



**Bushfire CRC
Safety in Decision Making and Behaviour
Project (D2.3)**

Report Number 1:2005

**Identifying the Causes of Unsafe
Firefighting Decisions: A Human Factors
Interview Protocol**

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Executive Summary & Recommendations

Summary

- The present report, Report 1:2005, introduces psychological human factors as an important area of safety investigation and focuses on the development of an interview protocol to target these factors. A companion report, Report 2:2004, focuses on the development of experimental scenarios which can be used to test findings obtained from the use of this interview protocol.
- Drawing on the literature of decision error in safety-critical environments we present a classification of those psychological human factors most likely to be associated with unsafe decision making in wildland firefighting. These factors range from the individual (e.g., risk perception) to the organisational (e.g., perceived safety culture).
- We indicate the issues involved in conducting post incident interviews, drawing particular attention to the challenges posed by inadequate memory recall and the tendency to offer self-protective justifications.
- We outline the “Human Factors Interview Protocol”, a multi-stage interview procedure and associated interview techniques, designed to maximize the quality and quantity of information recalled and recounted.
- We consider the extent to which a human factors analysis of non-problematic incidents (those which do not require any form of formal safety review or inquiry) can produce findings that generalise to more serious safety breaches. We conclude that investigation of safety-related human factors at relatively benign fires, including prescribed burns, can be expected to generalise to those fires that pose serious threats to safety and, in fact, progress to severe adverse outcomes.
- The interview protocol has been piloted-tested in 8 separate wildfire incidents, with 27 firefighter interviews ranging from Crew Leader to Incident Controller. Preliminary findings are presented to illustrate the type of information likely to be elicited by the interview protocol, such as the importance of trust/mistrust, the adequacy of changeover briefings, mental workload, and hydration.
- It should be emphasised that interviews conducted according to this protocol are quite different from current hot debriefs, after action reviews, critical incident stress debriefings, or other mandated post-incident reporting procedures, and therefore should not be seen as replacing them.

Recommendations

The following are recommendations for research activity in subsequent phases of the D2.3 Bushfire CRC “Safety in Decision Making and Behaviour” project:

- All Fire Agencies participating in the Bushfire CRC be invited to contribute to the “Safety in Decision Making and Behaviour” project, beginning with prescribed burns in Spring 2005 and in the subsequent 2005/2006 Summer fire season. This will require the implementation of procedures appropriate to each agency to enable research interviewers to be deployed to conduct post-incident interviews as soon as practicable after firefighters come off shift.
- Because the use of the proposed human factors protocol may affect material presented to any other, more formal inquiry, this “Safety in Decision Making and Behaviour” project should avoid serious incidents and focus on those incidents in which, although there may have been the opportunity for an adverse outcome, adequate steps were taken to avoid the development of a serious incident.
- As consistent patterns of findings emerge from the use of the interview protocol, existing incident investigation reports on previous fires should be re-examined for evidence relating to these specific findings
- Wherever feasible, the specific findings and conclusions obtained from these interviews should be experimentally tested with appropriately designed, computer-simulated wildfire scenarios.

The following more general recommendation is submitted for consideration by Fire Agencies in their own use of the human factors interview protocol.

- That this interviewing protocol and associated techniques may also be usefully applied, with only minor modifications, in other contexts including:
 - As a research tool in agency-implemented research into the rôle that human factors play in fireground safety.
 - As an adjunct to existing debriefing procedures to improve the lessons obtained in training exercises.
 - As an interview method for use in confidential “no fault” near miss and accident investigations where agencies are able to implement such confidential reporting systems.

Notes

We invite persons in Fire Agencies participating in the Bushfire CRC to provide suggestions as to how we might best implement such post-incident firefighter interviews.

We can provide advice and assistance to persons in Fire Agencies participating in Bushfire CRC who wish to explore for their own research, training, and investigations, use of the human factors interview protocol described in this report (full copy attached as Appendix A)

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1 Background to the Report

The aims of the D2.3 “Safety in Decision Making and Behaviour” project are:

- (a) identify the “human factors” that lead Australian wildland fire fighters to make decisions that place themselves or others at risk, so as to :
- (b) produce guidelines and recommendation for training and operations in order to reduce the negative impact of the identified human factors.

For the purposes of this project we use the term “human factors” to refer to those factors which influence how the human mind operates (other CRC projects, notably D2.1 “Firefighter Health and Safety”, investigate factors which influence how the human body operates). The present D2.3 project “Safety in Decision Making and Behaviour”, therefore, seeks to identify those factors at the individual, group, or organisational level that influence human decision making in Australian wildland firefighting contexts.

Two complementary research techniques are most frequently used by researchers to identify and study those human factors pertaining to how the mind operates:

1. Interviews specifically designed to reveal underlying psychological experiences and processes, and
2. Experimentation using computer scenarios specifically designed to elicit the relevant psychological experiences and processes

We propose to use both these techniques throughout the course of the D2.3 “Safety in Decision Making and Behaviour” project.

This report is concerned with the first of these techniques, the development of a post-incident interview protocol to reveal the psychological factors underlying unsafe decision making . A companion report, Bushfire CRC Project D2.3 Report 2:2004 “Development of computer simulated wildfire scenarios for the experimental investigation of unsafe decision making” (Omodei, Elliott, & Walshe, 2004) outlined the use of computer simulated wildfire scenarios to elicit the human factors underlying unsafe decision making.

2 Introduction

Reports of accidents, near misses, and demonstrably unsafe acts in the context of wildland (bushfire) firefighting identify human factors as the primary cause in 34% of cases and as a major cause in 80% of cases (Wildland Fire Safety and Health Network, 2004). Despite the overrepresentation of human factors in safety compromising situations, systematic investigation of such factors is both rare (Putnam, 2001) and sorely needed (Alexander, 2003).

The term “human factors”, broadly defined, refers to those factors which influence both how the human body operates (physiological factors such as dehydration, fatigue etc.) and how the human mind operates (psychological factors such as situation awareness, planning, trust

in team members etc). Although many of the negative impacts of physiological factors on decision making are mediated by psychological factors (fatigue can lead to poor decisions because of the effects of fatigue on memory recall), there is compelling evidence that many psychological factors negatively impact on decision making in the absence of any identifiable physiological assaults.

The scarcity of systematic research into the mental processes which underlie decision making in wildland firefighting is not surprising given that such processes cannot be studied directly on the fire ground, but must be studied retrospectively using interview techniques that cue memory recall. We suggest that the major issue contributing to the current lack of understanding of the role of human factors in wildland firefighting in particular, and safety-critical complex, time-pressured environments in general is the absence of an appropriate research methodology. In this paper we introduce an interview protocol that has been specifically designed to elicit the recall of the maximum amount of relevant information.

2.1 Inclusion of human factors in the formal investigation of wildland firefighting incidents and accidents

Formal investigations of adverse events and serious near misses are routinely conducted by fire services throughout the world, reviewing the orders and actions of their firefighters on the fireground. In such investigations the main focus is on procedural matters, environmental conditions, and the state of equipment with the aim of providing fire service agencies with guidelines as to how they might operate more effectively and safely. Although such an investigative focus provides data of considerable value in allowing agencies to adapt operational procedures, equipment procurement, and training activities to reduce the likelihood of such mishaps occurring in the future, what remains relatively unclear are the mental (psychological) processes which generate safety-compromising orders and actions.

The wildland firefighting operational guidelines codified as “10 Standing Orders and 18 Watchouts” (10+18) have become a powerful influence in framing investigations into wildland firefighting in the United States. The 10+18 was developed in the United States as a training aid and operational heuristic. It comes directly from the operational experience of wildland firefighters and identifies the common failures which have led to firefighter deaths and accidents. Every US wildland fire investigation structures its findings around compliance with the 10+18. The strength of this framing has led to the comparative neglect of firefighters’ mental processes as a subject for investigation. While non compliance with one or more of the 10+18 may be noted, exploration of reasons behind such non compliance tends to be superficial or absent (e.g., the South Canyon Fire Report: Federal Bureau of Land Management, 1995). Some limited attempts have been made to include human factors in formal fire incident investigations (e.g., the Thirtymile Fire Report: United States Department of Agriculture, Forest Service, 2001). However, in light of the interview requirements for eliciting detailed information on human factors (outlined later in this paper) it is unlikely that the protracted and formal nature of such investigations allow the underlying psychological states and processes to be adequately identified, let alone investigated.

These observations are not offered as a criticism of the approaches adopted in formal accident/incident investigations. Most of the aims of a formal investigation of a specific incident are somewhat incompatible with the aim of identifying the deeper psychological

factors and processes that influenced any observed orders and actions. As discussed in greater detail later in this paper, if one makes the focus of a post-incident interview the identification of potential breaches in procedural guidelines one is unlikely to create an interview climate conducive to a “full and frank” revelation of underlying psychological experiences and processes. Similarly, a focus on such private experiences is unlikely to lead by itself to a comprehensive account of the salient events and facts of any one incident.

There has only been one significant attempt to focus exclusively on the role of human factors in safety incident development, the SAFENET system in the United States (Wildland Fire Safety and Health Network, 2004). This is a self-reporting system that replicates to some extent the no-fault confidential incident reporting system in practice in the aviation industry by allowing anonymous reporting of safety compromising incidents and behaviours. However, unlike the current practice world-wide in the aviation industry, at present SAFENET has no interview component: firefighters complete a form in private and submit this electronically to the SAFENET website. The electronic reporting form to SAFENET asks if human factors matters contributed to an incident and implicitly invites elaboration of these in a section of the report devoted to an account of the incident. The absence of a trained interviewer limits the amount and the relevance of information recalled by the firefighter making it difficult to identify which particular human factors were primarily involved and how they may have operated.

We suggest that if safety on the fireground is to be enhanced, two complementary investigations need to be routinely conducted, one focused on the identification of suboptimal procedures, equipment, orders, and actions, and one focused on the human factors underlying such orders and actions. This difference in investigative focus is sufficiently great that interview methods appropriate for one are likely not only to be inappropriate for, but may distort, the findings of the other. Because of the likely incompatibility of the two investigative approaches, such complementary investigations may require that different persons be selected to conduct each such investigation.

2.2 Nature and scope of human factors in safety-critical contexts

The “human factors” approach to understanding how people interact psychologically and physiologically with complex task environments is particularly useful for understanding human behaviour in safety-critical situations, regardless of whether these are essentially man-made (e.g., an aircraft cockpit) or naturally occurring (e.g., a wildland fire) (cf, Johansson, Hollnagel & Granlund, 2002). Task-related psychological processes range from basic interactions with the task environment via perception and attention, through the processes which comprise memory functioning, to the complex functions of reasoning and judgment. The operation of these task-related psychological processes are modified by the operation of a range of predisposing physiological states (such as fatigue, nutrition, and hydration) and predisposing psychological orientations (such as self-confidence, morale, and anxiety).

The role of human factors in safety compromising incident investigation has been the subject of intense interest in military and civil aviation. As the fireground is a complex environment that shares many features in common with adverse aviation incidents, we have drawn on the extensive literature on aviation incidents and accidents to provide a classification of human factors potentially applicable to fireground decision making. We have found two frameworks to be particularly helpful in creating a comprehensive classification of psychological human factors potentially applicable to the fireground. These

frameworks, developed to identify human errors in aviation accident and incident investigation, comprise the Human Factors and Analysis Classification System (HFACS) (Shapell & Wiegmann, 2000; United States Naval Safety Center, 2003) and the Technique for the Retrospective and Predictive Analysis of Cognitive Errors (TRACER) (Shorrock & Kirwan, 2002). The provisional classification of human factors which underlies our proposed interview protocol, the first version being presented by Reynolds, Omodei, McLennan, and Wearing (2004), is summarised in Table 1. Note that this list does not necessarily include all relevant human factors and that we expect the list to be amended as other human factors emerge with use of the interview protocol. This proposed human factors classification emphasises factors that operate within the individual to influence behaviour, but examines these within the context of the effects on the individual of their immediate crew and/or brigade members (small group factors), and of their fire service and/or community (large group factors).

We have divided the individual factors into three broad categories: (a) factors that are in play before action takes place (predisposing mental and physiological states); (b) factors that directly enable decisions to be made (perception, memory, judgment); and factors that directly enable decisions to be executed (communication and action execution). Small group factors include the effects of interpersonal dynamics on individual behaviour. These generally fall into the area of leadership and small group dynamics. Large group factors are the broader, relatively more enduring, factors that reflect the firefighter's perceptions of the expectations of the fire agency and community to which he or she belongs.

2.3 Points for identification of human factors contributions to the development of a safety incident

In order to determine the points in the developmental trajectory of an incident that afford opportunities for interviewing to understand the human factors contributions to safety threats, we propose an Incident Threat Severity Spectrum (ITSS). Figure 1 outlines the basic structure of this ITSS, charting the progression of an incident from its beginnings to a serious event.

The range of threat severity covered by the ITSS ranges from mild, where on later reflection the incident may be said to have begun, to extreme where damage, injury or death has occurred. The "unfolding incident" refers to the very earliest stage at which an evolving safety threat is potentially, but not readily, detectable, with most incidents never developing beyond this level of safety threat. The next stage of increasing threat is the emergence of the threat, where the constituents of a potential safety incident and their interactions are now readily discernible. The developing threat has become apparent requiring defensive action to be taken to prevent escalation of the safety incident. The stage of most extreme threat is the safety incident itself, where the processes causing injury damage or death are now underway. As can be inferred from Figure 1, human factors are involved in all stages in the development of a safety incident, from the early awareness of the need to be alert to the possibility of a safety threat to the need to deal with serious loss of life or property.

Table 1: Framework for classification human factors potentially associated decision making safety in firefighting

	Factors	Examples
<u>Individual Factors</u>	Predisposing Physiological States	Fatigue
		Affected by alcohol, drugs, or medications
	Predisposing Mental States	Dehydrated
		Hungry
		Ill or injured
		Physical fitness
		Emotions (e.g., morale, enthusiasm, worry, stress)
	Perception	Motivation (e.g., personal goals, perceived rewards, perceived sanctions)
		Personality orientations (e.g., optimism, risk tolerance)
		Attitudes (e.g., personal values, expectations, preferences)
Memory	Vision	
	Hearing	
Decision making	Perceptual information	
	Previous actions	
	Immediate/current situation	
	Future actions	
	Knowledge base (e.g., operational procedures, fire concepts)	
	Mental workload	
	Situation assessment	
Communication	Judgment	
	Planning	
	Action selection	
	Self-monitoring and self-regulation (with respect to the adequacy of one's own performance)	
Action execution	Accuracy	
	Clarity	
	Conciseness	
	Timeliness	
	Timing	
<u>Small-Group Factors</u>	Positioning	
	Execution	
	Interpersonal climate	
	Leadership	
	Followership	
	Trust/Mistrust	
	Respect	
	Familiarity	
	Communication	
	Team Cohesion	
Team Dynamics		
<u>Large-Group Factors</u>	Doctrine	
	Culture	
	Expectations	
	Values	
	Trust/Mistrust	
	Respect	

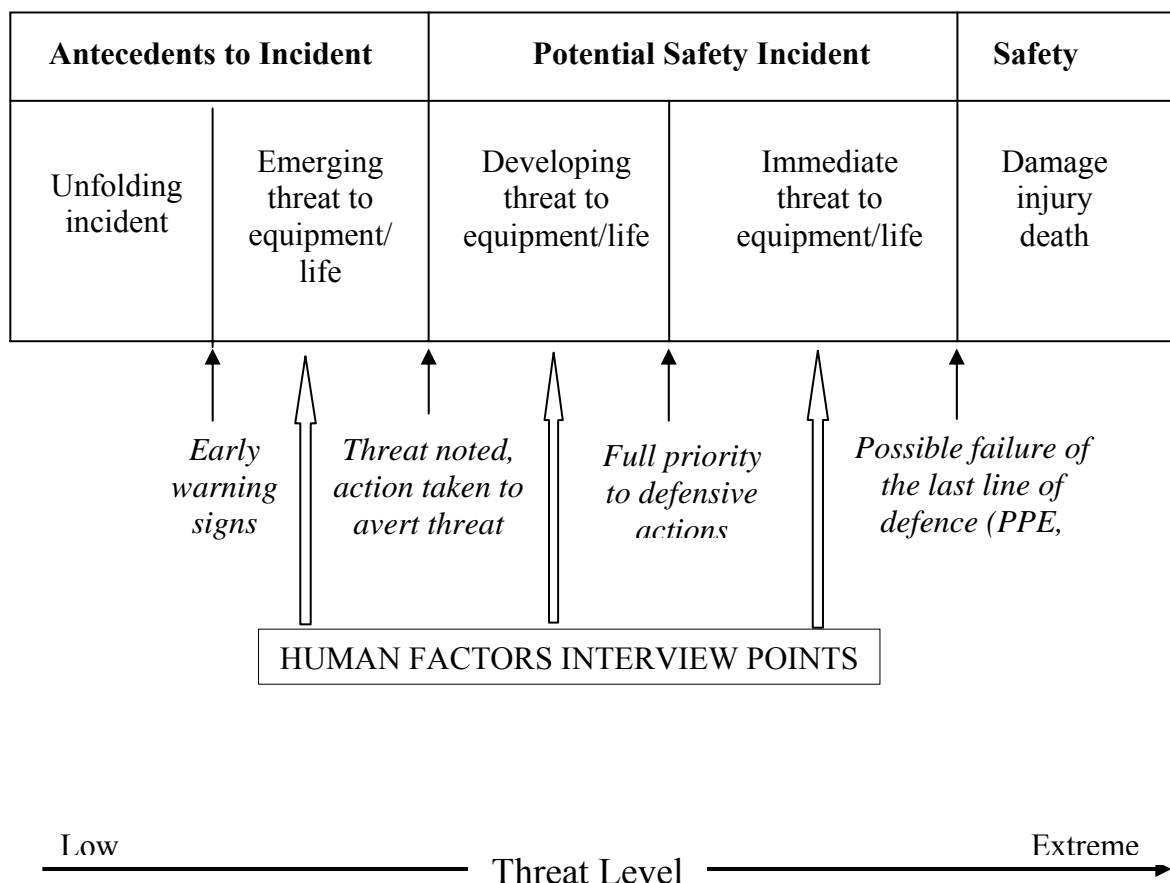


Figure 1. Incident-Threat-Severity Spectrum (ITSS): the development of a safety threat, decision points (in italics), and human factors interview points

Consequently, as shown in Figure 1, there are several points in the developmental trajectory of a safety incident at which interviews could usefully be conducted to determine the operation of human factors that lead to decisions that compromise safety. The experiences of all firefighters (regardless of rank) can be understood with respect to such a developmental trajectory of a safety incident.

With respect to our primary goal of enhancing understanding of the human factors which impact on safety-relevant decision making, we therefore conclude that useful information can be obtained by interviewing persons of all ranks after incidents of all levels of severity. We have, however, already indicated that the focus and methods involved in a formal operational investigation are sufficiently different from a human factors investigation that participation in one likely to introduce distortions in the other. Therefore research into the human factors underlying safety is best undertaken with persons who have not been, nor are likely to be, involved in a formal operational investigation. As serious incidents typically require all relevant persons be included in the formal investigation processes, we therefore recommend that any proposed human factors interview protocol avoid serious incidents, focusing on those incidents in which, although there was the opportunity for an adverse outcome, adequate steps were taken to avoid the development of a serious incident.

This raises the question as to whether a human factors analysis of minor safety incidents can produce findings that generalise to more serious threats to safety. Fortunately, although no two fires are the same, the underlying psychological characteristics of the human firefighter remain relatively constant across fires regardless of level of seriousness of the safety threats involved. Consequently, any findings and recommendations which emerge from an investigation of safety-related human factors at relatively benign fires can be expected to apply to other fires, including those that pose serious threats to safety or progress to severe adverse outcomes. The opportunity to reveal safety deficiencies in the absence of the actual occurrence of an adverse event is reflected in the concept of “latent failures” (cf Reason, 1997). As Weick and Sutcliffe (2001, p. 13) have indicated, such latent failures can be detected if careful attention is given to taking advantage of the “free lessons” which reside in superficially non problematic (normal) incidents. We therefore believe that the human factors interviewing approach we outline here will provide useful information on the human factors contributions to safety compromising situations of all levels of severity.

2.4 Issues in interviewing to reveal the operation of human factors

Essentially the challenge is to develop a post incident inquiry method which reveals comprehensive and accurate data about those psychological processes which generated directly observable orders and actions that possess the potential to compromise safety. This challenge is not a trivial issue. Indeed, Woods and Cook (1999) went so far as to argue that the operation of hindsight bias (knowledge of outcome biases our judgements about the processes that generated the outcome) renders useless most current applications of post-incident accident reporting as a means of understanding and preventing errors. While such a radical rejection of post-incident reporting as a data gathering methodology may be extreme, there are grounds for calling into question the comprehensiveness and accuracy of data generated by conventional interview or survey questionnaire methods.

Omodei, McLennan and Wearing (2004) suggest that typical strategies for obtaining retrospective self-reports, such as structured interviews and surveys, cause some psychological processes to be much more likely to be recalled than others, leading to a distorted understanding of the decision making process in general. This is particularly true when a clear decision-making error has occurred. What is least likely to be recalled are those perceptual, affective and motivational states that are essentially pre-verbal or at least not verbalised during the flow of the decision incident in question. There is abundant evidence, both anecdotal and experimental, of a pervasive human tendency when providing self-reports to present an image of the self that is both self-enhancing and self-consistent, through distortion and censoring (e.g., Swann, Griffin, Predmore, & Gaines, 1987). Thus, those experiences least likely to be recalled are those associated with actual or potential errors precisely because such experiences constitute a negative self-assessment and, as such, are subject to self-enhancement/protection processes (Omodei, Wearing, & McLennan, 2002). It should also be noted in light of the discussion in the previous section concerning incident severity, that the greater the apparent severity of an incident, the greater the pressure for such distortion and censoring in post incident recollection. Clearly, what are needed are interview methodologies that are capable of generating comprehensive verbal protocols which are as free as possible from serious self-referent distortion.

The literature on human memory processes (Matlin, 2002) indicates that comprehensiveness (quantity) and accuracy (quality) in memory recall will occur only if the following main requirements are met:

- (a) the presentation of adequate memory cues
- (b) the minimisation of potentially interfering recollections
- (c) freedom from criticism, censure, or embarrassment.

It is important therefore that interview procedures and guidelines be adopted which meet each of these requirements. It should also be noted that those fire incident investigations and reporting systems that do make some provision for the inclusion of human factors (discussed in a previous section of this paper) do not adequately meet these three requirements.

3 The Human Factors Review Interview Protocol (HFIP)

Drawing on the literature on human factors in decision making in general and the literature on human episodic memory in particular, we have developed “The Human Factors Interview Protocol” (HFIP) to maximize the quality and quantity of information obtained in post-incident interviews. The full protocol is attached as Appendix A. These guidelines include many of the key elements of Klein, Calderwood, and MacGregor’s (1989) critical decision method; and Omodei, McLennan, and Wearing’s (2004) two-stage cued recall technique.

To promote the recall of the maximum amount of relatively uncontaminated information, particularly in the early stages of the interview, the primary interviewing technique is to encourage the interviewee (i.e., the firefighter) to maintain during his or her recall an own-point-of-view or “insider” recall perspective:

Inner perspectives: The purpose of interviewing is to find out what is in and on someone’s mind. The purpose of open-ended interviewing is not to put things in someone’s mind (for example the interviewer’s preconceived categories for organizing the world) but to access the perspective of the person being interviewed (Patton, 1990, p. 278).

What is of interest is how the situation was experienced at the time by the firefighter, rather than how it might, or even should, appear now to an outsider, including to an interviewer. From the literature on interviewing techniques that promote such an insider perspective (e.g., Ivey, 1994; McLennan & Miller, 2000) this is achieved by the interviewer adopting as his or her primary goal an attempt to understand the interviewee’s experiences from the perspective of that interviewee. This is achieved, first, by adopting a stance of courteous, attentive, non-judgmental, interested curiosity in the experiences of the firefighter being interviewed. The interviewer then proceeds by using, mostly, leads which aid recall rather than being interrogatory: open-ended questions, invitations to say more, encourages, and paraphrasing to check accuracy of the interviewer’s understanding of what is being described. Although beyond the scope of this paper, this approach to interviewing has a distinguished lineage, deriving from early work by interviewing and counselling educators such as Rogers (1952) and Kagan (1984).

In order to create an interview climate conducive to the detailed recollection and reporting of relevant experiences, the following multi-stage interview sequence is recommended in which the person progressively revisits the incident with the recollections at early stages providing a stimulus and climate conducive to more detailed and reflective recollections at subsequent stages:

1. Set the parameters: Outline the structure of the interview and the steps that have been put in place to ensure confidentiality of any information obtained.
2. Elicit the narrative summary with its chapters: Obtain an overall description of the incident in the form of a “story line” or narrative, with key events to constitute “chapters” or “episodes” in this narrative summary. Use of existing incident maps or the creation of illustrative sketch maps or diagrams usually assist the person being interviewed by priming or cuing recall of important events and psychological experiences. Encourage the interviewee to identify “chapters” for more detailed recollection.
3. Collaborative analysis of the chapters: This is the core of the interview, taking the largest portion of the time allocated to the interview. For all interviews, it is important that the first chapter always be the 24-hour period prior to and including receiving notification of the incident. For each chapter in turn, encourage the interviewee to reflect on each chapter in turn in order to recollect and recount in as much detail as possible his or her experiences at the time, each such recollection acting as a cue to the recollection of subsequent experiences. The interviewer should be alert to possible decision points, particularly those that have implications for safety, and to assist the interviewee to elaborate on these in particular. The primary role of the interviewer is to provide minimal probes to elicit as wide a range of experiences as possible, and to assist the interviewee to avoid censuring recollections for accuracy or relevance, hindsight observations, self-evaluation, and self criticism. Use probes to encourage the recollection of the following:
 - What was noticed and paid attention to
 - Understanding of the situation and what was expected to occur
 - Any general concerns and feelings
 - Any particular safety concerns or issues
 - Specific decisions and plans
 - Intentions formed and actions initiated

If the person does not mention any safety concerns, the interviewer asks specifically about any potential safety issues.

If the person mentions previous incidents, these are probed for their contribution to the present incident

4. Stepping back - the wisdom of hindsight: Encourage the interviewee to provide now, with the value of hindsight, a critical analysis of the experiences recalled in the preceding phase. Specific interviewer questions are used to obtain information on each of the following:
 - What the person believes they should have done differently
 - What the person believes could have gone wrong but didn't

Both of these probes provide the interviewee with an opportunity to identify ways in which human factors might have led to the progression to a more serious incidents. The two probes typically result in generating a large amount of relevant, and sometimes unexpected, information

5. ‘Anything else?’ check: Give the interviewee the opportunity to raise any other events or issues of importance that might have been overlooked so far during the interview. Check if any other previous experiences, incidents, and/or war stories

might have influenced what they did. Get information on the person's experience and training in fire services.

6. Bigger picture: Encourage the interviewee to provide an account of their experiences of the overall climate of their work group (e.g., Brigade or Crew). Specific interviewer questions are used to obtain information on matters bearing on safety. This question also generates a substantial amount of relevant, and often unexpected, information relevant to human factors.
7. Even bigger picture: Encourage the interviewee to provide an account of their experiences of the overall culture of the Fire Agency to which they belong. Here also, specific interviewer questions are used to obtain information on matters bearing on safety. As for the previous question, this question also generates a substantial amount of relevant, and often unexpected, information.
8. Wrap up

It should be apparent from the elements of the interview procedure outlined above that for the interview to be most effective, it is important that it takes place as soon as practicable after the incident while experiences are fresh and readily recalled), and that total confidentiality be assured to reduce fear or criticism, censure, or embarrassment. Such confidentiality assurances are only possible if neither the firefighter, the fire incident, nor the fire agency can be identified in any reports of findings.

4 Preliminary Findings

Although the Human Factors Interview Protocol in wildland firefighting contexts is still in its 'proving' phase, we are able to provide the following preliminary findings.

During the 2004/2005 wildfire season, the Human Factors Interview Protocol was piloted in 8 separate incidents, 7 wildfires and 1 prescribed burn. Twenty seven firefighters ranging from Crew Leader (in charge of a 5-person crew on a single appliance) to Incident Controller (in charge of an Incident Management Team for a large scale fire) were interviewed.

Seven interviewers, who had only brief training in the application of the interview protocol, performed these interviews. All reported little difficulty in implementing the protocol, although considerable flexibility was found to be required to take into account the considerable variability in the nature and size of the incidents involved and the physical environments in which the interviews took place.

Preliminary findings from the transcripts of the 27 pilot interviews are offered here only in so far as they illustrate the sort of information that is likely to be elicited by the multi-stage interview protocol and caution should be exercised in interpreting any findings at this early stage. The following themes, with clear implications for the impact of human factors on safety, have emerged from these early interviews:

1. A lack of trust in information provided by firefighters they did not know personally was consistently reported. This lack of trust applied to persons in the command chain both above and below the firefighter being interviewed. One of the main behavioural indicators of such lack of trust was the tendency to go outside of the formal command chain to obtain information, not only further eroding trust but also eroding morale.
2. Despite the acknowledged need for detailed and accurate briefings at shift changeover, there appeared reluctance on the part of both outgoing and incoming shift personnel to engage in such briefings. The result of such cursory and inadequate changeover briefings created particular difficulties when operating in unfamiliar terrain and at night.
3. Another common finding was that persons in field command roles (particularly local incident command) experienced significant mental overload but were reluctant to recruit personal support of a dedicated assistant, or to escalate the level of the incident by activating a formal Incident Management Team.
4. Finally, despite the general awareness of, and concern with, the effects of fatigue and dehydration in summer fires in difficult terrain, the primary focus on getting the job done appears to override any such concerns. This appears to be particularly so in those fires where firefighters' own property, or that of his/her neighbours, is threatened by the fire. It should be noted that in Australia, most wildland fires are fought by volunteer brigades that recruit their volunteers from the local community.

Note that the 2005/2006 operational plan for this project will include continuing to interview firefighters in both naturally occurring fires and prescribed burns.

5 Conclusions

In this report we have outlined an interview protocol to discover, in as much detail, and with as much accuracy, as possible those psychological experiences and processes that underlie potentially safety compromising decisions and behaviours on the fireground. As the interview procedures differ from most that are currently in use in fire-agency mandated investigations, it should be emphasised that interviews conducted according to this protocol are quite different from, and therefore should not be seen as replacing, current hot debriefs, after action reviews, critical incident stress debriefings, or other post-incident reporting procedures.

In addition to research applications, the interview protocol and associated techniques may be adapted for use in training exercises. From our previous experience researching complex decision making in computer-simulated wildfire scenarios as described in Bushfire CRC Project D2.3 Report 2:2004 "Development of computer simulated wildfire scenarios for the experimental investigation of unsafe decision making" (Omodei, Elliott, & Walshe, 2004), we conclude that the only minor alterations to the protocol are required to achieve maximum learning from computer-simulated training exercises, sand-table exercises, tactical decision games, as well as from field exercises.

Similarly the interview protocol and associated techniques may be adapted to provide a suitable interview method for use in confidential “no fault” near miss and accident investigations where agencies are able to implement such confidential reporting systems. It should be noted that at present no fire service in Australia provides for such interviews.

The task of determining why good firefighters sometimes make unsafe decisions is complex. We believe that the interview approach outlined in this paper is likely to lead to findings and recommendations that will enhance safety, not only in wildland firefighting, but also in a wide range of industry and emergency settings that require persons to work in safety-critical task environments.

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Appendix A:

The Human Factors Interview Protocol (Ver 1.0)



**Bushfire CRC
Safety in Decision Making and Behaviour
Project (D2.3)**

Human Factors Interview Protocol (Ver 1.0)

**Jim McLennan, Mary Omodei, Chris Reynolds,
March, 2005**

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Safety in Decision Making and Behaviour Project (D2.3)

Human Factors Interview Protocol (Version 1.0)

Jim McLennan, Mary Omodei, Chris Reynolds

(March, 2005)

Consists of three sections:

Guide—a 1-page summary ‘guide’ for the interviewer to refer to during the interview

Description—an expanded version of the Guide, to be used as a reminder and refresher

Details—additional suggestions and explanations, will have extra material added as the team becomes more experienced, to be read through at regular intervals to maintain consistency of overall approach across interviewers

Human Factors Interview Protocol – Guide

Maintain a stance of polite, respectful, non-judgmental, interested curiosity about your person's experiences

1. Set the parameters: Introduce the safety project, say what you want the person to do, explain the confidentiality mechanisms, check for ineligibility, and invite participation. Informed Consent Forms to be signed—copy for person, give card with Interview Number. Switch on recorder (note: watch for when the tape clicks off at 30 minutes, halt the interview, turn tape over or replace tape).

2. Elicit the narrative summary, with its “chapters”: -Encourage/assist the person to give you an overall description of what occurred over the course of the incident, in the form of a narrative summary, with key events marking “chapters” in the account. If maps are available, use these to help; the person may find it helpful to draw ‘mud maps’ or diagrams. Use open-ended questions to encourage the person to elaborate where this seems needed. Be responsive and encouraging, without getting in the way of the person ‘telling their story in their own way’. As the person talks, note the key events which mark the “chapters”—at the end of the narrative, check with the person that your list of key events (chapters) matches their recollections.

3. Collaborative analysis of each “chapter” in the narrative sequence: This is the core of the interview. Chapter 1 is always the 24 hours previous to the incident. For each chapter in turn, encourage the person to reflect, recollect and recount to you in as much detail as possible his or her experiences—each recollection acting as a cue for subsequent recall of experiences. Be alert for significant decision points, especially those with potential safety implications. Be flexible, having regard for: the time you have available, the nature of the incident, the person you are talking to. Where it seems important, use probes to encourage recollection/recounting of:

- What was noticed and paid attention to
- Understanding of the situation and what was expected to occur
- General concerns, or feelings
- Specific decisions or plans formulated
- Intentions formed and actions initiated
- Safety issues or concerns.

--Your person may not mention any safety concerns, be prepared to **ask** specifically about potential safety issues associated with a particular event.

--If your person mentions previous incidents, probe these for contribution to present incident.

4. Stepping back – wisdom of hindsight: What the person might have done differently. What might have gone wrong but didn't.

5. Anything else check? Ask if there is anything else that might be important in this incident. Ask if any (any other) previous experiences, incidents, or war stories might have influenced what they did. Get personal history

6. Big picture—Safety Climate: (a) What is it like being a member of your brigade?
(b) How would you say your Brigade (Group/Region) is going with regard to crew safety generally?

7. Even bigger picture-Safety Culture: (a) Overall how would you say your Fire Service is doing in managing fires? (b) How would you say the Fire Service is going with regard to crew safety generally?

8. Wrap it up: Thanks, remind of confidentiality, clear finish of the interview (recorder off), small-talk as required.

[--“safe” tape, label with interview number, label notes with number, photograph drawings/diagrams.]

Human Factors Interview Protocol -- Description

Introduction

The interview protocol is divided into eight parts (the Eight-fold Path to Mutual Enlightenment):

1. **Set the parameters: introducing the interviewer, the project, and the interview process.**
2. **Elicit the narrative summary, with its “chapters.”**
3. **Collaborative analysis of each “chapter” in the sequence.**
4. **Stepping back – wisdom of hindsight.**
5. **‘Anything else?’ Check.**
6. **Big picture--Safety Climate.**
7. **Even bigger picture—Safety Culture**
8. **Wrap it up.**

Description – Expanded ‘Guide’

Each part requires the interviewer to do several things, as described below:

1. **Set the parameters.**
 - a. ***introduce*** the interviewer and begin to establish a rapport with the interviewee;
 - b. ***introduce*** and outline the project and the participant’s part in it;
 - c. ***establish*** whether incident is likely to lead to any kind of formal investigation or inquiry (is the person eligible to be interviewed?).
 - d. ***brief*** the interviewee on their rights and redresses under the requirements of University Human Ethics Committee and stress the anonymity of their participation;
 - e. ***give*** interviewee written description of the project and card with interview code number, ***assist*** in understanding as needed (interviewee to keep written description), ***obtain*** signature on Consent Form;
 - f. ***confirm*** the interviewee’s understanding of the process;
 - g. ***begin*** recoding the interview.
2. **Elicit the narrative summary account, with its “chapters”.**
 - a. ***initiate*** the process of the interviewee re-experiencing the incident on the basis of material retrieved from long-term memory;

- b. *elicit* from the interviewee an account of significant events in the incident as experienced by the interviewee;
- c. *obtain* sufficient supplementary information in the form of maps and diagrams to ensure that the sequence of events and the relationships between elements in the narrative are clear to you—and will be clear to another researcher during later analysis.
- d. *focussing: if* the account covers a long period of time, ask the interviewee to select a particularly significant component of it—for example, an aspect which had the potential to compromise safety;
- e. *list* what seem to be the significant unfolding events which break the narrative into “chapters” to be explored in detail;
- f. *confirm* the sequence of narrative “chapters” with the interviewee.

3. **Collaborative analysis of each “chapter” in the narrative sequence (the core of the interview):**

For each “chapter” in turn, *encourage* the interviewee to reflect, recollect, and recount to you in as much detail as possible his or her experiences—each recollection acting as a cue for subsequent recall of experiences. *Be alert* for significant developments in the incident and significant decisions and actions, especially those with significant potential safety implications. Use a note-pad to make a running *summary* of each chapter—where it seems important note times and geographic locations—your running narrative is to help you keep track of the interview in order to decide what aspects need further elaboration and probing. Be flexible, especially in relation to the time you have available to interview the person. Sometimes, you may only have access to the person for a short interview, in which case you will have to make judgement calls on what is most important and needing to be explored and what is peripheral and to be only noted in passing. As far as possible, concentrate on helping/encouraging the person to recall and describe. Where it seems important, use probes to encourage elaboration of:

- What the person noticed and paid attention to
- The understanding of the situation and what was expected to happen
- General concerns or feelings
- Specific decisions taken or plans formulated (and by whom)
- Intentions formed and actions initiated
- Safety issues or concerns.

Your interviewee may not spontaneously mention any safety concerns (especially if nothing untoward occurred to be recalled!). Use your judgement to ask specifically if there might have been any safety issues potentially associated with particular developments—but do not prematurely start the “hindsight” inquiry of the next Part. If the person refers in passing to a previous incident which seems to have had some carry-over to the present incident, probe for its contribution to the present incident.

4. **Stepping back –wisdom of hindsight:**

- a. “If you could magically turn the clock back and do things over again, what if anything might you do differently, and why?”

- b. “Suppose it had not been you as the _____ at this incident but instead there was someone less well trained or much less experienced. What are the most likely ways such a less experienced person might have got things wrong and compromised the safety of _____.”

5. “Anything else?” Check:

- a. “Now that you have gone through the incident with me, is there anything else that comes to mind that I should make a note of?”
- b. Obtain any important factual details about the incident that have not emerged along the way that you might not be able to get from other records of the incident.
- c. Depending on whether or not the person has already referred to previous experiences guiding their actions: “Thinking back, were there any (other) particular previous experiences you thought of and used to guide you at this fire?”
- d. Obtain fire service background information about the interviewee e.g. levels of experience and training in generally and with respect to wildland firefighting in particular;

6. Big picture—Safety Climate of primary ‘work group’ (brigade/Group/Region):

1. What is it like being a member of your brigade?
2. “How would you say your brigade is going with regard to crew safety generally?”
3. Probe as seems necessary, having regard for time available.

7. Even bigger picture—Safety Culture of the Organisation

1. Overall how would you say your Fire Service is doing in managing fires
2. “How would you say the Fire Service is going with regard to crew safety issues generally?”
3. Probe as seems necessary, having regard for time.

8. Wrap it up:

Thanks, confidentiality reminder; check person has: your card with his/her interview number on it, Information Sheet, copy of the Informed Consent Form. Recorder off. Small talk as required. Then, labelling, photographing if needed, “safe” tape. Prepare for next interview.

Human Factors Interview Protocol – More Details

Some general points

1. Make sure all materials are at hand. (Check interview material kit. Contents are listed in Appendix A).
2. Conduct the interview in a private place which will have no disturbances or distractions. Use the Bushfire CRC Interview In progress sign
3. Interviewer to turn off mobile (in front of participant so he/she might do likewise – but don't ask).
4. This is the interviewee's story and that they should tell it in their own way even if they depart from the protocol. If this happens, try to make sure that all of the points in the protocol are covered by the narrative. The protocol procedure is probably the best way to get the information from the interviewee and tactful guidance of the development of the narrative back to it should be tried where practicable.
5. Appendix B lists human factors items that are important to each interview. It is NOT intended that you exhaustively cover all these points for every narrative chapter—use your judgement, the list is intended to remind you of the broad range covered by “Human Factors”.
6. Make sure that the interviewee understands that the interview is not inquisitorial, judicial or disciplinary, that participation is voluntary, and that all information remains confidential.
7. Make sure that interviewees understand their rights as participants.
8. Generally, questions should be open questions. These allow the interviewee to answer fully and to elaborate their answers. Questions that can be answered simply by “yes” or “no” should be avoided unless it is necessary to establish something definitely.
9. Don't forget to SWITCH ON THE RECORDER once the interview starts, then to watch for when the tape clicks off at 30 minutes. Halt the interview to turn the tape over (or replace it as needed).
10. Label everything and make sure that the recording of the interview refers to all the documents and labelled details in these---eg, points on maps.

More Details of the Interview Parts

What follows are more detailed suggestions on how to proceed and explanations of what is intended. Remember that each interview will be different, you will have to tailor your approach to match the unique combination of: the incident, the person being interviewed, and the circumstances under which you are conducting the interview. What is ultimately important is to get good quality, trustworthy information related to issues of safety on the fireground from an individual who was 'at the sharp end' during the incident.

1. Set the parameters:

Introduce yourself; explain clearly the purpose of the interview and how it will proceed—

SAY SOMETHING LIKE: Hullo, My name is _____. Thank you for agreeing to talk with me and making the time for this. Has _____ given you an idea of what this is about? (depending on response) Let me just go through things then, to make sure you are comfortable with what I propose. I am part of a Bushfire Cooperative Research Centre Team hoping to improve safety at incidents. The team members are interviewing fire fighters as soon as practical after a shift to get more detailed information than could be obtained from a standard Incident report. I want to get from you as clear and complete a picture as I can of what happened at the _____ (fire or incident) at _____ (location) on _____ (day, date). I know you may have already made a Report about it and I am following this up to make sure I have all the information available about it. First, would you like to look at the Incident Report/Map again just to get yourself back into what was happening at the time? (give available material to participant; allow time for him/her to read it). Adapt this part according to the circumstances by which the interviewee has entered the review process. Before we go any further, do you have any reason to think that the incident will be the subject of any official investigation or inquiry. That is, was anybody injured or was any equipment seriously damaged? If yes, explain that the interview should stop so as to not interfere with any later inquiry

SAY: In a moment I will get you to take me through the incident in detail. Before that, I want to re-assure you that I will not pass-on to anyone in the organisation what you tell me. This project is run under the requirements of the La Trobe University Human Ethics Committee which require strict anonymity of all participants in University projects. Nobody, except researchers who are also bound by these requirements will have access to the raw material from this interview. There will be no information that identifies you directly or indirectly released to any person or organisation outside the research group. I would like to tape record our discussion so that I do not miss important material. I will be the only one who knows what incident is discussed on the tape. The tape will be kept locked in a Research Laboratory at La Trobe University. No one but a member of the La Trobe research team will have access to it. It will not be permitted to be taken away. Any written notes taken from the tape to be included in a Report will have all direct or indirect reference to you or anyone you mention removed before they are seen by anyone outside the La Trobe Research Team. The tape will be kept secure and will be destroyed after 5 years.

The information sheet I have given you summarises the project and provides general contact details. This card gives you my personal contact details. On the back of it is the code by which the material that you provide will be identified. At any time you may terminate this interview and request that no record be kept of it. At any time in the next 3 months, you may request that any material that you have given be destroyed and not used. Do not forget your code as this is the only way any request or enquiry can be authenticated. (REMEMBER to record date, time, place and code in your diary.)

Are there any questions you want to ask me so you are clear about the confidentiality of our discussion?

SAY: "Before we begin, what was your role at this incident?"

2. Elicit the narrative summary with its “chapters”:

SAY “Now this is what we are going to do. First, I want you to give me an overview, or summary description of what happened in the order things happened. That will help me to identify the ‘main’ stages in how the incident unfolded. I will make a note of these. Then we will go through the incident again, and I will ask you to explain each stage in detail. I would like you to summarise the incident: how it started, what happened, how it ended—start where it seems best. Try to help me understand everything that happened.

ENCOURAGE PARTICIPANT TO GIVE THE OVERVIEW HIS/HER WAY. TRY NOT TO INTERRUPT UNLESS YOU BELIEVE IT TO BE NECESSARY FOR UNDERSTANDING. ENCOURAGE PARTICIPANT TO REVIEW THE MAPS, ENCOURAGE HIM/HER TO DRAW MAPS OR DIAGRAMS ON THE WHITEBOARD. MAKE SURE THAT FEATURES REFERRED TO BY THE INTERVIEWEE ARE LABELLED AND THAT THE LABELS ARE MENTIONED DURING THE INTERVIEW. MAKE NOTES OF WHAT SEEM TO BE THE CRITICAL EVENTS WHICH BREAK THE INCIDENT NARRATIVE INTO “CHAPTERS”, EACH TO BE ANALYSED IN DETAIL IN THE NEXT PART.

TRY NOT TO LET THE PERSON GO INTO A LEVEL OF DETAIL MORE APPROPRIATE TO NEXT STAGE If it seems like the person is getting caught up in detail say something like “That’s OK, we don’t need to go into every detail here, you are giving me an overview of the main events. We will go back over each stage in detail later on.”

At the end, check that your list of key events/”chapters” seems right to the person.

NOTE: If a really long narrative is given, ask for the most significant aspect (=”chapter” to be selected: SAY (something like): “A lot happened. To save time, could you select the one aspect which may be had the greatest potential for safety to be an issue?”

3. Collaborative analysis of each ‘chapter’ in the narrative sequence:

Now we will look at each stage of the incident and what happened in detail. First up, however, I would like you to go back to the 24 hours **before** your involvement with the incident. What was this time like for you?” YOU ARE AFTER POTENTIALLY RELEVANT “PREDISPOSING STATE” FACTOR ISSUES

Then for each “chapter” in turn, help the person to recall as much information as possible, a good structure might be:

- THE EVENT WHICH INITIATED THE “CHAPTER”- CUES/INCOMING INFORMATION, & SITUATION AWARENESS
- CONCERNS, ISSUES DECISIONS
- ACTIONS TAKEN
- HUMAN FACTORS PSYCHOLOGICAL PROCESSES ‘DRIVING’ THE DECISIONS AND ACTIONS,

ESPECIALLY THOSE LIKELY TO BE RELATED TO SAFETY ISSUES

PROBE FOR AS MUCH DETAIL AS YOU CAN ABOUT THE HUMAN FACTORS PSYCHOLOGICAL PROCESSES WHICH “DROVE” THE DECISIONS AND ACTIONS. USE A MIXTURE OF OPEN QUESTIONS [“Say some more about _____.”] and CLOSED QUESTIONS [“I think we need to be clear. Did _____ actually happen?”] REFER TO THE HUMAN FACTORS CHECKLIST TO REMIND YOURSELF OF THE RANGE OF POTENTIALLY IMPORTANT FACTORS

Use a note-pad to make a running summary of each chapter. This is to help you keep track of the narrative chapter analysis so you can see more easily how things developed and can get immediate insights into things that need to be checked or probed more.

4. Hindsight review

What you want to find out is the person’s evaluation of how things went with the wisdom of hindsight knowledge of the final outcomes. The first open-ended question is straightforward:

“If you could magically turn the clock back and do it over again, with the wisdom of hindsight, is there anything you would do differently? Why?”

The second one is a bit more subtle. It is an indirect way of getting at: “In what ways might YOU have really stuffed things up?”—But by asking about a hypothetical ‘other’ the hope is that defensive reactions might be lessened

5. “Anything else?” check:

The main thing is to encourage the person to think back so as to be able to identify anything important that has escaped attention to this point. This could be aspects of the present incident, the impact of previous incident or of “war stories” from other firefighters/brigade folklore? Here is your chance to look over your running summary to check if there is anything else you believe you need to probe further. Here is a good point to get any needed factual information about your interviewee—years of experience, special training etc.

6. Big Picture—Safety Climate

Safety climate is the surface features of an organisation’s underlying safety culture. It is shown by the way in which a ‘work group’—like an individual brigade, or a Group, or a Region—goes about its tasks in relation to routine issues of safety

SAY: “What is it like being a member of your brigade?”

SAY: “How would you say your brigade/Group/Region is going with regard to crew safety generally?”

If probing, pay attention to: training, equipment, attitude to safety, morale, supervision and feedback

7. Even bigger picture—Safety Culture

Safety culture is the relatively stable and consistent ‘message’—both public and latent, intended and unwitting—which an organisation’s senior management communicates down the line to its ‘troops’.

SAY: “Overall how would say your Fire Service is doing in managing fires?

SAY: “How would you say the Service is going with regard to crew safety issues generally?”

If probing, pay attention to: training, equipment, morale, feedback

8. Wrap it up

EXPLAIN WHAT HAPPENS NOW – INTERVIEWING OTHER PEOPLE ABOUT OTHER INCIDENTS, COMPILER A REPORT ON “LESSONS LEARNED”, TELL HIM/HER ABOUT SUBSEQUENT AVAILABILITY OF REPORTS – STRESS NO IDENTIFYING MATERIAL. REPEAT THAT THEY MAY WITHDRAW FROM THE PROJECT WITHIN 3 MONTHS OF THE INTERVIEW AND THEIR DATA WILL BE DESTROYED—PHONE THE NUMBER ON THE CARD AND QUOTE THEIR INTERVIEW NUMBER.

Administration:

- a. label with the relevant code number: tapes, maps, white board diagrams, sketch book diagrams & summaries (all and any document relating to the interview) with the interviewee’s identity code #. “Safe” the tape so it can’t be recorded-over.
- b. photograph each of the labelled (interview code #) white boards and each sketch pad sheet used during the interview, if needed.
- c. note the interview date, location and interviewee label code # in your diary/log book.
- d. check the state of the batteries and recharge/replace as required
- e. check the levels of stationery and consumables in the brief case kit and replace as required
- f. if time permits, relax

Appendix A

Interview materials pack contents (in small crush-proof case)

- A. 2 x artist's sketch pads (No. 579) for maps/diagrams
 - 2 x black whiteboard pens
 - 4 x coloured whiteboard pens
 - 1 x 4 pack light tinted sticky note pads
 - 1 x clear tape dispenser

- B. 2 x A4 note pads
 - 1 x clipboards
 - 4 x 7mm mechanical pencils with spare leads
 - 4 x black biro pens
 - 1 x pocket notebooks
 - 2 x erasers

- C. 1 x pocket tape recorder
 - 12 x tapes
 - 2 x battery sets (AA)

- D. camera

- E. tools quick check
interview guide
human factors checklist

- F. personal pocket diary/bound notebook

- G. 20 x 'Invitation to Participate' forms (single pages with coloured photo at top)

- H. 20 x Information sheets for CFA, 20 x Information sheets for NSW RFS

- I. 40 x Consent Forms (one for you, signed, one for the person)

- J. Bushfire CRC cards, to write interview number on for the person

Appendix B Human factors checklist

List A

Individual Factors

Predisposing Physiological States

- Fatigue
- Affected by alcohol, drugs, or some medications
- Dehydrated
- Hungry
- Ill or injured
- Unfit

Predisposing Mental States

- Emotions (e.g., morale, enthusiasm, worry & stress)
- Motivation (e.g., personal goals, perceived rewards, perceived sanctions)
- Personality orientations (e.g., optimism, risk tolerance)
- Attitudes (e.g., personal values, expectations, preferences)

Perception

- | | | | |
|---|--|------|--|
| <ul style="list-style-type: none">• Vision• Identification• Hearing | $\left\{ \begin{array}{l} \text{Detection} \\ \text{Comparison} \end{array} \right.$ | Late | $\left\{ \begin{array}{l} \text{None} \\ \text{Incorrect} \end{array} \right.$ |
|---|--|------|--|

Memory

- | | |
|---|---|
| <ul style="list-style-type: none">• Perceptual information• Previous actions• Immediate/current situation• Future actions• Knowledge base
(e.g., procedures, fire concepts) | $\left\{ \begin{array}{l} \text{None} \\ \text{Overloaded} \\ \text{Incorrect} \end{array} \right.$ |
|---|---|

Decision making

- | | |
|---|--|
| <ul style="list-style-type: none">• Situation assessment• Judgment• Planning• Action selection• Self-monitoring and self-regulation | Incomplete / inaccurate / biased
None / biased
None / too little / incorrect
None / late / inappropriate
None / late / inappropriate |
|---|--|

Communication

- Accuracy
- Clarity
- Conciseness
- Timeliness

Action execution

- Timing Early / late / long / short

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- Positioning Wrong place / wrong direction
- Execution Incorrect / inept / inefficient

Small-group Factors: Interpersonal climate; Leadership; Followership; Communication; Cohesion; Dynamics, Trust-Mistrust, Respect, Familiarity, Trust-Mistrust, Respect

Large-group Factors: Doctrine, culture, Perceived expectations and values, Trust/Mistrust, Respect

List B

Other

Items to be avoided in interview if possible, but noted and recorded if unavoidable:

- Self-justification and self-blame;
- Self-enhancement and self-consistency;
- Incomplete recollection;
- Hindsight bias;
- Non-specific, trivial, and/or vexatious complaints