

ABSTRACT

In 2010, Ryan and Matheson (2010) compiled evidence to quantify the importance of communication activities to emergency management. The study involved a comprehensive content analysis of emergency incident and emergency exercise debriefing sessions and reports spanning 2003 to 2008. Six years on, this 2015 study replicates that work to determine the current significance of communication in emergency management. It also identifies trends in issues that occur during emergency events. This study considers recommendations and findings from 22 reviews of recent disaster events and training exercises from around Australia. Using content analysis, 20.4 per cent of the findings relate to issues with communicating with communities. This represents an increase of 1.3 per cent on the 2010 study. Resourcing, skills in social media, and community consultation and engagement feature in the study results.

The significance of communication in emergency management: what's changed since 2010?

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Introduction

In a natural disaster, communication and interaction with affected communities is a critical component of emergency management (Gilbert 1998, Haddow & Bullock 2006, Quarantelli 1986, 1988, 1989, Renckstorff & McQuail 1996, Young Landesman 2005). Veil (2007) found residents of one community 'considered communication a key aspect of the emergency response'. Community decision-making in disaster and possession of information have been consistently connected:

Citizens who do not have adequate information to assess the situation, the risks and possible actions, might make choices that – observing from a greater distance, with more overview – may be perceived as sub-optimal. (Helsloot & Ruitenbergh 2004 p. 110)

In the 2010 study it was discovered that 19 per cent of the 415 recommendations in 12 reviews of disaster events or exercises related to communicating with the community. This study also considers trends in community communication.

Method

Content analysis remains a reliable method to examine documents for data and trends (Krippendorff 2004). The following process was used (Wimmer & Dominick 2000):

- Formulate the research question.
- Define the population and sample.
- Select the appropriate sample from the population.
- Define a unit of analysis.
- Construct categories of content for analysis.
- Establish a quantification system.

Formulating the research question

- How often does communication with the community feature in emergency management post-incident or post-exercise reviews?

- How have community communication recommendations and findings changed since 2009?
- What trends in communication issues can be identified from recommendations and findings from 2009 to 2016?

Defining the population and sample

This study examined 26 reviews of incidents and exercises undertaken by Australian government agencies, state inquiries, royal commissions and parliamentary committees published from 2009 to 2015. These were sourced from agency and commission of inquiry websites. Four of the reviews were discarded because:

- findings were not clear
- findings were guided by survey questions that may not uncover issues that arose from that emergency
- the review was a discussion paper rather than a review
- the review did not examine response and recovery and the associated communication.

All remaining documents in the sample incorporated communication with community in their terms of reference. The features of the 22 remaining documents are outlined in Table 1.

This profile differed from the previous study that examined 12 documents from 2005 to 2009. These included two pandemic exercises, a tsunami, four bushfires, and five training exercises.

Defining the unit of analysis

The unit of analysis for this study was the individual findings or recommendations listed in the document. These were defined in the documents as ‘learnings’, ‘evaluation findings’, ‘propositions’, ‘strategic actions’, ‘suggested treatments’ and ‘improvements required’. The total findings varied from four in the Westmeadow review (Dalton 2012) to 117 in the north-eastern Victoria floods (Comrie 2011). As in the 2010 study, a number of findings contained sub-findings. Where these sub-findings were clear recommendations of separate activities, they were counted as separate findings. An example of a recommendation being broken down into sub-findings came from the *Hazelwood Mine Fire Inquiry 2014 Report Recommendations* (Teague, Catford & Roper 2014, p. 3):

The State empower and require the Auditor-General or another appropriate agency to:

oversee the implementation of these recommendations and the commitments made by the State and GDF-Suez during this Inquiry; and

report publicly every year for the next three years on the progress made in implementing recommendations and commitments.

In some cases, sub-findings were a prescription for how a recommendation should be implemented; these were not treated individually. An example came from the *2009 Black Saturday Bushfires Royal Commission Summary* (Teague, McLeod & Pascoe 2010, p. 24):

The State introduce a comprehensive approach to shelter options that includes the following:

developing standards for community refuges as a matter of priority and replacing the 2005 Fire Refuges in Victoria: Policy and Practice

designating community refuges - particularly in areas of very high risk - where other bushfire safety options are limited

working with municipal councils to ensure that appropriate criteria are used for bushfire shelters, so that people are not discouraged from using a bushfire shelter if there is no better option available.

Constructing the content categories

A list of keywords from the 2010 study and an initial reading of the findings guided classification of findings as ‘communication’ or ‘non-communication’. These are shown in Table 2.

The findings were sorted into themes. Themes from the 2010 study were used for a first coding attempt, but three adjustments were subsequently made. The original study included exercises that involved other nations, leading to an international inter-agency cooperation theme. No international reviews were considered for this study. Also, the first study found that ‘warnings’ and ‘pre-disaster community education’ could coexist in one theme. The first coding attempt showed that these two themes should be separated. In addition, the original

Table 1: Disaster type and document type featured in the documents sample.

	NSW	Queensland	Tasmania	Victoria	Western Australia	Total
Bushfire	1		1	14	1	17
Flood or storm	1	1		1		3
Hazchem				2		2
Total	2	1	1	17	1	22
Incident	2	1	1	15	1	20
Exercise				2		2

Table 2: Keywords used to analyse the findings.

Channels and messages	Approaches	Target publics
Media	Community engagement	Householders
Press	Community information	Community or communities
Radio (including the ABC)	Promote or promotion	Disabled
State Emergency Warning Signal (SEWS)	Community education	Vulnerable
Call centre	Education programs	Culturally and linguistically diverse communities (CALD)
Information line	Evacuation	Landholders
Website	Public education	
Information packages	Community partnerships	
Warning systems	Public information	
Communication networks	Publishing	
Social media	Measurement and evaluation	
Electronic signs	Messages and messaging	
	Risk information	

theme of 'community engagement' during and post-emergency was found to be inadequate for the current study. Resilience and recovery emerged in many of the documents, so the 'community engagement' theme was split into two to cover response and recovery. A communication measurement and evaluation concept emerged, but this was included in the 'communication planning' theme. The emergent themes are listed in Table 3 and compared with 2010 themes.

The 2016 version of the themes was used to code findings. Coding was undertaken three times over three weeks to ensure reliability. Of the 137 findings considered, differences across coding attempts were found in 14 of them. In each case, the adjective used was considered in conjunction with the noun to determine the emphasis of the finding. For example, the Tostaree fire review in 2011 (Office of the Emergency Services Commissioner 2011a) recommended that 'The Fire Services ensure that information and warning projects are able to be integrated within a common operating platform'. The first and second coding attempts classified this as 'communication planning' and 'technology'. The third attempt showed the combination of the adjective 'integrated' and the two projects would make this a planning issue.

Results

Table 4 details the documents reviewed, the number of findings and sub-findings, and communication with the community findings. The final coding results in Table 5 show the incident types and their prevalent themes.

Table 3: Themes used in the 2010 and 2016 studies.

2010	2016
Warnings and pre-disaster community education	Warnings Education and pre-disaster engagement
Domestic inter-agency cooperation	Inter-agency cooperation
International inter-agency cooperation	
Community engagement during and post-emergency	Information delivery and engagement during incident Information and engagement during recovery
Communication planning and plans	Communication planning including strategic planning, implementation, measurement and evaluation
Technology	Technology
Resourcing	Resourcing
Communications training, testing and exercises	Communications training, testing and exercises
Media	Media and other channels

Table 4: List of documents included in the study.

Event	State	Year	Findings	Sub-findings	Communication-related findings	% findings
Lancefield-Cobaw fire (Carter 2015)	Vic	2015	16	16	8	50.0
TriTech Lubricants factory fire(Office of the Emergency Services Commissioner 2011b)	Vic	2011	5	8	4	50.0
Nuplex Resins Hazchem incident (Emergency Services Commissioner 2012)	Vic	2011	19	19	9	47.4
Tostaree fire (Office of the Emergency Services Commissioner 2011a)	Vic	2011	29	29	12	41.4
Callide Creek flood review (Inspector-General Emergency Management 2015)	Qld	2015	13	15	5	33.3
Noojee and Lavers Hill communities evacuation (McArdle 2012)	Vic	2011	33	33	10	30.3
Westmeadows grassfire (Dalton 2012)	Vic	2012	4	4	1	25.0
East Coast storm and flood	NSW	2015	16	16	4	25.0
Goongerah-Deddick Trail fire (Lapsley 2014a)	Vic	2014	26	26	6	23.1
Hazelwood Mine Fire 2014 Report (Teague, Catford & Roper 2014)	Vic	2014	18	28	6	21.4
Hazelwood Mine Fire Inquiry Report 2015-2016 Volume I - Anglesea Mine (Teague, Catford & Roper 2015)	Vic	2015	18	18	4	22.2
Mt Ray Boundary Track fire (Lapsley 2014b)	Vic	2014	20	20	4	20.0
Stewarton fire (Victoria Police & Emergency Management Victoria 2015)	Vic	2015	5	5	1	20.0
Perth Hills Bushfire (Keelty 2011)	WA	2011	55	55	10	18.2
Kentbruck fire (IRS Services 2013)	Vic	2013	12	12	2	16.7
Review of the 2010-2011 Flood Warnings and Response (Comrie 2011)	Vic	2011	93	117	19	16.2
Tasmanian Bushfires Inquiry (Hyde 2013)	Tas	2013	103	103	15	14.6
Wambelong fire - Warrumbungles (Brown 2015)	NSW	2015	29	29	4	13.8
Harrierville fire (Office of the Emergency Services Commissioner 2013)	Vic	2013	8	8	1	12.5
Black Saturday Royal Commission (Teague, Ronald & Pascoe 2010)	Vic	2009	65	93	11	11.8
State Fire Exercise (Fire Services Commissioner Victoria 2013)	Vic	2012	10	10	1	10.0
Wye River Jamieson Track fire (Inspector-General Emergency Management 2016)	Vic	2015	8	8	0	0.0
Total				672	137	20.4

Table 5: Communication findings according to theme and disaster type.

	Total 2016	Bushfire	Flood	Hazchem
Education and pre-disaster engagement	39	33	6	0
Communication planning (strategic planning including communications)	21	16	5	0
Warnings	20	9	6	5
Media and other channels	17	9	5	3
Inter-agency cooperation	8	5	1	2
Information and engagement during recovery	11	9	2	0
Information and engagement during incident	8	6	1	1
Technology	7	6	1	0
Resourcing	5	2	1	2
Communications training, testing and exercises	1	1	0	0
Total	137	96	28	13

Comparing these results with those of 2010 highlights some differences. The most notable being education and pre-disaster engagement issues, which, at 28.5 per cent, was almost as many as the 2010 warnings and education themes combined (34.7 per cent). When combining the 2016 warnings with education and pre-disaster engagement, 43 per cent of findings related to these activities; an increase of almost 9 per cent since 2010. Inter-agency cooperation recorded a drop from 2010 to 2016, from 16 per cent to just under 6 per cent. Other themes remained similar to the results of the 2010 study. Table 6 shows the differences and similarities.

Addressing research questions

How often does communication with the community feature in emergency management post-incident or post-exercise reviews?

The data showed that 20.4 per cent of 672 findings related to communication with the community. This is compared with 19.1 per cent in 2010 from 415 findings. The incidents that had the greatest number of communication-related findings were a factory fire in Victoria in 2011 and a bushfire in Victoria in 2015; both with 50 per cent ratio. This is compared with the Wye River fire in Victoria in 2015 where no issues of communication with communities featured.

How have community communication recommendations and findings changed since 2010?

What trends in communication issues can be identified from recommendations and findings from 2010 to 2016?

These questions can be answered by comparing the number of communication-related findings between studies and examining the themes these findings relate to.

The prevalence of education recommendations in 2016 supported separation from the warnings recommendations with which education programs were grouped in 2010. Education and pre-disaster engagement was an issue in 28.5 per cent of the communications findings, and its 2010 partner, warnings, was a problem in 14.6 per cent of cases.

Communication planning increased dramatically in the 2016 study, rising from 5 per cent in 2010 to 19 per cent. This was partly due to three recommendations for communication measurement and evaluation that had not appeared in the 2010 reviews. However, a large number of findings related to activities that needed to be in place or planned for, being:

- education and pre-disaster engagement – 28.5 per cent
- communication planning – 15.3 per cent
- technology – 5.1 per cent
- resourcing – 3.6 per cent
- communication training, testing and exercising – 0.7 per cent.

Together, preparation issues were considered in 53.2 per cent of the findings.

'Inter-agency cooperation' showed an improvement, dropping from 16 per cent to 5.8 per cent between the studies. A small improvement of 2.2 per cent was recorded in 'information delivery' and 'community engagement' during response and recovery phases. 'Media management' recorded a 2.3 per cent drop between the two studies.

Recovery and resilience themes were so prevalent in the 2016 data that a standalone theme was developed for this phase. Technology, resourcing and media issues remained static between the studies, although the composition of 'media' changed. Social media was mentioned in nine findings and contributed to the widening of the media theme.

Table 6: Theme differences and similarities in the 2010 and 2016 studies.

Theme	2016		2010	
	Total	% findings	Total	% findings
Education and pre-disaster engagement	39	28.5	26	34.7
Warnings	20	14.6	0	0
Communication planning (including strategic planning)	21	15.3	5	6.7
Media and other channels	17	12.4	11	14.7
Information and engagement during recovery	11	8.0	12	16.0
Information and engagement during incident	8	5.8	0	0
Inter-agency cooperation	8	5.8	12	16.0
Technology	7	5.1	4	5.3
Resourcing	5	3.6	3	4.0
Communications training, testing and exercises	1	0.7	2	2.7
Total	137	100	75	100

Figure 1 compares composition of communication-related findings between the 2010 and 2016 studies.

Discussion

This study aimed to identify what changes had occurred to the significance of communication with communities in emergency management since 2010. The results showed that problems related to communicating emergencies actually increased by 1.3 per cent.

Examination of findings revealed several aspects of communication in this area. These related to resourcing, social media use, the type of exercise, techniques used to gather information in each review, and the capability of systems to work within unusual events.

Resourcing

Some findings were prescriptive and related to communication practice. Communication and engagement plans, specific channels, certain messaging and methods of determining messaging, media liaison skills, and media planning were suggested. It was evident in some incidents that communication expertise was lacking. The Tasmania bushfires in 2013 (Hyde 2013) is a good example of communication teams being stretched beyond their limits. This indicated that the 'resourcing' theme was more important than the figure of 3.6 per cent represented. Examples of findings with underlying resourcing issues were:

- The Fire Services, in consultation with media outlets, develop a more effective strategy for informing the community of Total Fire Ban Days (Office of the Emergency Services Commissioner 2011a).

- Strong, professional media liaison staff are vital to ensuring a positive outcome from the media (McArdle 2012, Noojee and Lavers Hill bushfire evacuation exercise).
- A formal arrangement is established to ensure twenty-four hour availability of information officers for the issuing of information and warning messages (Office of the Emergency Services Commissioner 2011b, TriTech Lubricants fire).
- Compile and maintain a list of vulnerable residents who need tailored advice of a recommendation to evacuate, and provide this list to local police and anyone with a pre-arranged responsibility for helping vulnerable residents evacuate (McArdle 2012, Noojee and Lavers Hill bushfire evacuation exercise, Teague, McLeod & Pascoe 2010, Black Saturday bushfires).
- The Fire Services recognises the specialised role of Information Sections and enhance training and resources accordingly. (Office of the Emergency Services Commissioner 2011a).

Social media catch-up

Nine of the 137 findings referred to social media (7 per cent), causing an increase in the total. Seven of these related to incidents in 2011, the other two from the Tasmania bushfires review of 2013. None of the 13 other reviews published from 2013 to early 2016 referred to social media, indicating that agencies have improved social media strategies.

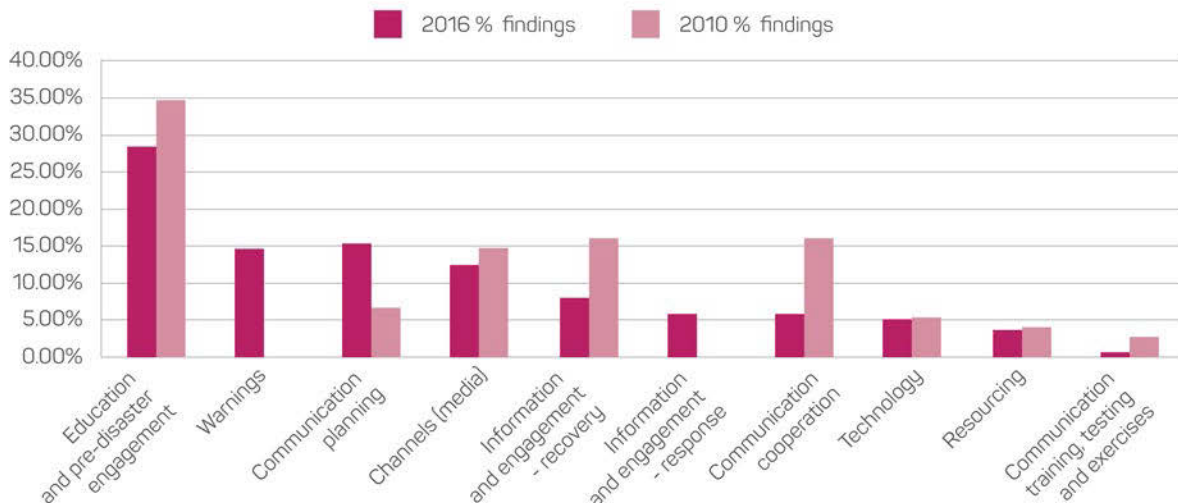


Figure 1: Comparison between 2016 and 2010 findings.

Reviews and community consultation

In 2010, half of the 12 reviews did not include community feedback in the debrief and review process. In 2016, 77.3 per cent of the 22 reviews held formal community consultation as part of the information-collection process. This supported the presentation of more issues in more depth than interviews with agency staff and reviews of operational records could produce. As a result, the number of findings across all reviews would be expected to be more than in 2010. Supporting this, the average number of total findings of the 2016 study reviews that did not do community consultation was ten. The average number of total findings of the reviews and inquiries that did do community consultation was 47.23. Even with the very large numbers of recommendations from the commissions of inquiry removed from this sample, the average was 26.2 findings per review. These calculations were made on the published findings rather than the revised number that was prepared for the content analysis for this study.

Community consultation seems to have increased the number of general findings. This would therefore influence the number of findings about communication with the community.

Systems shortcomings

Two incidents fell outside the business-as-usual approach for agencies. Findings from these showed that usual systems for other types of disaster events were not fit-for-purpose. The TriTech Lubricants factory fire and the Nuplex Resins hazchem incident, both in 2011, showed that 50 per cent and 47 per cent of findings respectively were related to community communication. In both incidents, communication processes normally deployed for a bushfire were not activated. The scale of the incidents and the media response seemed to catch responders and their communication teams by surprise.

This might be corrected as a result of this experience if an incident such as this was to happen in future.

Conclusions

The initial picture of emergency agency communication activities in this study looks grim, with 20.4 per cent of all emergency management problems linked to communicating with communities. This was an increase of 1.3 per cent since the 2010 study, despite agencies gaining incident and exercise experience in communication. A larger number of findings relating to the relatively new practice of community engagement has probably caused this increase. In addition, the recent practice of consulting the community during the review process may have increased the number of issues raised for scrutiny. Social media use has also caused a blip between 2010 and 2013 that has since been corrected. Many of the communication findings in this study occurred as a result of a lack of resources or were new activities required added resources. The review process is valuable as a measurement technique for agencies, with growth in social media use a sound example. Findings guided communicators to develop better strategies to avoid the mistakes experienced in the social media pioneering years.

This study shows the importance of communicating with communities by emergency management agencies. It has also uncovered the importance of community engagement during the review process.

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