CHALLENGES OF MEASURING EMERGENCY MANAGEMENT PERFORMANCE UNDER ADVERSITY: THE GOOD THE BAD THE UGLY
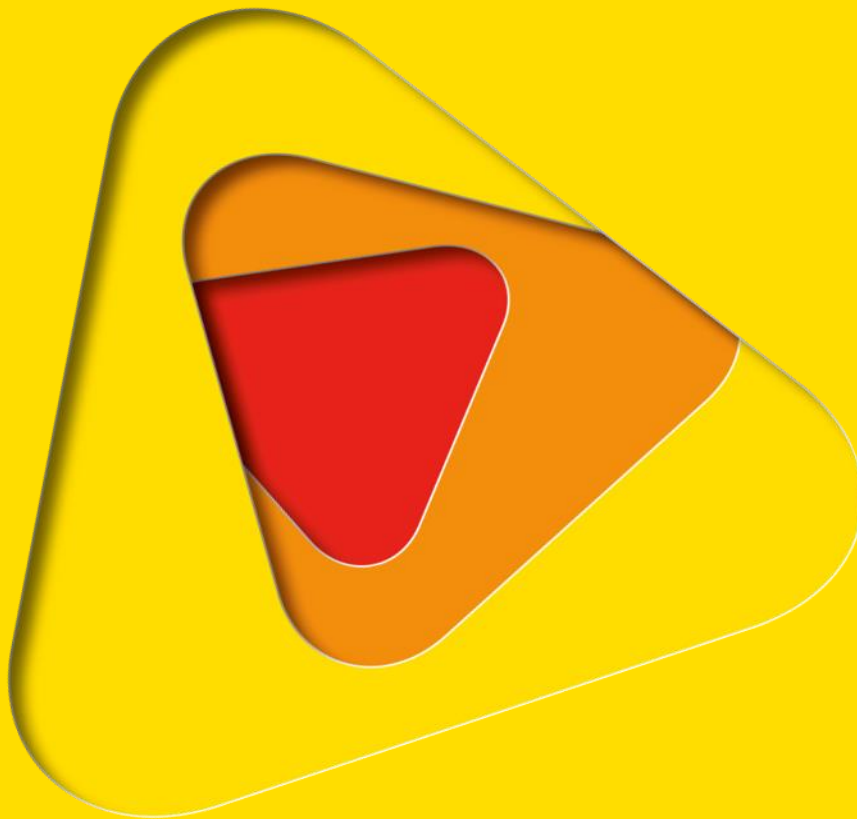
Proceedings of the Research Forum at the Bushfire and Natural Hazards CRC & AFAC conference
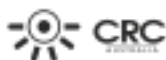**Wellington, 2 September 2014**

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ABSTRACT

Senior emergency management personnel face more extreme events and more complex challenges than their predecessors and these challenges will increase in the future. One of the key challenges that senior emergency managers face is the evaluation of operational performance in the context of increasing scrutiny from media, legal and political spheres. To investigate this issue we collected survey data from 38 senior emergency management leaders who operate at the strategic level (above the local IMT) as part of a broader survey examining the challenges of strategic emergency management (funded by the Bushfire CRC, Owen et al., 2013). Participants reported concerns that operational performance is currently judged by external sources (such as the media) in an often post- hoc and arbitrary manner and is dependent on whether or not what happened in the end was perceived as a good outcome. Reliance on the outcome of a complex event is problematic because there is not an absolute correlation between the process of managing an emergency and the outcome. Bad outcomes can occur despite good operational processes and good outcomes can occur despite bad operational processes. For example, all the best processes might have been in place and performed well but the outcome was bad because of unexpected climatic conditions, such as a wind change. This paper will outline the views of senior leaders in emergency management about what needs to be taken into account when measuring operational performance

INTRODUCTION

Emergency events are becoming more common and are increasing in complexity and duration, due to factors such as climate change, increased carbon emissions and deforestation (Few 2007). Large scale emergency events can be difficult to manage and success in such situations is often highly dependent on a range of factors. While many of these may be within the control of emergency response personnel many others are externally driven (e.g., weather).

In this respect managing emergency events is more complicated than managing in other complex socio-technical systems. This contrasts with many other safety-critical domains where much of the work is procedural, and where safety is attained through collective mindfulness and adherence to well-established doctrine and protocols. These processes are important in the emergency services sector – however, the people responding to and managing emergency events have to also manage other layers of complexity. These include high levels of uncertainty to make time-critical decisions using information that may be incomplete, inconsistent, or ambiguous, in part because the information available varies in quantity and quality; experiencing stress and fatigue as well as information overload and managing multiple and sometimes conflicting stakeholder objectives (Owen & Hayes, 2014).

Recent research into emergency management incident control systems (see Abrahamsson, Hassel & Tehler, 2010; Hunt, Smith, Hamerton, & Sargisson, 2009; Jensen & Waugh 2014; Scholtens, Jorritsma & Helsloot 2014, Rake& Nja 2009) suggests that there is a tension between the need for control and quality assurance and flexibility, and that this in fact can inhibit effectiveness. Indeed according to the literature (e.g., Bowersma, Comfort, Groenendaal & Wolbers 2014; Scholtens, et. al, 2014), there is evidence that control in the first phases of a large scale incident is hard and perhaps impossible to achieve, making evaluation of performance in this phase also

problematic. Moreover, Scholtens, et al., (2014) for example illustrate how the application of standard procedures within ICS may hinder action to protect communities through delays created by the need for bureaucratic authorisations. In this respect incident control systems, through their organisational efforts to define a set of systematic terms, responsibilities, rules and procedures can have the opposite effect – inhibiting the very flexibility that was sought by developing such systems in the first place.

At issue is the need to develop process measures which provide a process measure of performance, rather than the more common outcome measures. Outcome measures in the context of emergency management (e.g. number of houses lost, area of land burnt) are problematic in evaluating performance because they can be subject to uncontrollable events and are thus not necessarily indicative of operational performance. The development of process measures is an important way for agencies to evaluate their performance during and after an event so that they are better able to control their evaluation by external bodies (such as the media and Royal Commissions) and to manage community expectations.

In earlier research conducted through the Bushfire CRC (see Owen, Bosomworth, Fogarty & Conway, 2013), it was also reported that assessing the effectiveness of emergency management objectives was problematic. In this research a survey was distributed to 25 emergency services agencies in Australia and New Zealand, one of the questions asked *"what mechanisms are in place to assess the effectiveness of the objectives for managing the event".* Of the 206 survey participants, 35 or only 17% offered a comment that indicated that there were internal evaluation criteria in place within the agency. Other responses indicated that in such evaluation occurred if the ends justified the means (e.g., *"it worked out okay "*). Intrigued, these findings were then discussed with industry personnel in workshops to discuss the research and its implications. Following confirmation that evaluating the effectiveness of emergency management performance was indeed a challenge, 38 senior emergency management leaders were approached to ascertain their views on this and other challenges reported in the research (see Owen, Bosomworth, Bearman & Brooks, 2013 and Owen, Bosomworth & Curnin, 2014 for further discussion of these challenges).

METHOD

A consultation survey was distributed to the leaders of all 36 fire and emergency services organisations in Australia, under the sponsorship of the Australasian Fire and Emergency Services Authorities Council (AFAC) CEO who invited these leaders to nominate at least two personnel well placed within their agency to consider the challenges and what needs to be done. The potential pool of responses therefore was 76 persons, and 38 responses represent a response return of 50%, which is in keeping with response rates for organisational surveys of this type (see Baruch & Holtom, 2008).

Given the importance of the challenge associated with measuring emergency management response effectiveness, the survey included the following questions:

1. At a strategic level, what constitutes an appropriate set of objectives for out-of-scale events?
2. At local, regional or state levels, what are the indicators of "trouble" that may signal movement toward vulnerability in emergency response and its management?
3. How would we know that major/out-of-scale events had been well-managed?

THE SAMPLE

The contributors were all senior emergency services leaders within their own agencies with considerable experience within the emergency services sector. The median number of years that contributors have been in the industry was 24, and the median number of years within their agency was 13, thus demonstrating the level of experience of those responding. All were currently working at the state or strategic level of emergency management coordination. In addition, there was a good representation of emergency service organisation types with rural services (n= 10); urban services (n= 7), land management agencies (n= 8) and agencies responsible for different kinds of hazards (n=12) including natural hazards (fire, flood, storms, cyclones, earthquake, tsunami) and human hazards (oil and gas explosions; maritime collisions/oil spills).

In terms of the statements provided to the survey questions, where a sentence statement made by a participant covered multiple topics these were separated so that each individual sentence or topic could be separately coded. The coding and analysis was guided by an interpretational qualitative approach that begins by first gaining an understanding of the entire collected material and then looks for key topics or themes. The comments across all three questions were found to be addressing the five themes which are summarised in Table 1, including the number of comments coded to each theme within each of the questions asked.

Table 1. Themes found in data and number of times each was mentioned in each question

Themes found in data	Data extracts coded to theme		
	Q1: Approp objectives?	Q2: Indicators of trouble?	Q3: Well managed?
To be prepared and ready	9 (4%)	13 (5%)	2 (1%)
To ensure that the incident control system is maintained appropriately (achieving objectives, managing risks)	111 (48%)	117 (48%)	78 (44%)
To coordinate with other stakeholders	24 (10%)	16 (6%)	3 (2%)
To maintain the confidence of the affected and general public and its elected leaders	85 (37%)	85 (35%)	90 (52%)
To support whole of government strategic decision making for consequence management	1 (0.5%)	14 (6%)	3 (2%)
TOTAL	230	245	176

Once codes were identified these were then discussed by all authors to identify the issues outlined below.

FINDINGS

EFFECTIVE EMERGENCY MANAGEMENT OBJECTIVES

According to most participants, effective emergency management objectives emphasise what happens in response, however the levels of preparedness before the event and the efficiency of a transition toward recovery were also mentioned as needed in any articulation of emergency management objectives. In terms of the operational response, an emphasis on the sanctity of life of responders and community members is paramount and should guide all other deliberations. As one participant noted:

> "The critical issues must evolve around community safety" [#27].

In addition appropriate objectives include strategies to minimise losses (life, property, and environment) and that these are documented within systems (e.g., IAP). As one participant noted:

"there are clear strategic plans in place to manage both the event and consequences" [35]

Others highlighted the need for an explicit goal to promote shared situation awareness of the full impact of the current and emerging situation (including worst case scenario modelling) so the best decisions can be made both within the command and control structure and in coordination with key stakeholders.

"there is a shared understanding and common operating picture as to the current and emerging situation" [#30].

However another participant noted the tensions that sometimes arise in relation to what responders can do:

"I think we need to be settling on a realistic outcome and that may at times not necessarily be a palatable outcome...it may for instance include some loss of property and in fact loss of life but given the circumstances on the day that in fact may have been a great result... I don't think we are of a mindset to ensure that the public knows just how difficult a task is undertaken at times and perhaps we need to use the media more to our advantage" [#28]

And in relation to the need for a longer term strategic view another observed:

This pre-supposes that response is where we should focus. I would argue that an out of scale response should be perceived as a failure to manage risk." [#31].

From this perspective objectives need to be contextualised within the environment that has either contributed to (or mitigated) the level of impact as well as taking into account the "timeliness and smoothness of the recovery phase" [#10].

INDICATORS OF TROUBLE

At local, regional or state levels, the indicators of "trouble" that may signal movement toward vulnerability in emergency response and its management included unanticipated surprises that indicate that planned objectives are not matching the event or are inadequate as the following participant noted:

"The incident continues to escalate faster than the escalation of effort (or control), resulting in an increasing capability shortfall. The risk in these situations in that incident managers may narrow their focus to a heightened operational awareness, at the expense of considering potential impacts beyond the immediate theatre of operations (i.e. a community that might be impacted in the next 3-4 hours, critical infrastructure etc.)." [#13]

The consequences of this perturbation then threaten the objectives discussed earlier.

"Inaccurate or non-timely information provided to the community resulting in loss of life. Not recognising the requirements of maintaining primacy of life" [#21].

In addition disconnects within the incident control structure or conflict are other signs of trouble.

"Disconnect between the commanders intent, the events mission and the actions of practitioners through their tactics at the event" [#6]

"There is conflicting information / intelligence" [#4] "plans or priorities between stakeholders are in conflict" [#6]. This is likely to lead to as one participant commented: "an inability to articulate the situation and to predict immediate and future outcomes and resource needs" [#30].

Some felt that indicators of trouble could be quantified in for example "between 50-66% of state capability have already been assigned" [#31]. Another indicator of trouble would also be if "there was no plan for commencement of recovery activities" [#32] and that "We lose, or fail to establish, contact/engagement with the community at risk" [#2].

There were also comments of indicators of trouble beyond the operational response phase and instead in the preparedness phase. These included:

- "Increasing loss of experienced staff within agencies." [#10]
- "Lack of implementation of lessons learnt into doctrine and practice." [#10]
- "Rationalising resources - i.e. removing a surge capacity from an organization." [#16]

INDICATORS OF SUCCESSFUL EMERGENCY MANAGEMENT

The commentary discussed above as well as that provided to address indicators of successful emergency management can be grouped around four themes.

- **Maintenance of ICS and stakeholder engagement**. Assurance that the incident control system is operating effectively.

Managing an emergency response is successful when there is an understanding of the personnel involved and their actions, as the following participant noted.

"At all times each ESO should have no problems articulating the following: Exactly who from the agency is involved in every level of the response? (this means full details including names, addresses, NOK, positions etc.). Exactly where are they at any moment in time during the response? Exactly what are they doing in relation to the IAP?, and Exactly who is supervising them? If these questions can't be answered in exact detail, the strategic level is not even connected to the rest of the organisation and operating with these unknowns = vulnerability" [#13].

Monitoring and safety assurance also means looking ahead for planning in anticipation of what might be unfolding, as the following participant noted:

"the incident status needs to be constantly monitored and current priorities for resourcing etc. is set for each 24 hr. period. This means that capability and capacity can be mapped against demand daily and reasonable worst case scenarios modelled daily. It is also important that current information on existing and forecast conditions are available to the community in a range of media and also that State risk /asset owners are involved in decision making on a daily basis [#31].

These safety assurance elements feed into stakeholder engagement to support whole-of-government strategic decision making for consequence management as well as supporting critical stakeholders in assessing their own risk and vulnerability. Indicators of successful stakeholder engagement include "having already established MOU's between relevant stakeholders defining needed relationships and having response plans that are understood and have been practiced" [#12].

- **Confidence**: that the confidence of the public and its elected leaders is maintained.

This is indicated in timely information to communities which includes informing communities of developing risks, as the following participant commented "communities, media and politicians say 'well done', particularly with regard to information flows". This indicates that elected leaders and other areas of government need to be kept well informed so that they too can make good decisions about direct and indirect consequences.

This is also indicated in how quickly community conditions are normalised, as one participant noted:

> "The level of community recovery - a comparative analysis of the capacity of a community before and after the event; can it do/provide what it did before the event or has there been a change in that capacity and if so what is the size of that change. Ongoing and adverse psychological, social and physical effects on the community and individuals impacted - long term studies required [#10].

- **Reflexivity and learning** for continuous improvement.

A number of comments related to the capacity of the industry to learn from these events. This required having support and confidence to be able to name up what really happened, which may include mistakes. As one participant noted "we need to be able to create a learning environment where triumphs and mistakes can be shared in blame free environment for future benefit" [#3].

This paper has highlighted some of the comments emerging from research into what needs to be taken into account when measuring emergency response performance.

CONCLUSIONS: THE GOOD, THE BAD, THE UGLY

There appears to be a readiness in the industry to move towards articulating a set of indicators that can assist in measuring emergency management performance. As the comments highlight while the emphasis is mostly on how well the response phase is managed, it is also important to see this within a broader context of preparedness and recovery.

There are still concerns about whether the public and our elected leaders are prepared to accept risk and vulnerability as well as to acknowledge that managers of emergency events sometimes make mistakes. A framework is needed that acknowledges that sometimes personnel operate in degraded conditions. Degraded conditions include: failures in critical equipment or technology; the required human resources are either unavailable or are over- stretched or fatigued; and personnel are operating in hazardous (sometimes life threatening) conditions (Owen & Hayes, 2014).

Brooks (2014) developed a heuristic to help personnel operating in situations that might be degrading and thus migrating work practices towards unsafe conditions, which he called "Zone of Coping Ugly" (ZOCU). More work needs to be done to advance an understanding of what coping ugly might look like to help articulate the risks and emerging vulnerabilities within emergency management work. This concept is supported by others such as Phillips, Klein & Sieck, (2004, p. 305)

> *An important attribute of expert decision-makers is that they seek a course of action that is workable, but not necessarily the best or optimal decision…. time pressures often dictate that the situation is resolved as quickly as possible. Therefore it is not important for the course of action to be the best one; it only needs to be effective.*

There is still much work to do in this area. An appropriate framework to establish the basis for identifying both values and constraints inherent in emergency management work. This is necessary to avoid the hindsight bias that frequently occurs in media and in inquiries. As Abrahamsson, et al (2010) contend there are four challenges encountered when evaluating performance of emergency management response systems. These include:

Values. Making explicit the value judgements upon which the evaluation of performance is based.

Complexity. Acknowledging and addressing the complexity involved in the work.

Validity. Issues related to the validity on which the evaluation of performance will be based.

Limiting conditions. A need to explicitly name up the limiting conditions present in any performance assessment.

As they note: "There is a need to explicitly try to make the limiting conditions under which the emergency response performance occurred visible when analysing and evaluating its performance. Were there other ways of affecting the objectives of the system in a positive way that were not exploited, or were the actions taken the only ones or the best possible?" Abrahamsson et al 2010, p. 17). These ideas align closely with strategic initiatives within the Australasian fire and Emergency Services council to support professionalization in the industry and acknowledge the initiatives of individual agencies that are operating as early adopters. Future work will involve closely working with stakeholders to develop indicators with so that emergency management performance can be assessed in real time and to identify any problems individuals and teams are experiencing.

ACKNOWLEDGEMENTS

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