

# On Dangerous Ground: Human Factors and Fire Ground Safety

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## D2.3 - Investigating the "Human Factors" that impact upon safety on the fire ground

### 1. Human Factors Interview Protocol (HFIP)

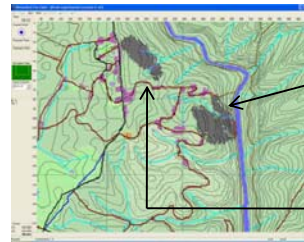
- 8 stage interview for understanding mental processes driving decision making
- HFIP in itself is a major CRC output. Fire agencies are free to adopt and adapt the procedure for their own purposes (e.g. near-miss accident investigation)
- D2.3 conducted 120 fire fighter (roles ranging from crew leader to incident controller) interviews between the 2004/05 and 2006/07 fire seasons
- Results highlight a number of **individual** and **small-group** factors which have the potential to impact upon fire fighter safety

### 2. Networked Fire Chief (NFC) scenarios for fire research

While NFC itself is not an output of the CRC, the scenarios produced for CRC-related research has demonstrated NFC to be a useful tool for controlled research into fire fighter decision-making.

#### NFC Investigation - Problem: Reluctance to Change Plans

- Why does it happen? (possible human factors)
- a) Pressure to Complete?
  - b) Sunk Costs Reasoning Bias?



Initial fire outbreak

At time x, a second, more threatening fire outbreak

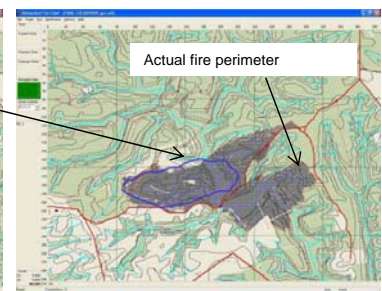
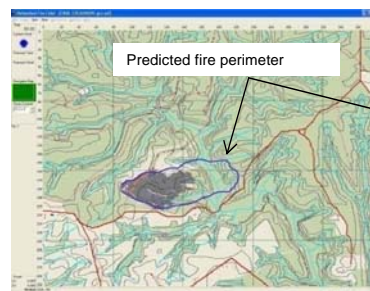
#### RESULTS:

- **38%** of trained fire fighters were significantly slower to respond to the new fire outbreak (this effect was even stronger when the initial fire outbreak was more advanced)
- Participant self reports and debriefs suggest a "Sunk-Costs Reasoning" bias as a contributing factor

#### Future NFC Investigation - Problem: Underestimating Fire Activity

- Why does it happen? (possible human factors)
- a) "Linear Bias"
  - b) Hidden information

Using NFC to test accuracy of prediction by fire fighters of uphill fire spread rates :



INDIVIDUAL FACTORS		
	DESCRIPTION	What firefighters can do to offset the traps
Limited cognitive capacity	The human brain is limited in the amount of information it can store and work with at any given time. Generally speaking we are not good at realising when we are mentally overloaded.	Offload tasks to subordinates. Offload information to memos or log books. Use mud maps and other basic decision aids.
Reluctance to change plans	There is evidence to suggest a tendency to stick with established plans even if it becomes obvious that the situation demands an alteration to original plans.	Be aware of changes in the fire situation and keep checking with yourself if there is something you should be doing differently.
Captured by the dramatic: vulnerability to cognitive illusions	A natural human tendency to pay attention to the most salient or interesting aspect of a complex environment, at the risk of missing other vital information.	Ask yourself if there is something else in the environment you could be missing. Be aware of becoming too narrowly focused on one problem at the risk of ignoring all other information.
Underestimating fire activity	There is evidence to suggest that firefighters are often surprised by the fire spread rate and/or the variability of fire behavior being higher than predicted.	Practice LACES* and maintain extra vigilance to subtle changes in weather and/or fire behavior particularly when working in the 'dead man zone'.
SMALL GROUP FACTORS		
	DESCRIPTION	What firefighters can do to offset the traps
ICS role confusion	A large number of interviewees report confusion about both their own role as well as confusion over who to report to on the fireground. There is evidence to suggest that commanders are difficult to identify on the fireground. This confusion is more typical during early stages of a fire and usually a day or two into a large fire command structures become more obvious.	Officers wear appropriate tabards in the field Sector commanders identify a dedicated Sector Command Point as often as practicable (oncoming crews know where as well as who to report to) Where possible personnel state their fireground role in communications with others.
Trust in Others	There is evidence to suggest that firefighters are circumventing the chain of command in order to retrieve information from known and trusted sources. There is also evidence to suggest that information provided by firefighters is being double checked by officers over open communication channels, leading to an erosion of morale in the junior officers.	Try to establish personal relationships at as many fires attended as possible. Encourage working in pre-formed teams/crews. With people you haven't worked with before, make casual enquiries into their background/experiences.