blaze. Later it appears that an aluminium garage had been bricked and plastered up, effectively turning it into a house. A large amount of flammable substances, such as paints and thinners, were stored inside. The possible missing person was later accounted for at another location. As the Inspector approaches the fire he is amazed at the spectacular colours and size of the flames:

The house, it was just raging. I’ve seen some house alights, but this was just like it was breeding, it was just like pulsing and going and going like anything…The house was just going so well on fire we weren’t going to stop it. Actually we just had to let it burn out… it was just amazing to see this house go.

It was pulsing, you know. There was orange gunk and blue flame and green flame and yellow flame and you could see it really moving and so I realised there was fuels in there and that type of thing, and anybody in that part of the building is going to be fried, let alone dead from the smoke.

The Inspector’s most immediate thoughts were on the information of a person trapped. Ultimately there was no one, but he did not find this out until the next day. Had there been, he was quite convinced they would not have had a chance of surviving the smoke, let alone the intensity of the flames.

It was a miniature factory so if you get a miniature factory, what happens with a metal roof is it buckles. It loses two thirds of it strength at 600 degrees so with other weight on it, it just buckles in, so it is very hard to get into the factory once you lose the roof because you’ve got these pockets in there and...
that’s what we had in this situation – a miniature factory basically. The metal roof had caved in and we couldn’t get close enough because of the instability of the brick walls.

In the meantime there was a house immediately next to it, within about 2 to 3 metres on the side furthest away from the fiercest part of the fire, what we call Exposure D. And it was a timber front house only partly constructed, so we concentrated the firefighters’ hoses and efforts on saving that.

So the metal roof buckled, collapsed, and fell in and then the sides buckled and sort of fell in and fell out, and the bricks and that sort of fell off. Out here this whole back brick wall just completely crashed right down to the base (points to drawing).

Figure 6.6: Mudmap of House Alight

**Totally involved**

To people with a fire-related background the phrase ‘totally involved’ immediately indicates that the entire structure is engulfed by fire. Others might think more
along the lines of a person who is totally engrossed in an activity, not necessarily a fire. Either way, the building and the Inspector are totally involved in this incident.

The written words on the House Alight Inspector’s mudmap dominate his depiction of the scene in that they stand out more than the lines indicating the building. This may reflect the House Alight Inspector’s lack of confidence in my ability to ‘get the full picture’ as he has drawn it, or perhaps it is in his nature to clarify and clearly express, leaving no room for doubt when I later start looking more closely at his drawing. These are speculative thoughts, and I include them because from a multimodal perspective they are enriching and important contributions to the various interpretations of his incident data. They also serve as an illustration of the choices and decisions I had to make in my data analysis, and as supportive evidence that there is no single ‘black and white’ interpretation. By writing the possible permutations I am acknowledging a fuzzy category, rather than stating something crisp and definitive.

In his mudmap the Inspector has ‘written in’ the fire, with the words “totally involved heavy fire” and “involved”. Close inspection reveals a tanker “relaying” water to a pumper, the presence of hazmat (hazardous materials) and a Breathing Apparatus (BA) staging area, and “1 x 38” meaning the size of the line of hose. A rough timeline crosses the top of the image indicating that the incident lasted long enough for him to order a fixed line of hose to cool the structure and make arrangements for refreshments. One caravan was salvaged, shown by a dotted line and the words “caravan removed”. At the bottom of the page we see that a Retained Captain was appointed Safety Officer.

Most fires are unexpected, and one that could never have been anticipated was the burning of the House of Lords and Commons in London, 1834. The artist, J.M.W. Turner was on scene to record the spectacular event. In paint he describes the same sensations that the House Alight Inspector describes with words: orange gunk, blue and green flame, a “pulsing”, “breeding”, “raging” fire.
Pulsing

Pulsing is a fire brigade term, used to describe the controlled movement of water from a hose in intermittent spurts rather than a constant steady stream. A pulsing motion is also visible in Turner’s painting (Figure 6.7) which is vibrant, fresh and slightly unfocused, providing it with a strong feeling of movement. Orange, blue, green and yellow flames light up the sky and are reflected in the Thames River. The vigour and suppleness of the blocking-in stage forms the visible finished image, leading to a moving and slightly fuzzy effect.

![Figure 6.7: Joseph M. W. Turner, Burning of the House of Lords and Commons (1834). Oil on canvas, Philadelphia Museum of Art.](image)

The speed at which Turner had to capture the scene is demonstrated in his application of paint, which is loose and not overworked. We are not privy as to whether he drew an outline before the application of paint, but his fuzzy hazy vibrating image indicates it is possible he did not do this in detail. The hazy outline of a structure in the midst of a fierce fire causes us to, as in a real fire, stare into the blaze in order to confirm that the shapes in its midst are indeed buildings. The fire seems to have absorbed all the hard edges of ‘reality’, yet the painting is
realistic. For these reasons I consider Turner has successfully conveyed the radiant heat of the gigantic fire.

As with the House Alight Inspector, Turner first saw the fire from a distance. Despite the passage of time, one can still ‘feel’ the heat of the flames and imagine the sounds racing across the water.

Turner clearly understood in so many different ways that vision was always an irreducible mix of elements belonging to the observer’s body and of external perceptions (Crary, 2008, p.68).

As with the Supermarket Fire and Burning of the House of Lords and Commons, 16th October 1834, the House Alight was also a large and spectacular fire. The House Alight Inspector was amazed at the orange glow on the horizon as usually it takes a factory and its contents to create such a large-scale effect. It appears the materials composing the British Houses of Parliament had similar burning properties emitting orange, blue and green flames.

In the House Alight the Inspector experienced tension, not knowing whether there was someone trapped inside or not. The information he received at the scene was slightly garbled and inconsistent. He also tasked himself with keeping the surrounding properties and exposures from catching alight. In the end, the firefighters managed to save one caravan and some of the cars:

And we got a message from the neighbours and police information that a suspicious car had been in the driveway and out of the driveway and this bloke had had a fight with his missus and moved into this place, no no, sorry and she’d gone away and he’d gone north two days ago or something. So we had all this conflicting information as to whether he was actually even in the town, let alone in this house. So I decided that of course if he was in there he was gone, and we can’t save him and we just had to then just concentrate on waiting until the fire basically burnt itself out and protect this exposure, exposure D.
We lost – I think there was two cars in an outside a garage, there was a car inside there and there was two caravans on the side.

**All life accounted for**

‘All life accounted for’ is another fire brigades expression, which in this incident means that the person presumed trapped was located elsewhere. In another situation it may mean that all victims have been extracted from the fire. As with the Basement Fire, the House Alight Inspector was fairly unconcerned with not knowing what ultimately happened in the end in terms of tying up all the bits and pieces:

We didn’t find out until 12pm the next day that we had confirmation that this bloke had been accounted for and that he wasn’t inside there.

I don’t usually find out...That’s the thing – unless you actually physically chase it up you never actually find out and because these things are all subject to Coronial Inquiry and that. Unless I am there to notify or it’s annoying me, then otherwise I don’t worry about it. Maybe I should, however I don’t. I just think “Well that’s done.” I don’t like lose any sleep over it, I mean I have done my best, I mean certainly whenever I leave I always think “Was that the right way? Is that the best way to go about something?”

Most of the time you’re happy with what you did. Sometimes you’re not and sometimes you didn’t have the option to do anything else. Now there’s only so much you can do and in our position now, where you do very little actual physical fire fighting and that, we are telling everybody else what to do, so you know, that’s what the job involves.
Both Turner and the House Alight Inspector could be considered experts in their fields. It is the aesthetic and somatic understandings that both fields draw upon that encapsulates Multimodal Decision Making. The common thread of both is their ability to ‘read’ the scene, to depict it and to say something about it. This ability evidences them as an expert in their field, and is a development of aesthetic awareness and somatic response, despite being expressed differently in that one extinguished a fire and the other recorded it in paint. Their activities were informed by the same aesthetic sensations, although they were expressed in different ways. Knobler (1980) draws a similar comparison between biology students and visual artists:

Biology students, who learn to interpret microscopic data, and medical students, who learn to perceive small changes in the sounds of the heart and lungs, have much in common with the novice in the visual arts, who must become aware of visual relationships that an untrained observer would pass over (p.14).

To the untrained eye an orange glow on the horizon may indicate a large fire when in reality it may be the distant glow of streetlights – such as those visible at night when approaching the town where I live.

There is a sense of urgency when viewing an art image – in recognising what it is, and what it means. Painting does not represent or reconstitute its subject, but opens up a distance between the subject and its representation so that the painting takes on a separate voice (Podro, 1998, p.113).

The “urgency” described by Podro certainly applies to an Incident Controller making decisions on the fireground as much as it does to a viewer of an art image. Turner’s depiction of the fire ‘voices’ what he saw, just as the House Alight Inspector ‘voices’ what he saw. Their mediums are different, but the aesthetic quality conveyed to their audience indicates the similarity of their aesthetic understanding.
Risk revisited

It is evident from the incidents analysed in this thesis as well as from the research of a number of risk theorists (Baker, 2002; Beck, 1999; Bernstein, 1998; Douglas, 1992; Giddens, 1990; Lupton, 1999) that risk perception directly informs decision making:

The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature (Bernstein, 1998, p.1).

The word risk “derives from the early Italian risicare, which means ‘to dare’” (Bernstein, 1998, p.8). Within the field of Emergency Management, risk is understood as a function of probability and consequence. To demonstrate, here are a number of definitions:

- Risk is a measure of harm, taking into account the consequences of an event and its likelihood. For example it may be expressed as the likelihood of death to an exposed individual over a given period (NSW Department of Planning & Australian and New Zealand Hazardous Industry Planning Taskforce, 1995).

- Risk is the chance of something happening that will have an impact upon objectives. It is measured in terms of likelihood and consequences (Standards Association of Australia & Standards New Zealand, 1999).

- Risk is a concept used to describe the likelihood of a consequence arising from a set of circumstances (Emergency Management Australia, 1998).

The commonality between these definitions is that they explain risk as a function of probability and consequence. What is the impact of this positivist perspective
on the way Incident Controllers (such as the House Alight Inspector) take control of the fireground response?

In contrast to the definitions of risk provided by government bodies such as Emergency Management Australia and the Australian/NZ Standards (a standard text for emergency service workers), within the artistic framework and encompassing visual culture and social semiotics, risk and decision making can be understood as socially constructed interpretations and responses that take into account a society’s cultural values and belief systems. Within the artistic perspective the important role of culture is able to be acknowledged in the assessment and interpretation of risk. By this I mean a fire always exists within a larger context.

From the artistic perspective, therefore, risk and decision making can be viewed as socially constructed interpretations and responses and cannot be understood apart from these processes. This is the same as saying that what we feel and how we behave cannot be separated. Sometimes we behave contrary to what we feel, but there is still a connection, a referent. Our feelings and emotions are indicators of our values and perceptions of the world. Within a given culture there is a shared understanding of what social and individual behaviours are is appropriate. In terms of an artwork, it could be the size of the image or its financial worth, it could be the spiritual power invested in it, it could be the ‘name’ of the artist who made it or the skill involved. All of these elements fuel emotion and feeling. In an example of how emotion and feeling relate to Incident Controllers on the fireground, the House Alight Inspector’s apprehension of the colour of the flames and the felt heat and intensity of the fire demonstrated his embodied response and awareness to the situation; these perceptions informed him that it was more than an average house fire.
Embodied appraisal

Intrinsic to the life of all higher animals are two complementary needs – for making order out of experience, and for disorder, novelty or the unexpected (Dissanayake, 1988, p.134).

During the 1990s a warning voice issued from a number of sociologists who expressed their rising concern over the trend of research to focus almost exclusively on the theoretical perspectives of the body and embodiment. Among these writers were Featherstone (1991), Turner (1996) and Waquant (1995). They encouraged sociologists to refocus on practical and experiential understandings of the social actor in relation to embodiment.

In a study of the lived experience of boxers Waquant (1995) wrote “One of the paradoxical features of recent social studies of the body is how rarely one encounters in them actual living bodies of flesh and blood” (p.1). According to Wainwright and Turner (2006) there still remains an “overtly theoretical approach to the body” (p.240) and their own research into the lived experience of ballet dancers seeks to redress this tendency.

In a similar vein, I endeavour in this thesis to contribute a practical example of embodiment in action. I propose that fireground decision making is closely linked to somatic and aesthetic awareness, and that the experience of Incident Controllers, finely honed through years of practice, is expressed both outwardly and inwardly through the expert reading of their own embodied experience.

According to Waquant (1995, p.1), “The newer sociology of the body has paid surprisingly little focused attention to the diverse ways in which specific worlds invest, shape, and deploy human bodies.” If ever there was an organisation that invests in the “deployment of human bodies” it is the fire services. How much attention, in this deployment, is given to somatic response and aesthetic awareness? In contemporary Western societies most fire service organisations possess a myriad of protocols and plans for the procedural approach to nearly every fireground and hazmat situation imaginable, but little official attention is
given to the somatic response of Incident Controllers. There is, however, a huge body of untapped anecdotal evidence. Mess rooms are awash with vivid descriptions of embodied responses in the face of fire, but the ‘rules’ are strangely devoid of this perspective. As an illustration, while interviewing Station Officers in previous research (Childs & Ingham, 2002), I encountered a disgruntled irritation with the way sophisticated technology and equipment was delaying or preventing a firefighter’s somatic response. These experienced firefighters felt removed and separated from their somatic reading of the hotness of fire. In the ‘old days’ they would retreat from a fire when their ears burned to a certain degree, and that degree was a function born of experience. Nowadays they are so swathed in Personal Protective Equipment they cannot feel the heat to the same degree, and anecdotal evidence suggests that a number of Western world firefighter deaths may be due to venturing too far into a fire as the result of not being able to access these vital somatic signals of danger. Technology, in the form of increasing Personal Protective Equipment, complex communication systems, and sophisticated fire fighting equipment, is usually understood as increasing the opportunity to prevent and control an incident. An alternative perspective could be that increasingly sophisticated technology is replacing somatic response with dangerous implications.

In another example, an Inspector told me how he cast aside his mechanical ‘sniffer’ when it did not register a high enough level of petroleum in the air, preferring to trust in the accuracy of his own and his crew’s sense of smell instead. These are illustrations of the reliance firefighters place on their somatic perception in relation to ‘advances’ in technology. Featherstone and Turner, writing in 1995, heralded this situation in the inaugural issue of Body and Society writing that:

The development of technology provides the potential to…construct artificial devices and alter the immediate near-to-body environment to augment and replace human capacities through systems designed to increase our empowerment (Featherstone & Turner, 1995, p.4).
Furthermore, as Featherstone and Turner go on to highlight, replacing human somatic response may well rather result in disempowerment.

The House Alight incident provides the Inspector with an opportunity to stand back and watch the blaze in all its colour and glory, rather like a techno display at a celebratory opening. Firefighters, unable to enter the building, content themselves with a ringside view, fighting the fire defensively and preventing its spread to the adjacent dwelling.

The successful, experienced and respected Inspector is not simply a cog in the organisation, dehumanised and uncaring. The individual Inspector is affected by the circumstances of his home life before he left for work and the victims he meets on the fireground, the Police and other Emergency Services – who also bring their own state of mind and body to the scene; they are affected by financial, social, ethnic and psychological factors. These complex components inform and affect their multimodal apprehension and assessment of the fireground in an integrated way.

**Conclusion**

The modern concept of risk incorporates the understanding that if the risk is known it can be prevented or at least prepared for. This provides a sense of security. In the main, this is because risk measurement is understood to be based upon ‘scientific fact’. Multimodal Decision Making suggests that the problem of risk can be identified and managed better when connected with the polarity of disembodied knowledges, and that the escalation of a sense of risk comes from the alienation caused by disembodiment. The measurements of risk in the scientific framework are out of control and not corresponding to the experience of practitioners on the ground and their holistic sense of embodiment. This is because ‘risk’ has been colonised by a particular discourse at this moment in time, understood by Douglas (1992) from a cultural and institutional perspective and described by Beck (1999) as the ‘world risk society’.
Multimodal Decision Making provides another perspective to risk analysis in that aesthetic and somatic responses are acknowledged as imperative and inseparable from risk assessment and consequent decision making processes. In this sense I do not agree with the grand discourse of risk, however I do acknowledge the basic human strategies for defying and coping with risk. It is evident that risk is inherent to all human activity and that it is nothing new.

The silence and lack of acknowledgement of aesthetic awareness in risk perception and decision making is due, I suggest, to two main issues. The first is the limitation of language when describing non-verbal processes, and the second is the public elevation of positivist science and ‘expert’ opinion over trust in human aesthetic perception.

It is evident from the incidents presented in this chapter that Inspectors are relying on the feel of alternatives rather than strict logical deductions to make decisions during the course of their work. This chapter provided illustrative evidence to support the idea of a complex relationship between the embodied Incident Controller, the social construction of Incident Controllers and their relationship to the public. Their fireground decisions reflect these complex processes and relationships, and are acknowledged within Multimodal Decision Making. These processes and relationships often fall together into a Situational Awareness, described by one Inspector as “something just clicked”.

The concept of a decisions-maker during an emergency as a ‘whole’ body, using all their senses to evaluate and act, is often omitted as an important factor of decision making theory. Multimodal Decision Making acknowledges the ways in which firefighters respond to risk in terms of social obligations and expectations, both from within the organisation and without.
Chapter 7: Complex Incidents

Introduction

One still must acknowledge that the richest aspects of any large and complicated system arise in factors that cannot be measured easily, if at all (C. S. Smith, 1978, p. 9).

This chapter explores the complexities faced by Incident Controllers making split second decisions on the fireground and demonstrates, through the analysis of a number of incidents, that the dominant models of rationality, logical argument and Naturalistic Decision Making are incapable of dealing with this complexity.

Emergency services within contemporary Western societies differentiate between routine and complex emergencies. A ‘complex emergency’ within the emergency services refers to a situation which is beyond the capacity of immediately available resources, usually involving complex political, humanitarian and agricultural variables. For instance, a drought-causing famine resulting in the mass migration of an ethnic group into a politically unstable and unsafe geographical area would be defined as a ‘complex emergency’ within an emergency services and United Nations context. Here in this thesis I am using the word ‘complex’ to mean incidents which present with intersecting issues such as the conjunction of the media and the public, multi agency response and so on. From this perspective, even the simplest incident has complexities and I understand that great complexity exists in ordinary situations.

Firegrounds are dynamically complex environments, fluid, flexible and not easily captured as a moment in time. Incident Controllers structure the fireground by designating sectors and deploying crews and resources, but it remains a continuously evolving and complex setting. Gilbert Rose (1980) writes on the power of form within the context of art, highlighting the importance of interaction in a dynamic and complex system and heralding a turn back to an interrelated multimodal perspective:
The new world-view presents the universe as a dynamic web of interrelated events, an inseparable whole in which all forms are fluid and ever changing. The structure of the whole is determined not by some basic building blocks, but by the overall choreography of mutual interrelations. The properties of material things are understandable only in terms of their interaction with the rest of the world with which they are always engaged (Gilbert Rose, 1980, p.23).

The complex “interrelated” intersections found on a fireground are not effectively explained through Rational Choice decision making models. Presenting decision making as a choice between options is an oversimplification. Naturalistic Decision Making has demonstrated that under the pressures of an emergency situation there is not time enough to weigh up alternatives. It draws on the cognitive sciences to explain how Incident Controllers make decisions which cannot be explained by probability theory or rational logic. Although I appreciate various aspects of the Naturalistic models, the problem for me is that the research has been conducted from a Cognitive Task Analysis perspective, where typically each decision has been broken down into its supposed constituent parts, analysed and then reassembled. I view this process as counterproductive to appreciating complex and interrelated decision making. Dissanayaka (1988) calls this “murdering to dissect” when writing of the same phenomenon in art criticism (p.11). Multimodal Decision Making is an holistic approach which presents decision making as an interrelated whole, incorporating all complex facets and dimensions of knowledge and experience.

Multimodal Decision Making recognises that probability theory or rational logic does not adequately explain how Incident Controllers balance feelings of contradictory information in parallel, and by the very clash or strangeness of the juxtaposition, see a way forward. This is reasoning by similarity rather than by calculation. I suggest that the mechanistic rational processes do not necessarily
disappear, but that they are assimilated into a dynamic, as opposed to inflexible and rigid, approach to decision making.

Firefighting is a real-life activity involving risk, knowledge and experience. Images created by artists, especially collages, often reflect an activity in life. Collage is an appropriate medium for this because in the process of construction, found objects may be recycled and synthesised into something fresh and new. Within the context of Visual Culture Cohen and Higonnet (2004) write:

Collaboration…preserves disciplinary expertise within an interdisciplinary context...This expertise is not treated complacently, but rather as needing to be defined against what it is not; as rethinking a vision of the internal consistency of the field as defined by its edges rather than a traditional lineage of received scholarship…collaboration is…the productive interface of the different kinds of skills that are necessary for the study of complex systems (Cohen & Higonnet, 2004, p.25).

Through using previous objects and images and presenting them in a new form, artists are able to use their collage construction as a vehicle to comment on something that could be related to the original image or else suggest something entirely different. In this way collage images contain elements of the ‘real’ world, but at the same time they are something new. The Art of Multimodal Decision Making by Incident Controllers on the Fireground is a synthesis of seemingly disparate scenes, objects, ideas and art ideas, melded and meshed and combined together, not blended at high speed into a single tasting ‘soup’, but nevertheless chopped and combined enough to enhance existing and individual flavours and simultaneously creating a new and original essence, leaving enough detail and texture to show the connections. It is about making connections across cultures, across disciplines, across techniques and materials, and building a bridge across the small fissures and larger chasms separating disciplines into categories that box individuals into predictable and therefore controllable spaces of containment.
Within this thesis, for a moment in time I am breaking the jigsaw and smashing the pot, then reassembling into something recognisable, because there are recognisable pieces, but also something new, because of the new connections, permutations and flexibility of shape. The connecting thread that feeds and invigorates this collage creation is aesthetic awareness, which is the indivisible and irreducible connecting fabric holding all incoming intelligence in tension.

In this chapter the decisions of Incident Controllers as complex functions of embodiment are discussed. The first incident involves an emergency rescue.

**Toppled Crane**

A crane driver, underestimating the weight of a large steel table sitting on the back of a semitrailer parked on a wharf, does not put down his stabilisers. As the crane driver lifts the steel table his crane topples forwards onto the semitrailer, trapping him in his cabin and pinning his leg against the semi’s tray. Various emergency services have been present for thirty minutes before the Inspector interviewed arrived onsite. During this time Paramedics have put a chest brace on the crane driver to stop him crushing his own windpipe through the crippling position of his contorted body, but there has been no progress towards righting the crane or extracting the driver.

The Toppled Crane Inspector, as a relieving officer in NSW Fire Brigades Hazmat Headquarters at Greenacre, listens to radio transmissions emitting from the Communications Centre, and attends any incident he ascertains requires his expertise. He arrives on the incident ground of the Toppled Crane at the thirty minute mark, realises that no one really knows what to do as it is such an unusual, large scale and complex incident, and assumes command. He conducts a size-up, appoints people to various roles and almost immediately forms two plans in his head. By the end of the incident he says he had three plans in his head. The incident is further complicated by a confidential meeting held between the Toppled Crane Inspector and the senior SCAT paramedic (Special Casualty
Access Team) who informs him they will have to amputate the crane driver’s leg if he is not released within the next hour because of the life-risk due to toxic shock. The Toppled Crane Inspector decides not to inform anyone, apart from a few key people, about this additional aspect of an already time-pressured situation. He makes a plan and issues orders for the assembly of a stabilising structure to be built for the crane. Adding to the complexity of the rescue is the receding tide and backwashes from passing ferries, as the crane boom is now leaning on a pontoon in the water. The subtle rise and fall of the crane boom causes pain for the trapped crane driver and danger for the firefighters working underneath. The Toppled Crane Inspector recounts the incident:

From past experience, I was aware that when cranes topple over, it’s generally because of a dynamic failure in the loading system, and that failure makes the whole load of the crane unstable and requires expert stabilization skills...But I had actually, I’d actually read a couple of articles about crane incidents, because it’s one of those, I suppose it’s one of those larger career sort of things. You want to know all the things you might be faced with and I just thought it was interesting, because eventually you’re going to come across something of everything in this job.

As I was driving there, I was thinking in my head, what was I going to find? What had I learned from the other incidents? What had I read about or seen and what was I expecting when I got there? And it was as I expected when I got there, but the only variable I hadn’t allowed for was the head of the crane was actually laying on a pontoon in the water, so it was being affected by the tide, which was receding.

We responded in what’s called USAR One, which is a heavy rescue semitrailer, which has specialist stabilisation and rescue equipment on it...
On arrival, the fire crews, the crews that we found, were a little bit out of their depth because they knew it was dangerous because of the instability of the vehicle, but hadn’t quite known what to do and also didn’t really have sufficient equipment to do it.

This incident demonstrates the multimodality of the Toppled Crane Inspector, in that he was able to form contingency plans when no one else seemed to have any plan at all, and he was able to visualise these plans in his head. The fourth option, that of amputation, he did not count on his list; he did not even entertain it as a possibility. Perhaps through refusing to accept amputation as the inevitable end to the incident he forced himself to come up with alternatives.

Imagination…involves the ability to create images, to elaborate memories and combine them playfully with new perceptions, to construct a different form. It aims at transcending the limitations of personal space and time. Creative imagination does yet more. It enlarges the dimensions of reality, but at the same time reunifies it with universal significance (Gilbert Rose, 1980, p.1).

Although Gilbert Rose (1980) is writing from an artistic perspective, there is a correlation with the Toppled Crane Inspector in regards to his aesthetic ability to visualise a number of resolutions to the problem. Serfaty, MacMillan, Entin and Entin (1997) hypothesised the differences between experts and novices in battle-command decision making and found that:

Participants with higher expertise levels generated more detailed courses of action, with more contingencies…Similarly, high-expertise participants were more able to focus immediately on critical unknowns and to ask diagnostic questions (as summarised by Zsambok & Klein, 1997, p.8).
Balancing training and real-life experience

Please view Toppled Crane film clip

The DVD is located inside the back cover of the hard copy thesis.

The film was taken by the NSW Fire Brigades and is used for training purposes, where it is presented as an example of excellent leadership because the Inspector can be seen confidently delegating tasks. As the incident occurred in a sensitive location it was not reported by the news media.

If you viewed the Toppled Crane film clip at the beginning of the thesis perhaps the incident appeared to drag on without too much happening, and you may have pressed the fast forward button a few times. Having travelled through six chapters and finally coming upon the incident, it may be that viewing it a second time will highlight your own developing Situational Awareness, demonstrated with deeper connections to the undercurrents of the seemingly static scene.

There are immense differences between a real life incident and an incident played out within a training context. For one thing, the possibility of someone in their prime living out their life missing a leg creates a tension for emergency responders that would be hard to replicate within a training situation.

In relation to film and training, Cristina Grasseni (2004) videoed breeders of cows, trailed around after vets and apprenticed herself in an effort to be able to ‘see’ what breeders were seeing in a cow. To begin with her untrained eye did not even know where to point the camera and relied upon instructions from participants. “I did not know what to point the camera at, because I could not see what was going
on” (p.20, original italics). The distinguishing feature of the Toppled Crane Inspector was that he could ‘see’ everything he needed to see in order to ‘point the camera’ and begin operations. Like Grasseni’s expert cow breeders, he knew what he was looking for, and had begun his size-up even before he had arrived on scene.

**Balancing tension and relaxation**

One of the tensions faced by Incident Controllers is finding a balance between their rushing adrenaline and the complacency that comes from familiarity. The film clip of the Toppled Crane Inspector’s calmness and direction has become a part of the NSW Fire Brigade training regime. The expert is able to relax in a familiar situation, not a sleepy kind of relaxation, but a calmness that defies the urgency of the moment. Someone experienced or skilled in a particular situation can ‘make it look easy’ because in their relaxed state they have all their energy and attention to give to the matter at hand. McKim’s comments on the aesthetic experience of drawing can also be applied to the incident ground:

> Relaxation is important to thinking generally, because we think with our whole being, our body as well as our brain (McKim, 1980, p.34).

Finding the balance between tension and relaxation is a sign of mastery, which is evidenced by an economic dynamic state of balance between complacency and adrenalin. Fear of failure is obviously an impinging factor for an Incident Controller and fear is also the cause of muscle tension. Along with tension created by fear is “an inability to relax” (McKim, 1980, p.35). In this state, distractions form a relief, making it important to avoid this condition on the fireground. Incident Controllers who are pulled in different directions by competing demands are perhaps fearful and in need of diversion and distraction to relieve their tension and mask their indecisiveness. At the other end of the scale of progressive disengagement, Lloyd-Zantiotis (2004) writes about firefighters “switching off” which “results in a loss of credibility” amongst their peers (p.115).
Life is awash with competing demands and distractions. It is possible to casually walk through an art gallery or live in a house hung with art work without actually stopping to take the time to look intently at anything in particular. Even when the intention is there, all sorts of things can get in the way of actively seeing, such as bad lighting, distracting noise, or poor choice of background wall colour. These competing demands may flow from the viewer’s lack of concentration and emotional state, or they may flow from the external environment. Such ‘distractions’ may create a separating divide between the viewer and the painting. As opposed to distractions, there may be a complacency that comes from familiarity – we’ve seen it before and have become comfortably familiar with our surroundings.

Incident Controllers encounter the same problems in their aesthetic appreciation of a fireground. There are competing demands begging for their attention to particular details, and it takes deliberate effort and experience to speedily sift and decipher the incoming information and prioritise and attend to the most expedient. Too much information is like white noise; it is confusing and debilitating. In addition, there is a tension to be maintained between complacency due to familiarity, and the rush of adrenaline which comes with commanding a large incident.

Knobler (1980) encounters the same experience of competing demands and distractions in relation to artistic perception:

To perceive something we must separate a limited number of sensations from a greater kaleidoscope array all being received at one time. We must attend to those sensations which may join to form a particular experience; the others we must disregard (p.13).

Incident Controllers are required to be at their optimal level of performance when the atmosphere crackles with tension. They are in a familiar environment when
there is time-pressure and escalating threats if they do not manage to bring the situation under control as quickly as possible. Not all people are able to balance their tensions in this kind of situation. It is the consequence of experience, exposure and practice.

**Balance and estimation**

The Toppled Crane incident highlights the importance of balance and estimation in sizing-up an incident. There is the estimation of the crane driver, or rather the underestimation by the crane driver, as to the weight of the steel table; the SCAT paramedic’s estimation of time before certain amputation; and the Inspector’s estimation of what is needed to stabilise the toppled crane in the face of a receding tide and waves created by passing water traffic.

When Incident Controllers size-up an emergency situation they are calling upon aesthetic and somatic processes which are no different in essence to those of a person looking at an artwork. It takes energy to read the distance of the crane boom across the water and visually measure various spatial relationships such as depth of field, height and the make-up of the construction materials of the crane driver’s cabin. As discussed above, this is referred to as aesthetic response and it is recognised that responding to art works involves every part of the human being (Eisner, 2002). In the fire fighting realm, as previously noted, this perceptual involvement is called Situational Awareness.

Perception and meaning when looking at a work of art or when sizing up an incident such as the Toppled Crane requires time, even if it is only split seconds. To deeply grasp the interaction and the integration of the image requires a build-up of ‘looks’ or experiences at the scene, each feeding into the other in order to establish a picture which, as information is added later, will be readjusted and reinterpreted. This accumulation or build-up of experience at the scene of the image or incident is continually modified. When, through lack of experience, the elements are not entirely understood, the image may appear confusing, baffling or
perhaps incomprehensible, and attention may wane. Situational Awareness and aesthetic appreciation, I propose, are the same, although the purpose of appraisal is necessarily different.

When art critics appraise an image they are looking for patterns of pleasure – by this I do not mean a pleasant image, but rather patterns that please the eye – balance, colour, a ‘working’ of the image, a unity that conveys some kind of effect, even if the message is disharmony and disunity.

When Incident Controllers survey an emergency event, perhaps circling it and gaining a Situational Awareness, they are taking account of the disharmonious, the out of place. They are purposefully detecting the imbalance, the pieces of building not behaving as expected, the unexpected, out of the ordinary reactions of people and the environment.

In both art and firefighting we could say that enculturated members are seeing effectively. Each culture has its own principles for effectively understanding an image. Colour meanings, the shape and patterns of various materials, are all a shared understanding of the formal organisation of the work. Firefighters have a shared understanding of the organisation of the work in that they all read certain signs to mean something similar, even if their interpretation differs slightly. For instance, concrete cracking in a fire means that structural collapse is a possibility. Just when the collapse will occur depends on the fine reading of the cracks and knowledge of the concrete components, but the understanding that cracks = potential collapse is the cultural meaning of concrete cracks for a firefighter.

What both groups, the aesthetic appraisers of art and Incident Controllers appraising through Situational Awareness, have in common, is that they measure size relationships and distance, colour intensity, shape, texture, and balance. These are the essential building blocks which the Toppled Crane Inspector uses to ascertain what he will do to free the trapped crane driver before him. “We can
only make sense of things if we are willing to contemplate them in the first place” (Drummond, 2001, p.31). This involves not being stymied by the pressure of the situation to ‘just do something’.

The Toppled Crane incident illustrates the importance of balance. When we look at an image it is balance that we are intuitively assessing. A crane works through balance. Heavy objects are lifted and moved as the result of a lever and fulcrum, in much the same way that a seesaw works. For this particular crane driver, unaware of the weight of the steel table he was lifting, the crane toppled over as he had not engaged the stabilisers.

When a large mass is presented in a painting the artist often provides a counter weight to lever it. Sometimes it is something small that balances out the larger weight or object in the image. This kind of ‘highlighting’, where an artist directs our vision, is achieved through colour, usually bright; or size, often large; and also through perspective, where the lines lead our eyes to one spot of convergence, or conversely, to the edges of the canvas. These components are all designed by the artist to help our looking. What we make of what we see is another matter, but the attempt by the artist to direct our gaze in a certain direction is there in one form or another.

In the following painting, Figure 7.1: The Torn Veil, it is possible to follow a number of large, structural sweeping curves which centre and guide the focus of the eye. The place of the ‘fulcrum’ will be an individual choice.
Try ascertaining where the point of balance, or fulcrum, is for you. Concentrating on the outlined image may assist.

When we appraise an image, whether sculpture or painting or performance, we intuitively seek out the fulcrum, or the centre of the work from which the lever is balanced. In a live incident, such as the Toppled Crane, the ‘new’ fulcrum is the crane driver, pinned in his cab to the semitrailer by the weight of the crane boom. Here the Toppled Crane Inspector has to solve a real-life dilemma where the physics of the situation are impacted by the forces of gravity; in a painting, gravity is an implied influence.

The artist is consciously involved in solving both aesthetic and technical problems, as well as making a living in a way that, far from incidentally, happens to entail physical work (Gilbert Rose, 1980, p.3).

Multimodal Decision Making recognises that Incident Controllers, in “solving both aesthetic and technical problems”, hold in balance a number of complex, competing sensations and perceptions generated by their own somatic awareness, and that this activity is central to their decision making on the incident or fireground.
**Fruit Juice Factory Fire**

In the Fruit Juice Factory Fire the Inspector interviewed holds the reigns as Incident Controller for twenty minutes, having arrived about five minutes after the first arriving Station Officer. He decides to retreat firefighters from the tilt-slab walls of the blazing factory. Anticipating potential collapse, the Inspector explains about tilt-slab construction and the guessing game of whether it will fall inwards or outwards in a fire. His size-up reveals a number of 44 gallon drums with unknown contents, and initially his Red Message is for eight pumps and two aerial appliances. He expresses the common frustration of competing demands, with people coming at him from all directions, when all he wants to do is conduct his own Situational Assessment by walking around the building.

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**Please view the Fruit Juice Factor Fire film clip**

The DVD is located inside the back cover of the hard copy thesis

The video takes about 6 minutes, and illustrates a number of fire brigade practices, briefly summarised as:

- establishing radio communication channels
- mobilising aerial appliances
- depiction of hose set up
- tactical discussion between three commanding officers
- the use of tabards for roles such as Safety Officer
- the contrasting tenor of voices, such as that of the firefighter at the top of the aerial appliance and the Incident Controller
In the following images the Fruit Juice Inspector demonstrates his depth of engagement with the spatial dimensions of the incident ground. Having viewed the video and studied Figures 7.2 and 7.3, it is possible that readers will subsequently experience their own enhanced spatial awareness relating to the incident.

Figure 7.2: Fruit Juice Factory Fire, aerial view with sectors marked

Figure 7.3: Drawing of the street-level view of the Fruit Juice Factory Fire
The Inspector’s plan of attack was to stay defensive, similar to the Supermarket Fire Inspector. Amongst firefighters there are conflicting cultural views on fire attack in certain large fire situations. Broadly speaking, one view is to take the offensive approach and knock down the fire quickly in its early stages, if at all possible. This involves greater risk. The other view is to stay defensive and protect surrounding properties. These views and priorities change with time. For example, thirty years ago a firefighter did not wear breathing apparatus and had no respect from his firefighting mates – always a ‘he’ back then – until he had proven himself by coughing up orange bile after too much smoke inhalation. This was the culturally recognised sign of a real professional, in keeping with a macho and heroic image. Today these firefighters are colloquially known as ‘smoke eaters’ in the USA and in Australia the expression is ‘to chew some smoke’. In Australia, going on the offensive and knocking the fire down quickly and saving the property at all costs may still be the appropriate response in certain situations, but the current organisational emphasis is first and foremost on crew safety, then victim safety, then property. This shifting of priorities, influenced by increasingly stringent OH&S legislation, took time as an official agenda to filter up through the ranks. Today safety comes first, and this is through the medium of caution. In practical terms, this means Incident Controllers think and prepare for the worst possible scenario. This perspective is echoed in the Fruit Juice Inspector’s words describing his concept of a successful mission: “Everybody went home that night.”

Incomplete and inconsistent information

The Fruit Juice Factory Fire is characterised by the Inspector not knowing the contents of the containers and not knowing what the factory contained – there were two large vats containing an unidentified liquid, a wall of 44 gallon drums and the inside contents of the factory. What was ultimately found to be contained in the vats makes no difference, as the basis for the Inspector’s decision making is to envisage the worst possible scenario. He imagines the liquid to be something that when ignited produces toxic fumes, endangering the lives of his crews. He
talks only of his twenty minutes as Incident Controller. Then because upon
hearing the level of the fire, determined by his call for crews and resources, the
Incident Command Vehicle turned out and he was then relieved of the role of
Incident Controller.

Figure 7.4: The Fruit Juice Factory Fire Timeline

The Inspector’s timeline of the incident, Figure 7.4, indicates his arrival at
10.30pm, one minute for a briefing from the first arriving officer, and by the third
minute he had conducted a size-up and sent his first message. At the five minute
mark he receives intelligence that it is a fruit juice factory. The Inspector’s
timeline highlights the difference one minute can make on the fireground:

It was good! I got there real early and I looked at it and I said “Alright, I’ll
do a size-up” and I got the first bit of information from the SO who was
there. He was only there about five minutes before I got there. And I went
down the side, and there were all these 44 gallon drums that were stacked up
as high as this wall (pointing to Figure 7.3) which was about, say, ten
metres. Fire was coming through the roof already and through a – it must
have been a plastic – you know that alsonite, or laser lite panels? There must
have been a few of those ’cause it had already vented. I said “Get those
blokes back now. What’s in these drums?” No one could tell me, we didn’t know it was a fruit juice factory just from the sign.

The Fruit Juice Inspector is not working in a vacuum, waiting for a creative impulse that may or may not come to him. He has a handle on a number of elements, which he must combine within the shortest possible timeframe to create the desired outcome. His approach must satisfy statutory obligations and NSW Fire Brigades Standard Operating Guidelines, whilst at the same time being pragmatic. He must juggle these competing demands to produce a predictable outcome: extinguish the fire.

Artists also juggle competing demands and time pressures. For instance, the different drying speeds of paint. Watercolour drying times vary according to humidity and application; acrylic drying speeds are enhanced by dry air; and drying inhibitors or speeders may be mixed into oil paint; plein air artists must work quickly if they are to capture the moving and changing shadows; studio artists must contend with the general demands of a normal life such as toilet breaks, food, and the necessity of finally giving in and going shopping for supplies. Ultimately, unless you are Van Gogh, an unsuccessful outcome will not be life-threatening leading to public accountability. Nevertheless, as with Van Gogh, the pressure of defeat may be exhibited with disastrous consequences.

So the Fruit Juice Inspector is not leisurely wondering what his next move will be. If all the elements are in place, such as experience and practice, the materials and the mission, it is a simple act of will to start combining. Time pressure does add an imperative as he cannot say “I do not feel like working now”. Incident Controllers’ work times are dictated by fires, car accidents and other unforeseen, yet prepared for, events. The precise call to an incident is not predictable; there are busy fire stations and busy times, but the exact time the work is to be undertaken cannot be prescribed. The essential element is to be in a state of readiness at all times when on duty.
Incident Controllers deal with sets of ambiguous data on a daily basis. This is not a new experience for them. At no time in the interviews did any Inspector downplay the risk to the very least threatening possibility. Rather, they veered towards the worst contingency they could imagine. I suggest this is a learned fire fighting cultural trait that has been encouraged by current training and the directions of the Standard Operating Guidelines.

The Inspectors often measured their own success at a particular incident by the accuracy of their call for resources required at the outset. In blue text the Standard Operating Guidelines warn that it is more expedient to overestimate rather than underestimate the resources needed:

![Figure 7.5: Section 3.6.5 from the NSW FB Communications SOG](image)

Crew safety was foremost in the Fruit Juice Inspector’s mind when he decided to ‘go defensive’. This meant standing back and directing water onto the fire from a safe distance of possible collapsing tilt-slab walls. Going on the offensive would have meant entering the burning factory to actively seek out the hot spots for extinguishment:
And a 44 gallon drum falling on you from ten metres is going to kill you as easy as a full one anyway. There were two big stacks, and I just pulled people out and then I went out and got going and they sent the whole Incident Management Team, because I called the eight pumps and two aerials, and then it went bigger from that, twelve pumps eventually.

Taking on the baton of Incident Control means not working with an empty canvas. Do any of us really start with an empty canvas? Artist, researcher and Incident Controller – we all bring to bear our prior experience and varying degrees of expertise, our social, cultural and organisational expectations of what should and should not happen, and our cultural definition of success.

I recall reading a lovely piece by the Italian artist Pietro Annigoni (1910 to 1988), one of the last classical realists. He told of meeting up with a research student who had spent a lot of time deciphering the quantities and components for egg tempera paint consistent with the Old Masters. He passed this information on to Annigoni with the strict command to keep the formula a secret to himself, not to share it with anyone. Annigoni took pride in writing that he promptly gave the recipe to as many people as he could, anyone who was interested, and then to prove his point, reproduced it in print just to make sure. Passing on information is a tricky business. You can receive the same recipe as Annigoni, but that does not mean you can construct the same kinds of images. The ingredients of experience and imagination and knowledge as to how the materials and medium work together can be repeated to you many times, but actually using it creates something different every time, as the Fruit Juice Inspector relates:

And I went and gave a briefing to the new commander, Incident Controller, and I said “Look the walls are bowing out on this side, about half a metre I reckon, so I don’t want anyone going up here and there” and I said “I can see all the corking is melted.” Because they put like Silastic between the concrete panels, and that was gone and I could see fire coming out.
The handover from one Incident Controller to another Incident Controller draws on a mutual understanding of the meaning behind “the walls are bowing out” and “the corking has melted”. We might be asking ourselves “what does that mean in terms of predicting the fire’s behaviour?”, but the relieving Incident Controller is expected to immediately know the implications.

According to an ABC report there were seventy firefighters deployed and over a thousand people evacuated. The Fruit Juice Inspector talks about his deployment of the resources:

When I turn up at a job, and I’ve got a tilt-slab construction job, a factory you know, I look at it and I think “What’s the intensity of the fire? Yes, it is going pretty good” and then, straight away, my first thing is I want those people moved out, just get them out from there… it’s already locked into me… I suppose by looking at it, the intensity – it’s the little ones that we want to get in and get it before it gets to 600 degrees and starts damaging the structure.

When provided with a copy of this chapter to review the Fruit Juice Inspector noted in his feedback:

I don’t think 1000 people would have been evacuated. I’d be surprised if 50 people were. That may be the media talking it up a bit.

**Competing demands**

What happens when Incident Controllers are confronted with competing features vying for their attention? The ability to sort and prioritise is an important characteristic of decision making in time-pressured, information sparse situations. It is an indication of experience and expertise, the way one works with a medium – works within its limitations and the degree to which one stretches the
possibilities. The rules must be a known body of accepted knowledge in order to ‘break’ them. Being an expert at something means not only knowing what can be done with a medium, but also the ability to do it. What can be done with a medium is theoretically learned through text-based information and later contested and reshaped through experience. Lloyd (2007), in the context of firefighting, puts it this way:

The community may present a version of professional practice that challenges the institutional discourse, because information is drawn from experiences of experts in everyday workplace situations (p.193).

Creative decision making occurs when the person has a deep knowledge of the discipline. Great flashes of insight rarely come to the inexperienced, unprepared mind. People who do not understand rhythm, melody and harmony will not be able to compose complex pieces of music. Creative and innovative decision making on the fireground will not be possible without prior experience regarding how various materials react on combustion, the structure of the organisational hierarchy, crew configurations and the nature of the fire being fought. There is beginner’s luck of course, but this will not be a consistent approach to an otherwise fearful and dangerous situation, because knowing what to expect means feeling less danger and less fear, and therefore freeing up more energy to respond creatively. By way of illustration, consider the comparison of a junior firefighter feeling fearful prior to his or her first incident, with the anticipation and exhilaration (and possibly complacency) of an experienced firefighter.

The ease of the Incident Controller moving through the decision making process, perceiving the situation, looking at the fire and sizing it up, is not reliant upon eyesight alone. It involves the ability to adjust, reframe, and move through the incident without losing their bearings, no matter how or where they are physically situated in relation to the fire. Seeing does not involve only eyesight – it sums up the experience of becoming so familiar and integrated with the aspects of fire
behaviour that expert Incident Controllers do not lose their bearings in the process of changing their physical location. Often they rely on incoming intelligence to develop a three-dimensional perspective of the fireground. They have a multimodal perspective, an holistic vista, because their sensory relationship with the fire is so thorough and so extensive. The Fruit Juice Inspector goes some way to demonstrating this by his multiple perspectives, depicted in Figures 7.2, 7.3 and 7.4.

Looking at the fire for the Incident Controller is not just looking at the fire, it is an aesthetic experience in which there is a shared standard for recognising what is happening, and what should be done to mitigate it. Participating in the knowledge of these standards, these ways of seeing, is recognised as part of the identity of the group member. Firefighters are known and respected within their cultural context by their depth of understanding of these shared standards, which may or may not be a reflection of the official organisational viewpoint.

Standard Operating Guidelines provide a hierarchy of needs, and prescribe recommended approaches for various fireground contingencies. This does not mean that Incident Controllers are not creative. “Play and art without rules is uninteresting. Absolute liberty is boring” (Karlqvist, 1997, p.111). Within the context of the fireground, creative experience is deliberate as opposed to random. The creation of innovative approaches does not happen in a vacuum; rather it is the result of playing with the rules, stretching them, moving and testing them. It is essential to maintain common operating guidelines, or rules, because they form a stock body of common knowledge, but it is equally as essential to stretch, bend, and maybe break the rules and play around with them. Karlqvist (1997) writes:

Mastery reveals itself as breaking rules. The secret of creativity hinges on this insight, to know the right moment when you can go too far (p.112).
There are experts who are trained to be mechanical, and there are experts, such as the Inspectors I interviewed, who integrate and sometimes override the mechanical list of rules. The ability to distinguish the ‘right’ time to override is recognised as part of Multimodal Decision Making. Multimodal Decision Making presents a way to resist mechanical rationalism because it does not deny the value of Standard Operating Guidelines.

**Preschool Fire**

![Preschool Fire Mudmap](image)

A man in a diabetic coma veers off the road, hits a lamppost, and smashes into a preschool where over thirty children are sleeping. Seven are badly injured. As the car bursts through the preschool walls it breaks sink taps. Water and rubber smoke fill the room. The Inspector turns out and assumes Incident Control just as the fire, caused by one of the tyres spinning in a pool of petrol, is extinguished and the car is lifted to extract a child.
The Inspector points to his drawing, Figure 7.6: Preschool Fire Mudmap, and gives an initial description of the position of the children and the general devastation he witnessed upon his arrival:

When the car has launched in through here it split the plastic fuel tank on the Commodore and it’s ignited because the wheels were just held off the ground, on the bricks. The friction has caused the petrol to catch fire and a pool of fire has formed. And there was one here, and there was one in here (points to his drawing). And so that’s how they got so badly burnt. They were more burnt by the fuel than they were injured and broken. And the little kid over here – he had broken his pelvis and both his legs and his arms, so he was in a traumatic way over here, but he wasn’t burnt.

The car is shown propped up in Figure 7.7 below.

![Figure 7.7: The propped up car in the Preschool Fire](AAP, 2005)

The striking thing about this interview is the way the Preschool Inspector just talked, almost without stopping. When looking at the transcribed text on a piece of white paper, there are whole pages of dense print without a word from me. The interview took place two months after the incident.
It happened at about one, one thirty, in the afternoon, and it was really a very straight forward job.

Upon arrival the Preschool Inspector had these priorities:

- evacuation of the children
- accounting for all the children
- stabilising the scene
- evacuation of the seriously wounded

The Preschool Inspector speaks with the confidence of an expert:

I haven’t come across an incident yet that I haven’t been able to handle…I never thought I would say it twelve months ago, but I use how we were trained or how we trained ourselves on the IPP where we all sat around – and I tend to think we had sixteen or seventeen of some of the brightest Incident Controllers in the brigades at that time – and we worked out a, not like a formula, but like a template, and I have pretty well applied that to every job I have had.

After this incident, the sound of the distressed children precipitated nightmares for the Preschool Inspector over a number of days:

I had nightmares that night. There was absolute screaming kids and you know I didn’t sleep well for a couple of days, only because you keep going back to what the kids were like and I remember seeing this little bloke here with the split head (points to drawing).

And there is nothing worse, the one thing that will upset firefighters is screaming and crying children.
It was absolutely chaotic. There were children screaming. These over here were pretty quiet, actually, because they were so badly injured (points to triage area, Figure 7.8). Over here (points to the general assembly area) they were screaming and crying. And I said “We need to sort out like a reception area for the parents to make sure no one steals a child.” That was my first thought. It was a strange thought, but I didn’t want a child to go missing, to be kidnapped or taken by somebody.

The Preschool Inspector generated a rapid, complex, simultaneous solution to the problems in that he created a reception area to ensure no children were stolen and a place where parents and children could be reunited.

Figure 7.8: Mudmap of the Preschool Fire with my arrows indicating sectors
The incident ground was broken into various sectors by the Preschool Inspector, illustrated by the arrows in Figure 7.8. These were the:

- triage space
- classroom space
- healthy kids space
- injured kids space
- helicopter landing space

The space of the small classroom was chaotic with smoke from burning rubber mixed with water from broken taps. The Inspector likened the devastation to a bomb blast in Baghdad. He described trauma injuries from flying bricks and glass and said he had seen those before, but it was the scale of the incident and number of children involved that increased his concern:

There was a couple of kids, I thought they were like – they had white tee shirts on, they were like the colour of your shirt – red – and I thought “Oh no! They’re not going to make it” and the ambulance guy said to me “They will be alright, they are only little kids. Broken bones don’t affect kids, they will make it” and two days later I saw one. He came into the station to say thank you and he was fine. He had his head shaved where they stitched across the back of his head, but he was fine; he was just a little brat, being a kid you know, and a couple of days before that he was unconscious.

**Echo of a scream**

The Inspector described the Preschool children’s tee shirts as “red – like the colour of your shirt.” The Mexican artist Siqueiros painted *Echo of a Scream* in 1937. Siqueiros’s painting is very tonally dark (see Figure 7.9: Echo of a Scream), and the moment I saw it I was reminded of the Preschool children, not only because the child’s garment is red.
Siqueiros’s motivation for Echo of a Scream has been attributed to a photograph that appeared in Life Magazine at the time of the horrifying 1937 Japanese massacre in Nanking, now known as the ‘Rape of Nanking’. As Siqueiros had a collection of over 11,000 photographic images, now held in Mexico, I found this hardly surprising. On the trail for the Siqueiros photograph (Figure 7.10), I was appalled to find myself in the midst of photographic images from the Nanking massacre. The orphan photograph that Siqueiros selected as a model for his painting does not show the disintegrating black and white images of bodies being torn apart, women tied back for rape, anguished faces, or piles of severed heads. Instead Siqueiros selected a child, left behind in a desolate landscape that offers no hope. Very clever of him, I thought. You cannot dwell too long on specific time-and-place images of torture; his subject selection ensured the longevity of his message.
It is notable that Siqueiros painted broken taps, and bits of them are scattered throughout the painting. The Preschool Fire Inspector also comments on broken taps. Broken pipes and taps appear to be a predictable feature of destroyed and burned out buildings, reminiscent of the more recent disaster occurring in Baghdad at the time of the interview:

Oh well I haven’t seen kids like that. I have seen badly burnt people and badly burnt kids, but not that many kids. It’s like something that you would expect to see in Baghdad. You know – the way the building had blown up, bits of lights hanging down and water flowing in and burned shit everywhere. It was just like a scene out of Baghdad with human bodies all over the place, but none of the adults were injured.

Although Echo of a Scream is held in time by the political context in which Siqueiros painted and lived, the painting is a testimony to universal human anguish. The child’s cry is more the cry of humanity in the midst of wreckage, rubble and fragments of a civilisation, no different, I imagine, to the screaming and crying children the Preschool Fire Inspector describes. A crying child is something we can recognise and respond to, even if we do not immediately identify with it.
Munch painted The Scream in 1893, but his scream transformed the landscape into a wavy haze of colours. Siqueiros has echoed his scream by doubling the image of the child, who is, in an opposite manoeuvre, reacting to his or her environment.

Ugliness often forces a fascinated fixture of a stare or compels us to look away. In a traditional understanding of aesthetics, beauty and harmony go hand in hand. Ugliness, disfigurement and distortion are not understood as beautiful or harmonious and therefore they are not generally desirable. In Echo of a Scream the infant is echoed in the environment, bodily and physically as well as in the silence of the scream. Only in this way is the infant in unity, a subjective unity, with its (is it male or female?) environment.

There is a reverberating echo, a disjuncture, and an emptiness, despite the cluttering rubble. Echo of a scream indicates significant loss – loss of innocence, loss of nurture, loss of unity. In the same vein, the Preschool children depicted in the newspaper images (Figures 7.11 and 7.12) have lost a sense of unity and the peaceful regime of an afternoon nap, and on this particular day, the promise of presents from Santa who was expected to arrive on a fire truck that afternoon, once they had woken up. This turned out to be a fortuitous appointment, as firefighters were already preparing for their visit and knew the Preschool’s exact location when the alarm sounded.

Figure 7.11: A child being comforted after the Preschool Fire  
(Pearce, 2003)
The images selected by the Sydney Morning Herald to put online (Figures 7.11 and 12; see DVD within hard copy thesis for full series) portray a very different scene to the one described by the Preschool Fire Inspector. In the photographs we see no smoke and no unattended raw injury to children. These disturbing images are censored away from the gaze of the public eye. Instead we are presented with images of alert and grateful children, sitting up on stretchers in the shadow of redeeming helicopters, carried safely, and so on. We see the car, on its side and propped up, but are shielded from the smoke and running water, and the chaos of the scene as the Preschool Fire Inspector described. In this way the visual images ‘detour’ us.

Screaming distorts the human face, making it less attractive. We are always being reminded by media articles and images of the broad smile of one of the toddlers rescued from under the burning car in the Preschool. We are never presented with an image of a child crying in pain at being bathed or having their bandages changed, or trying to walk with their feet missing. We never see children screaming on television footage. It is offensive to us in the West when we see loud and violent expressions of pain. For this reason, Siqueiros’s painting is disturbing and unsettling. We cannot escape the obvious pain, which does not appear to be physical as the infant is not physically damaged.

Figure 7.12: Injured child leaving the Preschool Fire (Pearce, 2003).
Expectations

Seeing a helicopter arriving, the children swarmed over into another danger zone – under the helicopter blades, presumably expecting Santa’s arrival mode had changed. This in itself could indicate a form of pattern recognition by the children, i.e. ‘a large noisy machine which delivers people in uniforms’:

So kids that you would swear were dying five minutes ago jumped up and MC was out there with one of the other rescue blokes with his witches hats and he was swarmed by these 20 odd kids screaming to get to the helicopter. So they survived being burnt to death only to be nearly made into chopped liver out there under the helicopter blades.

The Preschool Fire Inspector felt relief when the helicopters arrived, but he was not sure why. He had never landed one, let alone three, and neither had any of the Police on duty. Crucial to Multimodal Decision Making is understanding why the Preschool Fire Inspector, with no prior experience in landing helicopters, felt he could handle the situation while the Police, also with no experience, said they could not:

Then the Ambo said he had organised for helicopters to come in, but no one to land them. And I said to the Police “Well can you land the helicopters because my firefighters are doing this search” and fortunately the rest of the guys had stabilized the vehicle. And he said “We don’t know how to land a helicopter” and like out there (pointing to Figure 7.6) was virtually like 3 or 4 football fields, it was huge, there was no drama. So I said “Well, right” so I got the rest of the guys and I said to MC “I want you to land, set up a landing zone 40 by 40, I don’t know how many helicopters are coming in, just set it up.” So he set it up and the helicopters started to come in and I actually felt reassured by the helicopters. I don’t know what it is, “Mix master belong ’em Jesus Christ” but when that big thing comes in you think “He knows what he is doing”.
Every minute that passes without making a decision can make the decision more critical:

And it just went like that. I sit back and think no, I couldn’t have spent that long there, ’cause it only felt like about twenty minutes, half an hour, but you just – you know – ’cause your mind is obviously racing about a million miles an hour doing job after job after job and then next thing you know it was quarter to seven and I was leaving and I got there at one o’clock. That’s six hours.

In terms of spatial movement, Firefighters usually conduct themselves calmly:

V: So when you very first arrived what did you see?

Chaos. Just chaos. Just a road full of fire engines. Firefighters running everywhere. It’s always a pretty bad sign. I always think it is a pretty bad sign when you see firefighters running. You know I was telling everyone “Don’t run, walk” ’cause you only start to panic if you run, so I just walked.

Apprehending the signs

It was a small fire, but there was lots of smoke. Why would there have even been a fire? For the Preschool Fire Inspector it is not the physical size of the fire that makes it “one of the best” he has attended:

I think it is one of the best fires I have been involved in and it was only a really small fire, but the problem was it was the tyre – you see there is no tyre left on the back passenger side door? It was just totally decomposed and burnt and if you look inside and then up in the roof you will see all the staining and the soot marks down the walls and stuff. There was a huge amount of smoke in there because it was a relatively small room.
The “systematic training of visual sensitivity” (Arnheim, 1969, p.315) is indispensable for the preparation of a firefighter. The Preschool Fire Inspector displays his “visual sensitivity” by reading the signs of soot, smoke and fire in the “relatively small room” and ascertaining what had happened before his arrival, in much the same way that the Double Murder Inspector did. Meanwhile the unconscious driver, assumed by the paramedics to be intoxicated, was left unattended under a tree. Actually he was in a diabetic coma, established only after the Preschool Fire Inspector had requested help for him.

The Preschool Fire Inspector had to work with various missing pieces of information upon his arrival at the incident:

“How many children are there? Are any unaccounted for?”
“Who works at the childcare centre and who is a parent?”
“I don’t know how many helicopters are coming in.”

Moreover, he had to determine whether there were children missing:

We had everybody pick up every brick, move it back a foot, lifted up every carpet tile, every little bed, because the mattresses were like two inch foam just laying on the ground. Picked up all those, went into the toilets, every shower, and every toilet cubicle.

**Flexible template**

An attending Police Officer wanted to follow the disaster protocol which involved tagging the children with Victim Identification Tags. After an initial confrontation with the Police, an Ambulance Officer sent the children on their way to hospital untagged and unidentified. This was within ten minutes of the accident and helped to save their lives. In terms of Multimodal Decision Making, the police used a less efficient linear system in wanting to follow a formulaic protocol. The approach of the Preschool Fire Inspector using his flexible “template” strikes a strong contrast.
This is demonstrated in his organisation of the helicopter landings and his support for the multimodal decision of the ambulance officer, who, because he did not follow protocol had to account for his actions later:

That is what the policeman wanted to do. He wanted to give them little tags – well the person with the bag of tags was coming from Redfern you know and I am thinking, well I don’t want to wait till he gets here just so the kids can have a nice tag to go to hospital.

I said if we had waited the girl would have been dead, it would have been a body recovery. And the ambulance guy – he was flabbergasted, cause like, the ambulance guy had the debrief and they gave it to the ambulance guy about transporting the two girls and the little bloke so, and I said “Well I am here to tell you, well they wouldn’t be alive now.”

The mechanical analysis, such as displayed by the Police Officer, can miss things out, bypass the ‘evidence’, and demonstrates a lack creativity in the thinking processes. According to the Oxford Dictionary (1990), creative carries the meaning of “inventive and imaginary”. I think a more meaningful understanding of creativity involves a disciplined approach to problem solving – ‘disciplined’ in the sense of having learned various techniques, approaches, media, and once having mastered these, being ‘free’ to create with the full knowledge of the expected consequences, even if these are expected to be ‘happy accidents’. In music this is called improvisation. In this sense, ‘freedom’ does not mean being free from all constraints, but rather carries with it a notion of knowing the boundaries and expectations, and therefore having a consciousness when traversing or breaking them.

Kendra and Wachtendorf (2002) write:

While planning and preparedness serve as the backbone for disaster response efforts, creativity enhances the ability to adapt to the demands imposed upon
individuals and organizations during crises and bolsters capacities to improvise in newly emerging physical and social environments (Kendra, 2002, p.1).

Kendra and Wachtendorf highlight the similarities between the artistic environment and the disaster environment. Likewise, the Preschool Fire Inspector, following a “template” devised by himself and his colleagues, is able to be flexible and creative with his interpretation of it; the Police Officer, trained to follow a formulaic protocol provided to him, does not have the same freedom.

Kendra and Wachtendorf (2002, p.4) distinguish between creativity and improvisation. In their view, creativity is essential to all the functions of a disaster manager, from the beginning planning and prevention phases right through to the response and recovery phases. Improvisation, on the other hand, is defined by the “unplanned activities that take place after the crisis event.” These concepts are reflected in the actions of the Preschool Fire Inspector, who demonstrates an ability to judge and prioritise, moving beyond a “measurable technique”:

> Expertise in technique is a sturdy prop for inadequate management performance, and it is relatively measurable, whereas highly developed skills in situational analysis are likely to be less marketable (Ellis, 1996, p.8).

McEntire and Fuller (2002) when writing about the need for an holistic approach in disaster research, claim that: “The weaknesses of the reactive and technocratic theoretical perspective of the past are becoming too evident” (p.128). The case of following a template or a protocol, that cannot predict the unfolding of a disaster, provides a good example of this situation.

**Interlocking complexities**

> It is the interlock of the smaller parts that generates the larger overarching structures (C. S. Smith, 1978, p.9).
The interlocking complexities that encompass the swift onset of an emergency are anticipated on a daily basis by Incident Controllers. When dealing with a complex and dynamic system, cause and effect are not sufficient explanation for what is happening.

The positivist-scientific approach is reductionist, confining the complex to the simplest form, in this case a protocol involving victim identification tags. I suggest that instead of linear progression we are looking at a feedback or circular system, in which a small act may produce a larger reaction. The Police Officer used an inappropriate linear system and by adhering to protocol lives could have been lost. Multimodal Decision Making recognises the difference between a strict formula and a flexible template.

The “crisp” thinking (Hodge & O'Carroll, 2006, p.27) of the Police Officer endangered the lives of the Preschool Fire victims. He proposed to follow the ‘correct’ disaster protocol. Breaking with protocol was not, however, an uncomfortable or unfamiliar situation for the Ambulance Officer or the Preschool Inspector. A number of explanations could be offered here, all speculative. It could be that the Ambulance Officer and Preschool Inspector were relying on previous experience within their organisational culture, and knew that they had the freedom to move around the protocols and “templates” provided to them, while the Police Officer may have been more constrained by his organisational demands and unwilling to take the consequences of ‘breaking the rules’. Or conversely, it may have been that the Ambulance Officer and the Preschool Inspector had developed an expertise which enabled them to make multimodal decisions based on their aesthetic awareness and somatic response, effectively overriding the ‘rules’ despite the expectations of their respective organisations. That is, they used all their senses to judge and act, and did not rely solely on a rule-based protocol to guide their decision making.
After organising debriefing for his crews, debriefing for the Inspector only occurred informally when his Inspector peers phoned him up later that night. This informal debriefing could also be understood as transference of newly acquired skills and experience to other Incident Controllers.

**Conclusion**

Decision making on the fireground is a complex and difficult activity. It is complex because the variables are uncertain, the threat to life and property is immediate and the safety of the crew, trapped victims and observing public, the perceptions reported by the media and the statutory obligations that motivate firefighters to their tasks are intricately interwoven. This melting pot of variable contingencies creates a complex working environment, which I suggest is negotiated by somatic and aesthetic awareness.

To live at this moment in time is to experience unprecedented and complex change occurring at a speed in which our ability to comprehend is constantly challenged. Change has always been a part of life, but what makes this moment in history significant is the actual rate of change and the sense of acceleration. Despite this sense of change and speed, complexity does not have to mean confusion.

A fireground is a microcosm of complex change and speeding up. Requiring a rapid response by firefighters acting under statutory obligations, the speedy progress of a seriously threatening fire does not allow for the weighing up of alternatives or the verification of information, as in the Rational Choice model. There is no time to spare as decisions concerning victims, property and crew safety must be made immediately. On what basis are these decisions made? I have been suggesting that, further to statutory obligations and Standard Operating Guidelines, the aesthetic awareness and somatic response of Incident Controllers on the fireground enables them to negotiate complex and often conflicting incoming information in ways that are little acknowledged because they are not easily articulated and therefore difficult to verify.
Chapter 8: Post Incident Debrief

Introduction

*What is retained from the past is embedded in the present and forces the mind to stretch forward to what is coming. The more that is compressed from prior perception, the richer the present and the more intense the forward impulsion (Gilbert Rose, 1980, p.7).*

In this, the last chapter, I seek to balance various complex tensions rather than resolve them. There is an aesthetic quality to encountering resistance or undergoing tension. Rather than struggling for the dominance of the aesthetic perspective as a resolution to opposing tendencies, I recognise the fuzzy borders; and rather than resolving an issue, I make suggestions for learning to live productively within the tension.

The way in which Incident Controllers conceptualise the fireground establishes and determines their Situational Awareness and consequent decision making. This thesis calls into question the dominant paradigm involved in recognising just how they do this. The dominant science-based paradigm could be conceptualised as a set of linear controls and, sometimes, inappropriate demands. The important contribution of somatic response and aesthetic judgement, which informs the Situational Assessment and consequent decision making by Incident Controllers, has until now been largely unnoticed.

The voices of the Incident Controller practitioners, the writing of mainly USA practitioners in fire-related publications, and the academic writers of fire textbooks and research articles, concur in that a strong emphasis is placed upon the actions of the first arriving firefighters. Attention is focussed on the importance of the first phase of the incident in order to maximise response efforts. A number of participants voiced their concern about holding in tension the competing demands of protocol and guideline expectations on the one hand, and on the other what they perceived needed to happen in their first arriving moments on the fireground.
Their Phase Change Model, introduced in the next section, goes some way towards explaining their frustration and suggesting an alternative approach.

**Considering Change**

*Change...is inevitable, so instead of letting it happen to us passively we should actively embrace and shape it by wilfully striving to change our lives and thought in directions that we determine, rather than just going with the flow of previous directions (Shusterman, 2005, p.67).*

Reflecting on the generic problems of the dominant representation of crisis situations, two Inspectors, Nicholas Ferrante and Philip Harlock, have begun formulating what they call the Phase Change Model. Their model dovetails neatly into this thesis in relation to balancing competing demands, for example, those demands expressed by the Supermarket Fire Inspector and the Fruit Juice Inspector. The Phase Change Model is important because it has been devised by two practitioners who are exhibiting their expert knowledge as theory, and interestingly they use a drawing to communicate their thoughts (Figure 8.1).

The fireground is often unpredictable and hazardous, with many unidentified variables. The work of Incident Controllers is to bring under control, as quickly as possible and with minimal damage, an out of control situation. Their initial risk assessment has important consequences in that it is within the first few moments that the greatest effect can be achieved. The longer their initial size-up and call for resources takes, the greater the time the fire will be out of control. The demands competing for the Incident Controller’s attention are at this point the most pronounced.

The Phase Change model builds up to a subsuming generalisation; it is a reflection on the complex, unstable, object of analysis – the first phase of a fire brigade’s response to an incident. The model suggests a fundamental shift in that it proposes diminishing the organisational demands which occur within the initial phase of the operation.
Explanation

In the standard model of incident response, a number of actions must be performed by Incident Controllers immediately upon their arrival to the fireground. Sending an arrival message and then a risk assessment message to the Communications Centre are organisational priorities.

In a conversation with me, while drawing a sketchy graph and timeline (see Figure 8.1), Ferrante and Harlock explained the priorities challenging the Incident Controller during the first phases of the standard incident response model. In the Phase Change Model, the timeframe they have inscribed as ‘Danger/ Risk’ on the left hand side of Figure 8.1 is the locus of attention. According to Ferrante and Harlock, it is at this point in the incident that risks to life and property are at their peak, and so it is here that the firefighting effort can have its greatest effect in the shortest possible time.

Competing with their initial risk assessment are Communication Centre demands placed upon the Incident Controller for situation reports, known as ‘sitreps’. In the Phase Change Model, Ferrante and Harlock propose to limit or cease the Communications Centre messages and all activities not directly related to saving life in the first arriving period, thereby allowing increased attention to size-up and achieving rapid search and rescue of victims.

The rationale for this proposal is that the Communications Centre messages impinge upon this vital time-sensitive phase of the incident. Ferrante and Harlock understand that the time taken to perform and report a formal risk analysis actually increases the risk of the fire spreading and lessens the chances of survival for the victims, because enacting the decision making and subsequent plan of fire attack is delayed.
The rising curve of the top line in Figure 8.1 indicates the escalation of the incident and the bottom horizontal lines represents time. The objective of the Incident Controller is to reduce the time taken to reach the peak of the curve, as it is from this point that the fire may be deemed under control, or at least containable. The fire may continue to burn and require a response effort lasting many more hours, but after all life has been accounted for following the search and rescue phase, risk is deemed to be significantly decreased.

The peak risk period, where the fire would be considered as still escalating, is indicated by the words ‘Danger/ Risk’ in Figure 8.1. Ferrante and Harlock define this period by two overarching activities. The first is accounting for all persons and the second is endeavouring to gain control of the fire. While victims are in danger, a higher level of risk will be tolerated by the Incident Controller and other fire brigade personnel compared to when lives are no longer threatened. The
determining factor is the degree of perceived risk. The turn at the peak of the graph indicates control over the incident and thus the associated risks are significantly decreased at this point. If a formal risk assessment and Communications Centre message was not required until all life was accounted for, Ferrante and Harlock theorise the time line would move up to the thicker line, indicated by the horizontal line marked with an ‘x’, thus rapidly reducing the escalation of the incident. They have dramatically depicted this by the raising upwards of the horizontal axis labelled ‘time’.

After the peak point has passed, the Incident Controller is less likely to place personnel or resources in positions of high risk. Typically at this stage they reassess the situation, and send another sitrep to the Communications Centre. The peak at the top of the graph indicates the moment when the incident has escalated to its highest point before all life has been accounted for. The fire may continue on for hours after this point and require days of salvage operations, but after this peak the risk from fire is severely reduced, and according to Ferrante and Harlock the reports required by the Communications Centre may be transmitted and received without impinging upon valuable time or threatening to distract the focus or attention of the Incident Controller.

Suggestions for change in any arena necessarily encounter resistance, as the new idea is mentally tested and perhaps physically trialled. Shifting the basis for making value judgements is something that should be debated vigorously. Value systems for making judgements in the arts have been debated and rearranged for centuries. Who decides what is ‘good’ or ‘bad’ art? Rules and procedures which worked sufficiently in the past may not be flexible enough to work within the present context. Knobler (1980) writes:

The paintings of the [Impressionists] were rejected by the large mass of the public, the critics, and museums, because they introduced methods of paint
application and colour usage which were not consistent with previous usage (p.15).

Like the early Impressionists, those who break new ground and come up with a non-traditional, unconventional, alternative approach or solution to a problem often face persecution. A lifetime later their ideas may have become so much a part of common usage that they seem blatantly obvious and require little explanation. The Phase Change model is a little like this – quite a large paradigm shift is involved in realising the full import of this perspective to decision making on the fireground, and proponents may initially face strong resistance.

**Linear command, control and communication**

Ferrante and Harlock recognise that linear control and rational forms of communication are sometimes incompatible with the first phase of incident response. Their perception of the need for change was first echoed by the research participants, who occasionally expressed frustration with the organisational requirements in the first phase of the incident. The following excerpts from transcripts do not belong to either Ferrante or Harlock and were transcribed well before the formulation of the Phase Change Model.

The first is from a newly promoted Inspector who expresses his frustration when managing the competing demands of the public, his own organisation and the fire itself, resulting in having to make and communicate decisions without being able to size-up the incident for himself:

The thing that I find frustrating now is you can’t get enough good information from the people that are there before we get there. You know and they say to us “Just stand at your car, get some info, send a message.” Then you’ve got Comms saying “Can you give us a sitrep?” but hang on I haven’t been able to go and have a look ’cause everyone is in your face. You know
you’ve got this, this and this, and there’s people up here and there’s someone there.

Another Inspector expressed his frustration at competing demands in this way:

I went to a fire when I was acting as a sub-commander back in March/April and it was a Saturday morning. And it got bigger than Ben Hur, and it was ridiculous and it got like this before I got there. And the Fire Brigade works on fixed stations and the whole Fire Brigade seems to come now – you will finish up with a Regional Commander there – it is just ridiculous. And the first thing he said to me was “Where’s your worksheet?” and I said “I haven’t done one yet” and he says “That’s got to be one of the first things you do” and I said “okay”, ’cause I hadn’t done one ’cause I was sitting up in the Superintendent’s car and I didn’t have one in the Superintendent’s car. I had only just got there myself and I was sizing-up, making sure that they were fighting the fire properly and that they had a Safety Officer and that they were working safely and that sort of thing. So I’d only just got to that point of sending a message, and he was there, so um, so I am always very particular on my worksheets now.

V: Did the first arriving officer write one up?

No, they are fairly new. I mean I’ve never used one till I became an Inspector. I actually don’t think they have much time to use them. You go through stages, there is so much for them to do, and you’ve got Comm’s in your ear saying “Send us message, send us a message.” And I haven’t had a factory fire myself yet but I do believe that that is going to be my role when I get my first active role and I’m going to fail to get one of these done in the first hour half an hour. But it is crucial as an Incident Controller to know where your appliances are and look for where your men are, even where your men are as opposed to where your appliances are. You know you draw
a nice little picture of the fire, but that is not the point. It’s a matter of where your crews are and it is a crucial part of the job. As I am learning more and more, you have to account for your people. Saying that, you have to size-up because you have to get, send your message, to get the extra resources you need there as soon as possible.

The Communications Centre insists on continuous reports because back at Headquarters in the Incident Command Centre there are a number of key personnel monitoring the situation, if it is a large enough incident. These senior officers are charged with determining ahead of time a number of options at a strategic level. These decisions concern factors such as the mass evacuation of surrounding residents, organising for an electricity or gas shut down across large residential, commercial or industrial areas and the request for assistance from other agencies. Large GIS maps would be flicked up onto a wall screen and the reports of the Incident Controller on the fireground would guide their strategy as much as their own birds-eye view from various satellite images beamed in, in addition to live television footage. Sometimes hundreds of kilometres away and sheltered from the immediacy of the operational and tactical details of the incident, these strategic commanders are at times not very popular with personnel on the fireground, as illustrated by the following interview excerpt. Here the Inspector (again, it should be pointed out neither Ferrante nor Harlock) expresses frustration over the requirement to constantly update the Communications Centre in the initial ‘Danger/Risk’ phase illustrated in Figure 8.1. Further, he alludes to the idea that the strategic decision makers may be trying to influence the in-situ Incident Controller’s decision making:

I have had words with two Superintendents and said “I have got it in control. If you want to take it, take it off me, otherwise leave me to it” and hung up the telephone. You can’t tell people over the telephone. You know Q. will phone and Q. in the position of Hazmat Manager: “R. do you need this?” “Yeah I do” and he’ll send it to you. You know he won’t phone me up and
say “Do this, do that.” That’s who you want a phone call from. You don’t want someone to phone you up and tell you how to do it, because they are not there.

One of them phoned me up and said “You know you have got the P’s Department?” I said “Yes I know, I am at the P’s Department, I’m stood next to the fricken’ sign.” He said “You haven’t sent the message yet”. I said “I am talking to you on the telephone. I will call you back.” I just hung up the phone. Then I turned it off so they couldn’t call anymore. That’s what I find frustrating.

Turning his phone off is ‘breaking the rules’. This newly appointed Inspector felt confident enough to take this action. His first priority was effectively controlling the incident, rather than mechanistically following what he was ‘supposed’ to be doing. This is not an either/or situation, but rather involves a delicate, multimodal balance of competing demands by the Inspector.

The decisions made in the ‘Danger/Risk’ area of Figure 8.1 represent those most likely to be called into question at a legal level, especially if there are fatalities. These decisions, which may have taken split seconds or minutes to make in the ‘Danger/Risk’ period on the fireground, may be debated in detail in court for months, using a logical, rational, linear model of decision making – whereas the decisions themselves were made in a multimodal and holistic space, under time pressure and with limited resources, conflicting information and competing priorities.

What happens when Situational Awareness is lost or disrupted by disorienting distractions? According to Strauch (2004), who investigates human error:

During high periods of workload operators will almost certainly face competing demands on their attention, and can often be interrupted during
their activities. When returning to their tasks their ability to maintain the situational awareness that they had acquired before the disruption will be reduced (p.203).

Strauch (2004) gives the example of the MD-80 aircraft accident in 1987 where, after the pilots had been interrupted during routine checks, they failed to “extend the flaps and slats” before takeoff. Over one hundred and fifty people lost their lives as a consequence.

The Phase Change Model is revolutionary in that it proposes a break from the well-established protocol of maintaining constant communication with headquarters during the first arriving phase. It incorporates a recognition and reliance on the aesthetic judgement of the Incident Controller to assess the situation, as not immediately sending communication messages leaves the organisation in a temporary ‘black spot’, not knowing or being able to record what is happening. On the flip side, the Phase Change Model has the advantage of lessening the distractions impinging upon an Incident Controller in their first arriving moments, thereby increasing their effectiveness in the most crucial first moments of the fire.

In summary, the first phase of a fire brigade’s response to an incident is the place in which rational and logical decision making is inappropriate, and Naturalistic Decision Making is inadequate. This first phase is the zone of criticality where the rules of rationality do not work, as there is not time for them. Moreover, it is here that the most important issues are judged and decided upon. Multimodal Decision Making recognises that Incident Controllers may be more effective in their role if liberated to act upon their aesthetic interpretations as a priority.
Multimodal Decision Making: The aesthetic connection

Multimodal Decision Making, seamlessly involving various modes of perception, provides a more accurate image of decision making on the fireground by Incident Controllers than a sequential formula of their cognitive processes. Aesthetic awareness reasons by nonlinear modes of association rather than by logic. Multimodal understandings converge towards a solution, rather than a single chronological linear progression. Aesthetic awareness is holistic, constructing spatial relations, recognising the familiar, and placing meaning on understanding parts only when they are placed within the context of the whole.

Multimodal Decision Making highlights an holistic appreciation, as found in the artistic practice of blocking in, rather than relying on one aspect, piece of information, or focus at a time. This is a skill of handling information which I suggest is ultimately best learned in the field, because a computer simulation or a re-enactment will not accurately convey the competing tensions which exist in the reality of a live fireground or a similar emergency incident.

Multimodal Decision Making is characterised by the acknowledgement of the emotional, intuitive features unique to a person, a situation or an experience. It places importance on previously unrelated elements in a decisions maker’s persona such as the argument before leaving for work, coming down with a virus, feelings of excitement and exhilaration, or the tired ho hum of the job; in other words, the total sum of the well-being of the decision maker. Multimodal Decision Making also places importance on recognising that Incident Controllers are influenced by their previous experiences, social and cultural understanding, and more. It highlights the previously unacknowledged elements of intuition, emotion, aesthetic awareness and somatic response.

Integral to Multimodal Decision Making is that all these aspects were previously (as in the positivist-scientific perspective) considered to impact on a decision maker. They were perceived in a negative light as something to control, but I
content they are actually a part of the decision maker, indispensable in their contribution to time-pressured decision making, and they should be acknowledged in a new light. Multimodal Decision Making encompasses the elements of time, space, emotion, experience and expertise, which I understand to be not just similar to, but the same as, aesthetic awareness and artistic modes of thought.

Multimodal Decision Making is a model used to explain ‘unexplainable’ decisions, and as such it is a critical incident decision making theory. Naturalistic models, although desiring to acknowledge the intuitive element, do not have the means to explore this connecting link due to the positivist influence directing the data analysis.

**Multimodal connections**

*Despite the explosion of sensory media, teachers of the visual are paradoxically faced with a shrinking arena of influence (Elkins, 1999, p.197).*

We live in a Western society where quantification is habitual, where measurement and procedure are understood and expected, as are rational responses in work and home-life spheres. The essence of modernisation remains with us despite the postmodern era, evidenced in a desire for control. Individually, this is worked out as control over one’s emotions, life’s events, and freedom from danger and insecurity. On a contemporary societal scale, the desires are the same. We live in an age of surveillance and we dread risk taking; many communities live in fear of the possibility of what might happen.

Fay (1996), the author of Contemporary philosophy of social science, writes:

> Perspectivism has taught us that any theory of how the cosmos works necessarily occurs from within one conceptual scheme or another, and consequently the deep patterns science seeks to ascertain are as much imaginative constructions as they are discoveries (Fay, 1996, p.204).
Whether understood as “creative constructions” or “discoveries”, the role of Incident Controllers demands the ability to hold in loose tension the various strands before them, and I argue they do this by keeping their aesthetic and somatic senses open to the larger pattern of the fire and focusing broadly. In this way they are more able to detect a change in the situation than if they were focused analytically on a single part. Jackson discusses Dewey’s emphasis on “The forces that give unity to a situation” (Jackson, 1998, p.xiii). These “forces” are the true focus of my thesis. In a similar vein, two researchers investigating creativity in the emergency response to the World Trade Centre attack, write:

Even though creativity and flexibility are regarded as important qualities of emergency managers…having to exercise creativity during a response is, paradoxically, often regarded as dysfunctional for emergency personnel. It appears as an indication of failure to plan properly ahead of time (Kendra, 2002, p.6).

For emergency managers in general, and fire officers in particular, the philosophy of creativity is in conflict with previously determined boundaries and rules and thus precipitates a crisis.

Adult educators and linguists have long pointed to the exclusion which happens when a ‘private’ language, for example legal jargon, inhibits entry into the understanding of a discipline. The practice of putting things simply and plainly has been termed Plain English, and we are encouraged to rephrase our choice of words so as to allow entry into what we are saying by the ‘uninitiated’, i.e. those with no ‘expert’ knowledge of the field, but who nevertheless need to negotiate it. The defining of a discipline by its use of language has allowed academic disciplines to grow in isolation from one another, and I believe this has led to a sense of fragmentation, a breaking apart of a previously cohesive understanding which incorporated emotions, feelings, objective and subjective understandings. It has led to a sense of isolation and today there is a drive to reconnect the disparate circles
of disciplines, spinning around in their own little universes, through the buzzword ‘networking’. The way these individual spheres can be united – the thread that can be used to draw them together into a productive union, the communicating mechanism, the glue, the undercurrent of collective understanding, the transportable credentials that we carry with us between spheres and universes – is our aesthetic awareness and somatic response.

Our gut instinct, our individual and collective emotional and intellectual perception, informs and influences our interpretation of all the scenes in our lives, regardless of where they unfold. These channels that circulate can be likened to the vascular system of a human body, refreshing the body with life-giving oxygen and removing the dross and waste. Feedback from our aesthetic perception and somatic awareness provides a bridge for these spheres, rendering them an interconnected whole. Without this cross-pollination we can lose our orientation; with it we can negotiate new and previously unexplored spheres, because we are equipped with something which transcends discipline and sphere, a transferable credential which enables new connections to be made.

We are all living in communities that have been organised in terms of physical and cultural structures and with expectations of how to negotiate them. Our recognition and response to these systems is a complex function of visual and perceptual training. We learn how to recognise and interpret our visual experiences from the moment our eyes open at birth, when we begin processing visual and sensory information into perceptions. In maturity, Incident Controllers and those who appreciate art alike, learn to become aware of these interpretations, perceptions and relationships, things that the untrained eye would not recognise or interpret.

There is a general understanding that the world around us is perceived in much the same way by all of us, ‘us’ meaning our community. The training of vision and perception that an artist undergoes calls for the same amount of effort to be made.
by the viewers, otherwise viewers are left to comment only on their reactions and the image will remain largely a mystery to them:

The challenge facing us as art educators is both simple and complex: How does one devise a pedagogical strategy that makes “practical sense”, but does not merely fall back into a skills based pedagogy? This question has become particularly critical at a time when art education has become so driven by conceptual and thematic concerns that materials and processes are conceived instrumentally to be used in the service of an idea, rather than as productive in their own right (Bolt, 2006, webpage).

The essence of the problem, the global situation, is the deficit of educational attention concentrating on understanding the visual and sensory in science and technology, and the reticence in the arts to examine and acknowledge ‘facts’. We are at a stage in our Western history where images and visual literacy are being enlarged upon through various modes of Information Technology, and there are important collaborations between art and science (Eisner, 1981; Karlqvist, 1997; Wechsler, 1978), yet tertiary institutions within Australia are scaling back and actually closing down their fine arts programs. For example, the University of Western Sydney has retired what was a thriving Fine Arts program, providing a practical illustration of how “The scholarly, cultural, and social significance of art is grossly undervalued” (Sullivan, 2005, p.xi). Fine arts programs, where they are still running, are not engaging in a practice of mutual exchange or cross-pollination with other programs in ways such as Elkins (2008) and Eisner (1981; 2002) advocate.

Part of our problem as decision makers is that we can easily end up taking our information literally and become lulled into a false sense of security as a result. A traffic light at green means that we have a right of way at a junction. It does not mean that the road is clear. Yet how often do we
proceed unthinkingly simply because the light is ‘at green’? (Drummond, 2001, p.79, original bold).

For all firefighters, Standard Operating Guidelines are memorised and revised constantly to the point where they are acted upon almost without thinking, like “lights at green”. Standard Operating Guidelines need to be so familiar that they readily come to mind because situations of high stress affect memory and movement. The participant Inspectors often talked about keeping their emotions under control as they were well aware that succumbing to stress severely inhibits the speed of their judgement and decision making.

**Multimodal awareness**

‘Cumulative bias’ acknowledges that exposure to one incident affects a person in a different way to multiple exposures, by which time a recognisable pattern has been built. The problem here is that there may only be one chance. Presuming this is not the case, as a firefighter experiences more exposures their perception of risk changes. This change usually involves increasing levels of competence and confidence in being able to cope, and consequently risks may be minimised. In fact, research indicates that over-exposure may lead to complacency (Linley & Joseph, 2006; Strauch, 2004). This, is in part, due to the focus in training on following ‘the rules’, which in turn may reduce the sensitivities of individuals, as with the “lights at green”, to more complex situations. In terms of knowing what to expect, there are two sides of the situation which the Incident Controller must delicately balance: one is not overreacting and the other is not becoming blasé.

The difficulty of examining errors in naturalistic decision making can be attributed, in part, to difficulties in distinguishing between the quality of the decision making process and the quality of the decision itself. The two are similar but different and the quality of the decision should not be used to gauge the quality of the process used to reach that decision (Strauch, 2004, p.210).
In terms of this research I have tried not to make evaluatory judgements between what was a ‘good’ decision and what was a ‘poor’ decision, and in this way I am similar to Naturalistic Decision researchers in that experts and their practice are regularly described and explained, but rarely judged or evaluated. To do this would have entailed applying a logical, rational decision making expectation to a multimodal situation, in addition to contravening my ethics approval.

Arts-based research addresses the problem of visual stimulation and over-familiarity through presenting a familiar thing or event in a defamiliarised way. bell hooks calls this visual art method “aesthetic intervention” (1995, p.54-64). The advantage of art here is that it can demonstrate something familiar or stereotypical to one group of people, but to another group it may be new information, and completely unfamiliar. The context for hooks is social inequality, but the concept applies equally to identifying for Incident Controllers their subconscious aesthetic and somatic awareness in Situational Awareness on the fireground. According to Leavy (2009), art can “promote defamiliarization – visual art can propel people to look at something in a different way…Visual art can jar people into seeing something differently” (p.220, original italics).

**Multimodal learning**

> Artists commonly stress that their work has to “breathe” and “move” to be artistically successful...It is therefore understandable that the artist is considered to have extreme bodily sensitivity (Gilbert Rose, 1980, p.100).

Power-point presentations, photographs, videos and the recount of live experience, differ in important ways from the experiences they describe. They are displayed independently of the background and the noise of the actual situation. They lack the complexity of an uncertain and unsure outcome. They are, in effect, shown against a blank background. The Incident Controller, once in the field, will be confronted with an uncertainty, excitement and fear that cannot be replicated apart from live experience.
According to Dewey, genuine learning happens when people work on problems that are real and meaningful. Without a real life context, information is separated from reality; images become stylised; concepts are reduced to acronyms; and statistics have no correlation. On the other hand, simply exposing the Incident Controller to real-life experience is just as invaluable and empty an experience. The key is to span formal and experiential learning with an aesthetic connection, involving an emphasis on codes of meaning outside verbal language:

Meaning resides so strongly and pervasively in other systems of meaning, in a multiplicity of visual, aural, behavioural and other codes, that a concentration on words alone is not enough...no single code can be successfully studied or fully understood in isolation (Hodge & Kress, 1988, p.vii).

According to Hodge, allowing a contradiction to exist rather than trying to find a merging point, is “productive because it allows new ideas to come in from either side, provoking further ideas in response, complicating and enriching both sides” (1993, p.xii). Hodge proposes these “unresolved contradictions” do not require removal by seeking a solution, but rather should be approached as something to understand. This is precisely the situation of the Incident Controller in the midst of a large scale incident in that throughout the transcripts there does not appear to be a desire to resolve a situation through the merging of competing or conflicting information, but rather a determined effort to hold all facets of the incident loosely within a productive tension, trying to achieve a resolution through balance rather than cancellation. “Effective teaching (substitute firefighting) is made up of these contradictory qualities inextricably combined” (Hodge, 1993, p.7, my italics).

There is a certain sense in any practice, for example art making or fire fighting, where a novice and an expert are distinguished by their mastery of various techniques and skills and the acquisition of expert knowledge, often in terms of unacknowledged somatic and aesthetic perception. Ostensibly, the art of fire
fighting involves the skilled use of technology, application of prior experience, teamwork and an understanding of the scientific nature of fire, given certain circumstances. I suggest that each of these components is inseparable from the aesthetic awareness and somatic response of the individual concerned, and that the ease with which an individual moves through the decision making processes in both art and fire fighting characterises expert practice.

We cannot simply trust our habits to correct themselves through unconscious trial and error or through eventual evolutionary adjustments… (this) not only leaves too much to unreliable blind chance but also works far too slowly to ensure the individual’s well being and to keep up with the rapid pace of new technological inventions, which will require ever new somatic adjustments (Shusterman, 2008, p.13).

Expertise moves beyond technical knowledge of the medium and how to interact with it. Even so, every permutation cannot be known and there remains a decision making challenge of judgement for the expert. This is because technical skill on its own will only lead to a ritualistic following of convention. Of this balance between technical expertise and ‘expressive possibilities’, Feldman (1992) writes: “that is why, as critics, we find ourselves judging the connections between artistic means and ends; we are interested in the quality of interaction between medium and meaning” (Feldman, 1992, p.267, original italics). From the perspective of nursing, Darbyshire (1999, p.131) claims that:

A rampant and unchecked technical rationality poses a threat to nursing because it can quickly become a totalizing and enframing orthodoxy, a template to be squeezed down on top of all thought and practice until uniformity is achieved.

Nurses, as with firefighters, are dealing with human life at its most vulnerable points in time. Protocols and procedures ensure maximum care is taken when
dealing with individual and specific situations, and yet Darbyshire points out the importance of a response that moves beyond “technical rationality” and “templates” to the somatic and aesthetic awareness of the situation. In the same vein, summing up their case calling for an integration and recognition of art in the practice of nursing, Rose and Parker (1994) write:

If artistry is neglected in professional practice the risk is that practitioners will focus so much on rules that their actions may become ritualistic and their clients dehumanised cases (p.1008).

Standard Operating Guidelines and similar directives such as Standing Orders are imperative for effective fire attack. They are undeniably important. What is lacking, however, is an acknowledgement of the experienced Incident Controller as someone who mediates the Standard Operating Guidelines on the basis of their somatic and aesthetically informed expertise.

In the final section I briefly outline a number of recommendations which are intended to springboard the continued development Multimodal Decision Making on the fireground.

**Recommendations: Operational Analysis**

At present in there is a demand for evidence based outcomes within Australian education and training. This focus on the end result often stymies enquiry into other possible avenues of thought and research because it precludes spending time critically examining the philosophical knowledge base and foundations of a discipline or profession, something already thought to be worked out so we can ‘get on with the job’. The following recommendations are realistic, tangible suggestions to enhance current practice within fire services. Nevertheless, a foundational shift will be necessary to fully realise the potential of engaging with an aesthetic perspective.
Within the ‘Standard Operating Guidelines for Academic Writing’, the introduction of new information is not expected in the Conclusion and Recommendations. I include Figure 8.2 here to demonstrate the aesthetic shock when culturally agreed ‘rules’ are broken, and also because the points in the ‘Operational Analysis (Post Incident)’ neatly encapsulate what the recommendations in a thesis are meant to achieve.

2 OPERATIONAL ANALYSIS (POST INCIDENT)

2.1 Introduction

2.1.1 Operational Analysis (Post Incident) is a process whereby a written report highlighting an issue or issues at an incident debrief will enable recommendations and actions to be documented.

2.1.2 The process is not intended to lay blame or to criticise individual performance, but review the organisational performance to enable actions to be taken to improve deficiencies, and to recognise areas of strength.

2.1.3 Lessons learnt from the analysis can be integrated into the Prevention, Preparedness, Response and Recovery (PPRR) phases of future incidents. This will enable a review of Command, Control, Co-ordination and Intelligence (C3I), combined with operational strategies, tactics and tasks that will ensure improvements in operational effectiveness.

Concentrating on programs and practices which acknowledge and encompass resources from the visual and somatic world of fire fighting, such as real-life experience, video footage and training scenarios, helps firefighters to grasp what they would not be able to grasp through simply reading a text. A Multimodal Decision Making perspective encourages moving a step further, in learning to visually differentiate and refine their practices of looking and sensibilities. This necessarily involves organisationally and individually acknowledging and developing a strong sense of aesthetic judgement.

We learn through what we see and experience. In art education it is mostly the doing and making of art that is emphasised and it is the ‘how to’ that is important.
This is a limiting perspective on the contribution of the arts to learning in general, and comparable to teaching the physical skills of firefighting only. Studying the visual, as well as creating and learning skills, is equally as important. The skills of art criticism and interpretation of fireground scenes need to be taught with equal imperative to the actual doing of the skill, the performing of the act. The following “debrief” is intended to “enable recommendations and actions” to progress this.

**Learning to love the experience**

The Preschool Fire Inspector said “it was one of the best fires I’ve been to…and time passed in a flash.” This is a neat illustration of how the satisfaction of a job well done is experienced aesthetically; not simply after the event, but during it. All sense of time changes; as with an artist, it is the process of commanding an incident that provides the satisfaction, as well as the end product. The journey of the fire, the total immersion in the event, is what provides, upon reflection, a sense of fulfilment.

If the sole goal of being an Incident Controller was to tick off checklists of boxes and fill in various report forms, there would be little motivation or incentive to take on the responsibility. Rather, it is the thrill of the actual engagement. Is this taught? Are Incident Controllers actually encouraged to appreciate and enjoy the experience? Those who do are able to relax in time-pressured situations and from an outsider’s perspective make their work appear deliberate and organised. At times there may be a sense of not enjoying the process, but they certainly value being a part of the outcome. These could be called intrinsic rewards, rather than rule-driven, correct answer, following the linear plan, extrinsic rewards. I suggest the satisfaction which lasts longer springs from the satisfaction of a job well done.

**Incorporating content and process**

In education, content and process are considered separately. Typically, what is to be taught is considered and written up separately to how it is to be taught. An aesthetic perspective would not consider this separation of content from process
productive. Instead it would recognise that, for instance, the content of what is to be said multimodally influences how it is conveyed, and the two can only be artificially separated. The shape of one form is related to the shape of the other – there is a correlation. For Incident Controllers, this could mean learning to recognise stance, posture and gesture as conveying a message as loudly as the ‘factual’ content of their words; it could mean learning to distinguish and recognise voice quality as well as literal word content, as in the Quivering Voice in Chapter 4.

Teaching and recognising non-verbal kinds of knowing

Incident Controllers unfamiliar with the protocols and procedures of their fire brigade would be in deep trouble. A lack of knowledge and understanding of the importance of aesthetic judgement is equally as troubling. There are things that Incident Controllers know which cannot be adequately ascertained or expressed in verbal or written formats. The Incident Controller’s embodied perception makes important contributions to their discernment, judgement and decision making. This is a different kind of literacy, and one that is usually learned and recognised informally and mostly subconsciously. Thus I propose the way Incident Controllers think and talk about the context of firefighting be reconsidered. At present it contains a technical rationality that moderates and tempers their understanding of risk and consequent decisions.

To incorporate aesthetic awareness into the education and training of firefighters, familiarity with the ways in which they learn is imperative. Recognising the restrictions and opportunities provided by the training exercises and the tools firefighters have to work with, in terms of aesthetic perception, is one angle that could be developed. Another is recognising the social, cultural, and organisationally accepted patterns of behaviour, and how these are learned and negotiated, as they may not always be the same. For instance, saying “I have a feeling” may be acceptable to fellow crew members, but not acceptable from an organisational position. Reconceptualising firefighting practice to incorporate an
artistically based, aesthetic perspective means thinking about which kinds of actions are applauded and which are discouraged in each arena.

The appreciation of any practice, in this case decision making on the fireground, has much to benefit from developing a language for aesthetic appreciation and acknowledgement in all aspects of work. Recognising and including opportunities to experience non-linguistic forms of knowing and communicating in training programs and later on the fireground could be facilitated through the recognition of Multimodal Decision Making, so that it becomes part of the language and culture of mess room talk, debriefing and court hearings. Simultaneously, this would initiate the development and recognition of an aesthetic vocabulary for the wider emergency services.

**Recognising there is more than one “correct” answer**

Firefighters’ lives depend on their enculturation into the various social and organisational fire brigade conventions. There is, however, evidence presented within this thesis to support the understanding that experienced Incident Controllers not only know the standard procedures, but that they negotiate them in a way which creatively leads them to realising that sometimes there is more than one solution to a problem. Much fire brigade activity is directed towards all members converging upon the same answer, while the evidence suggests that the occasional unconventional answer which is not necessarily found within the Standard Operating Guidelines may unravel the knots and clarify the various dimensions presented by the situation.

**Trusting individual judgement**

The Inspectors interviewed at times disregarded protocols, for example turning their phone off or not waiting for Victim Identification Tags to arrive. These instances occurred in the first Phase of the incident (see Figure 8.1), when time mattered most because their decisions had the most potential for greatest effect.
As demonstrated by the Inspector in the smell of petrol incident (Chapter 6, House Alight), Incident Controllers will override mechanical devices and will instead trust their embodied senses when there is conflicting information between the two. For Incident Controllers, learning to trust their judgement over the mechanistic reading of a piece of equipment, takes courage and experience. It means leaving the safe haven of ‘being right by the books’ and stepping out to follow a somatic and aesthetically informed sensation.

Judgements concerning timing and volume may benefit from incorporating an aesthetic perspective in that there is not much time for calculations and formulas on the fireground. The Incident Controller must determine instantly how much, how fast and what size. These questions are best answered by a feeling of gut intuition, as with the Liquorland Inspector who had a “feeling” that two lines of 38 would do the job, delicately balancing the volume of water so as to extinguish the fire effectively, but not damage the entire contents of the store. This sense of ‘rightness of fit’ is aesthetically developed. Initially, it relies on learning to calculate mechanistically, but experience finely hones this understanding to work its way out into an experienced Incident Controller “just knowing” what measures will counter the force before him or her. Learning to trust intuitive judgement from an aesthetic perspective could be taught through practical exercises in estimation and prediction.

In addition, an explanatory booklet could be developed for court and related legal applications. This would outline the different conditions under which decision making is conducted, recognising and explaining that decisions made in split seconds have an inherently different quality and may lose their essence when dissected in court room conditions, where there is ample time to apply logic and rational choice.

The booklet could also make explicit the relationship between understanding something as a ‘fact’ and then assigning value to that ‘fact’. Trying to draw a
judgement on the value of a decision based on the ‘factual’ understanding of the situation is an erroneous approach based on logic. “You knew the facts, why didn’t you act on them?” would be a colloquial way of expressing this situation; however, Multimodal Decision Making suggests that sometimes Incident Controllers, in full command of the ‘facts’ to hand at that moment, may be basing their decisions on something other than the ‘facts’ i.e. an intuitive, aesthetic perception which may conflict, contradict, or support the ‘facts’ they have to hand.

**Improvisation**

A part of being enculturated into a community of practice is a diminished ability to distinguish and value alternatives and innovations. The arts can teach the importance of being flexible and open to alternatives rather than finding a course of action and mechanistically holding fast to it, no matter what. Being able to conceptualise another plan or approach is an ability to be developed, as is the confidence and courage to let go of one plan and initiate another.

As with jazz musicians, improvising on a theme exploits and exhibits the best of the musician and the original musical score. The actual permutations are not expected, but that there will be changes, is. Being able to take advantage of unanticipated opportunities means not being mechanistic in following the score, but improvising creatively, keeping the original flavour of the code, but adapting it to fit within the current circumstance.

When conflicting information comes in, being able to think outside the ‘norm’, the culturally accepted, expected, response, and identifying the opportunity to break from the original pattern, rather than resisting doing this, may need to be encouraged and actively taught. Change can be frightening because of the associated risks, especially when changing midway through an incident, and most people, not only firefighters, are reluctant to abandon their first plan, even if it is not proving the most expedient.
Actively imagining alternatives

Creativity, imagination, and the nurturing of the senses could be carried from the arts into the ‘scientific’ world of firefighting. Incident Controllers are attuned to valuing the linear progression of an event, the measured accuracy, the ‘facts’, and the black and white statements. What possibilities could be opened up if the unrecognised aesthetic practices of Incident Controllers – the things they are already doing, learned through trial and error and experience – were actively recognised and taught earlier? For example, in a training situation Incident Controllers could be encouraged to imagine different approaches to the handling of an emergency. This would not be possible without having previously learned the standard operating procedures, because in order to break the rules one must know them first. But what if they were encouraged to learn how to imagine possibilities, incorporating their skills and technical expertise? The Toppled Crane Inspector had three plans in his head by the end of the incident, while the many others present had not generated one. What made the difference? He was able to imagine the effects of various manoeuvres, but how did he even conceive of those manoeuvres? He had previously read up on cranes, he already had the technical knowledge and skill. Now he applied his imagination, even before arrival. The art of imagining alternatives is a difficult skill to learn, and especially difficult to put into practice when under time-pressure. I recommend developing the conscious perceptivity in firefighters and not leaving this development up to ‘chance’ or ‘experience’.
Conclusion

Experienced Incident Controllers are relying, in part, on somatic and aesthetic awareness. I have drawn connections between the practice of art and decision making on the fireground, and I have illustrated how decisions made in both realms are informed by somatic and aesthetic perception. This has been explained through the development of a new model of decision making which I have referred to as ‘Multimodal Decision Making’.

My argument has been that decision making by Incident Controllers can be better understood through incorporating an aesthetic approach, and described with reference artistic practice. As a result I have proposed a new theory, Multimodal Decision Making, which incorporates examining each incident as a whole, rather than taking one feature and examining it across a range of incidents. Within the data analysis I have endeavoured to maintain the fabric of the entire incident, and therefore I have provided a contribution to time-pressured decision making from a perspective not previously considered.

There are no lines on a map that exist independently of other represented lines. The social space in which emergency service personnel conduct their professional working lives influences their decision making. This thesis provides evidence to support the notion of a complex relationship between the embodied Incident Controller, the social construction of Incident Controllers, and their relationship to the public. It suggests, furthermore, that their fireground decisions reflect these complex processes and acknowledge the importance of these relationships. Rather than being prescriptive, this thesis has been a case study in which I have argued that Incident Controllers are expert practitioners whose somatic and aesthetic awareness are intrinsically important in time-pressured decision making.
I began this thesis by considering questions such as: What is it that Incident Controllers look for? How do they make sense of the situation? What directs their attention? Specifically, I directly asked the rather broad question:

What is the relationship between risk perception, decision making and aesthetic and somatic forms of awareness in Incident Controllers on the fireground?

I found the manner in which complex incidents were negotiated, how competing demands and conflicting information was resolved, and the Incident Controller’s ability to decode the situation in order to precipitate and communicate a plan of response involved their whole body in a continuous and holistic awareness of the scene.

I suggested that arts-informed practices were exhibited by the Inspectors, but they were not necessarily formally taught, or actually recognised and valued as such by the Inspectors themselves or by their organisation. For many participants there was a sense of “I’m odd, I’m the only one who does this” and a slight feeling of sheepishness that their way of operating did not fit within the ‘norm’. I proposed recognising the aesthetic judgement of Incident Controllers and legitimising artistic forms of practice and aesthetic forms of awareness, allowing these mostly subconscious features to be nurtured and fostered at a much earlier stage in a firefighter’s career. As it is, many of the participant Inspectors had to step out in faith to follow their gut intuitions and aesthetic judgements, rather than stepping out with a sense of organisational endorsement and encouragement.

The importance of a connecting theoretical positioning between art and science, positing that such a conclusion will result in the enriching and heightening of alternative explanations and encourage discourse concerning decision making on the fireground, has been foregrounded. Multimodal Decision Making acknowledges the complex and contradictory pressures faced by Incident
Controllers by highlighting somatic and aesthetic awareness as an essential feature of decision making on the fireground.

Understanding the concept of a decision maker during an emergency as a ‘whole’ body, using all their senses to apprehend the scene and generate decisions, provides a useful platform for future decision making research with beneficial implications for fire brigades and other emergency services.
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Appendices

Appendix 1: Tactical Worksheet – Hazmat

Appendix 2: Standard Incident Action Plan as constructed by two of the participants

Appendix 3: Contributions to journals and conferences as a result of the research
Appendix 1: Tactical Worksheet – Hazmat

The original is A3 in size (420x297mm).
Appendix 2: Standard Incident Action Plan
(As constructed by two of the participants)

Standard Incident Action Plan

Overall Objectives for any Emergency Commander for any incident. Note: The objectives are very strategic in nature and are more than likely dictated by some piece of state legislation

1 - Save / Protect lives affected by the incident
Note: We mark this achievement by transmitting an “ALL CLEAR” message.

2 - Confine the incident and stop it spreading
Note: We mark this achievement by transmitting a “SITUATION UNDER CONTROL” message.

3 – Minimise the impact of the incident on the surrounding community
Note: This is a major transition in the incident. Saveable lives are now safe and we know that we have the resources in place to stop further serious damage from the incident. In effect, the situation is no longer an emergency. We should now take a look at our operations and, based on the fact that 1 & 2 above are met, make sure that the disruption caused by our operations are not more damaging than the incident itself (an example of this could be Sydney’s Brecia Furniture fire where the cost of closing Parramatta Rd was calculated as being far more expensive than the damage incurred from the fire, the closure of the road continued well after the building was lost)

4 – Meet other (non emergency) legislated requirements
i.e. Get the paperwork in order. This is things like record keeping, dynamic risk assessments, investigations etc.
Tactical Priorities used for meeting above Strategic Objectives

Note: These priorities come in sets and are the things we will do to achieve each of the separate objectives above. Tactical Priorities are made up on the run and can change often.

For example during a fire:

1. **Rescue** - By using FF in Breathing Apparatus with thermal imaging cameras to search each floor and by keeping other persons away from the scene by blocking surrounding streets (this addresses objective 1)
2. **Exposures** – Prepare hoses in place to protect surrounding buildings if we cannot confine the fire to the building of origin (objective 2)
3. **Confine** – Utilize hoses and ventilation points to stop the fire spreading to undamaged parts of the building (objective 2)
4. **Extinguish** – Once the fire is confined, move in and finish off extinguishing the fire (objective 2)
5. **Overhaul** – Check inside compartments for further fire spread or hot spots (objective 2)
6. **Salvage** – Protect other parts of the building from water damage (objective 3)
7. **Reduce** – Begin minimising the number of FF and Appliances on the scene (objective 3)
8. **Recover Area** – Open roads, reconnect power, allow limited entry to effected area (Objective 3)
9. **Conduct Investigations** – Written risk assessments, Origin & Cause Determination Etc (objective 4)
Appendix 3: Contributions to journals and conferences relevant to the thesis

Submitted, under peer review

Conference abstracts accepted


Journal articles


Conference presentations


