



Breakdowns in coordinated decision making at and above the incident management team level: An analysis of three large scale Australian wildfires



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ARTICLE INFO

Article history:

Received 10 December 2012

Accepted 4 August 2014

Available online

Keywords:

Incident management

Teamwork

Shared mental models

ABSTRACT

Emergency situations are by their nature difficult to manage and success in such situations is often highly dependent on effective team coordination. Breakdowns in team coordination can lead to significant disruption to an operational response. Breakdowns in coordination were explored in three large-scale bushfires in Australia: the Kilmore East fire, the Wangary fire, and the Canberra Firestorm. Data from these fires were analysed using a top-down and bottom-up qualitative analysis technique. Forty-four breakdowns in coordinated decision making were identified, which yielded 83 disconnects grouped into three main categories: operational, informational and evaluative. Disconnects were specific instances where differences in understanding existed between team members. The reasons why disconnects occurred were largely consistent across the three sets of data. In some cases multiple disconnects occurred in a temporal manner, which suggested some evidence of disconnects creating states that were conducive to the occurrence of further disconnects. In terms of resolution, evaluative disconnects were nearly always resolved however operational and informational disconnects were rarely resolved effectively. The exploratory data analysis and discussion presented here represents the first systematic research to provide information about the reasons why breakdowns occur in emergency management and presents an account of how team processes can act to disrupt coordination and the operational response.

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1. Introduction

Wildfires¹ are both becoming more common and are increasing in complexity and duration due to factors such as climate change, increased carbon emissions and deforestation (Liu et al., 2010). Wildfires are also doing more damage in terms of mass casualties and infrastructure/economic damage (Chen et al., 2008). Increasingly wildfires require coordination between multiple agencies to provide effective response and recovery (cf. Owen et al., 2013). At

the same time financial constraints from government, declining volunteer numbers, an aging workforce and workforce restructuring are presenting agencies with significant challenges (cf. Canton-Thompson et al., 2008). One consequence of this growing number of challenges in complex emergency situations is the likely increase in the frequency of degraded operational situations, breakdowns within and between teams and the occurrence of errors. This research considers three large-scale Australian wildfires and how differences in shared understanding between teams can effect coordination by interfering with situational assessment, planning, and plan execution.

1.1. Incident management

In Australia, large-scale wildfires are typically managed at three organisational levels: Local, Regional and State. The local level consists of personnel (many of whom are volunteers) who are at

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¹ In this paper we use the term 'wildfire' which is considered to be synonymous with the Australian term 'bushfire'.

the frontline of emergency response and are responsible for direct management of the fire. Regional and State level personnel (who are typically paid staff) provide strategic support and oversight, as well as managing inter-agency coordination. Regional and state levels of coordination have been referred to as the ‘many second coordination cycle’ during incident management to reflect the larger time window for operations (Chen et al., 2008). This is distinct from the ‘mini second coordination cycle’, which refers to the local onsite response coordination and has a smaller time window for operations (Chen et al., 2008).

Wildfires are typically managed using an Incident Command System (ICS), or one of its variants (Bigley and Roberts, 2001). In Australia, the Australasian Inter Service Incident Management System (AIIMS) provides an ICS framework to be used by emergency services for incidents of all sizes and it ‘provides the basis for an expanded response as an incident grows in size and complexity’ (AFAC, 2011, p. ii) (As shown in Fig. 1). AIIMS is structured around four functions of: Planning, public information, operations, and logistics. Each of these functions can be further sub-divided (see Fig. 1). In a small wildfire an incident controller will carry out all these functions. In a larger wildfire some or all of these functions will be delegated to others, with the incident controller in overall charge of coordinating the response.

Managing natural events (such as a wildfire) is arguably more challenging than managing a technical system (such as a power plant) because of the uncertainty, unpredictability, time criticality and involvement of multiple stakeholders in managing natural events (Owen and Hayes, 2014). According to Owen and Hayes (2014) when managing a natural event, emergency services personnel are required to operate in uncertain and sometimes degraded conditions, making time-critical decisions using information that may be incomplete, inconsistent, or ambiguous.

Managing a natural event is also different from managing a technical system in that emergency events are often unpredictable and don’t ‘play by the rules’ (Weick and Sutcliffe, 2007). Many other safety-critical domains are largely proceduralized, where safety is

attained through adherence to well-established doctrine and protocols together with reflection on the way those procedures are functioning (Owen and Hayes, 2014). While these processes are important in the emergency services sector there is also a reasonable degree of flexibility in decision making required to deal with the unpredictable nature of the events (Elliott and MacPherson, 2010; Owen et al., 2013).

Emergency incidents are also characterised by condensed timelines, which means that people need to pay particular attention to the management of stress, fatigue and information-overload (Owen and Hayes, 2014). Finally, there are frequently multiple stakeholders involved in the operational response who may have differing objectives that need to be reconciled. Stakeholders in the management process may be from different emergency management agencies, but may also include people who are injured, traumatised or distressed by events (e.g., community members, Owen and Hayes, 2014).

In Australia, emergency incidents (such as wildfires) are separated into three distinct levels depending on their severity (AFAC, 2011). A Level 1 incident can be resolved at the local level using the available resources on-hand. Level 2 incidents are more complex in nature due to increasing size, need for resources or community risk and can last from a few hours to several days. Level 3 incidents require divisions to be established to effectively manage sections of the incident and support from numerous external agencies. In Level 3 and some Level 2 incidents, Incident Controllers are supported by Regional and State Coordination Centers that provide strategic coordination and additional resources. We are particularly interested in Level 3 incidents in this paper where Regional and State levels of coordination are required and there is a large amount of complexity.

1.2. Team coordination

A large scale emergency response requires a variety of implicit and explicit relationships between actors and technical systems

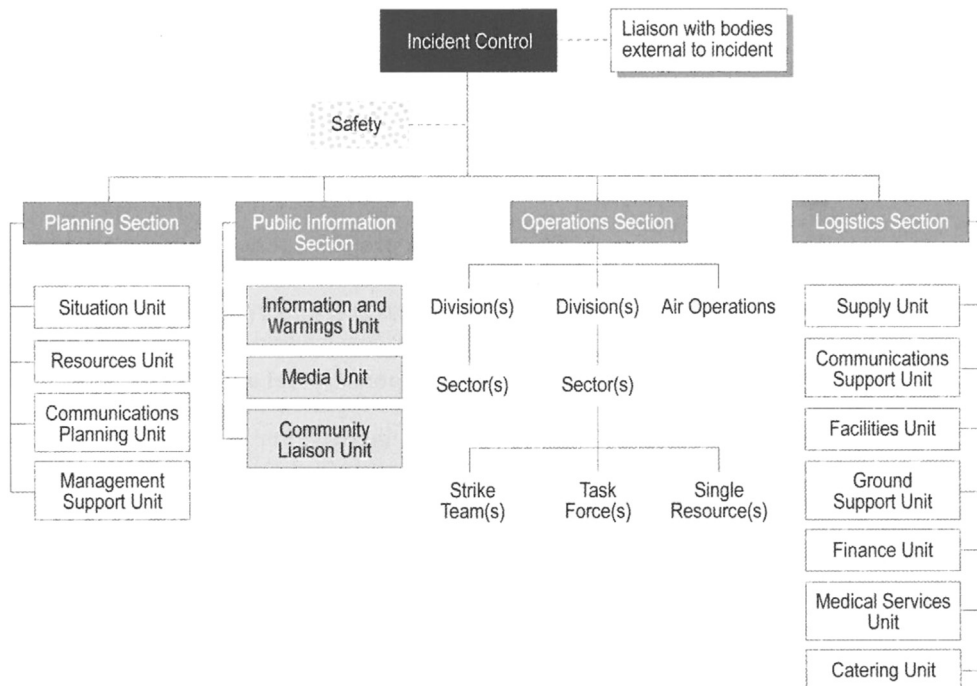


Fig. 1. AIIMS structure (AFAC, 2005).

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