



SUPPORTING EVIDENCE FOR THE EMERGENCY MANAGEMENT PROFESSIONALISATION SCHEME CORE INCIDENT MANAGEMENT TEAM CAPABILITIES



Research Utilisation Resource

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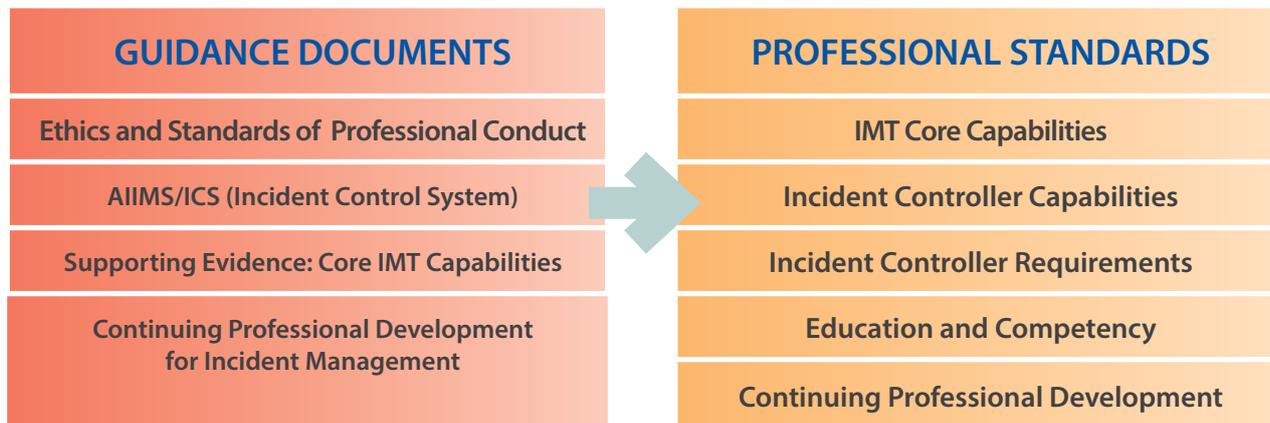
Purpose

The evidence presented in this document provides the basis for the adoption of a suite of core Incident Management Team (IMT) capabilities and associated behavioural indicators to underpin the operation of the Emergency Management Professionalisation Scheme (EMPS, or the Scheme). The Scheme will contribute to capability building and formally recognise those who practise the profession of emergency management.

The identified core capabilities will underpin the assessment process used by the EMPS Panel to evaluate candidates. In addition, it will provide to practitioners direction and guidance to self-assess capabilities and identify opportunities for further professional development.

Presented herein is the result of an extensive review of Bushfire CRC research, along with national and international evidence, centred on the human factors involved in emergency management.

This document should be read in conjunction with established EMPS guidance documents and professional standards as presented in the figure below.





Background

EMPS, a priority program of the AFAC National Council, credentials emergency management practitioners who have completed a process to recognise their skills, abilities and experience. The Scheme provides a mechanism for AFAC to:

- lead on developing emergency management practice and practitioners;
- establish the standards that define emergency management capabilities and the quality of services provided; and
- assure the community, government and sector colleagues that practitioners are certified to undertake their duties.

As part of the Scheme's development, AFAC contracted Dr Christine Owen, Dr Peter Hayes, Dr Ben Brooks, Mr Cameron Scott and Mr Geoff Conway to review the initial capabilities for the Incident Controller¹ prepared at the Scheme's inception. They were also tasked to undertake an assessment – based on research evidence – of the capabilities required to perform IMT functional roles.

For the purposes of this work, a 'capability' refers to the cluster of behaviours expected from personnel to succeed in achieving their objectives.

Scope

There are two main areas of capability for IMT team members. These are:

- capability to manage the incident and
- capability relevant to the specific hazard context.

The roles of IMT leaders are an important element of the Scheme as they provide guidance on the abilities required for effective team performance. The focus of this review has been on the capabilities required to manage the incident and the associated behavioural indicators.

Required capabilities also include those relevant to a specific hazard context – represented by technical skills and expertise in a specific hazard (fire, storm, shipboard fire, hazardous materials, etc.). These are, however, outside the scope of this review as those capabilities are necessarily defined by the industry.

The core capabilities developed have focused on managing the most complex types of incidents. However, the same capabilities and behaviours are relevant to less complex incidents².

The Scheme's initial focus is on the capabilities of the following IMT leaders:

- Incident Controllers (initial credential offering)
- Operations Officer
- Planning Officer
- Logistics Officer
- Public Information Officer

Remaining functional roles will be the subject of a separate project.

¹ EMPS Professional Standard – Incident Controller

² In lower levels of incident management there will not be the same amount of teamwork complexity involving personnel with different responsibilities

Establishing the evidence base

Previous research (e.g., Flin, O'Connor, & Crichton, 2008; Glickman *et al.*, 1987) has suggested that a broad distinction exists between the technical skills required to perform a job (such as AIIMS knowledge or knowledge of fire behaviour) and non-technical skills (such as decision-making). Because the emergency management environment includes challenges around uncertainty, time constraints, fatigue, stress and affective triggers (e.g., loss of property; injuries and loss of life), personal qualities play a significant role in the ability to effectively manage an incident.

The materials used by AFAC to develop the initial capabilities were researched from sources that had enacted this approach (e.g., team, technical and personal), and, therefore, reflected a similar structure. Although this is a useful way of considering capabilities, this approach can lead to the aggregation of more detailed behaviours under three high-level categories (e.g., team, technical and personal). A limitation of using this approach is that it may compartmentalise, and thus constrain, a view of the behaviours used. In other words, by breaking down the behaviours used in incident management to its constituent parts, we may lose sight of the complex sets of capabilities actually used as a whole. The review process identified that the capabilities included in the initial work prepared by AFAC were important, however gaps existed and the work could benefit from high-level descriptors to better define the scope of capabilities needed.

The Scheme's more holistic approach to establish required capabilities for incident managers aligns with the literature (e.g., Brown & McCartney, 2004; Hase & Davis, 1999; Hase & Tay, 2004; Nagarajan & Prabhu, 2015; Stephenson & Weil, 1992). This literature generally describes capable people as:

- able to work creatively and effectively in turbulent and complex environments;
- possessing an all-round capacity based on high self-efficacy;
- capable of learning;
- able to use competencies in familiar and novel situations; and
- working well with others in familiar as well as unfamiliar situations.

IMT capabilities require the coordinated and sophisticated use of team, technical and personal elements for activities such as sense-making, decision making and consequence management. Moreover, there is interdependency and a degree of overlap between these capabilities. For example, sense-making and planning may be considered the respective front end and back end of decision making (Mosier & Fischer, 2010). The review team's approach was to reconsider 'capability' by identifying key activities and processes central to all incident management. Central themes from a range of literature were considered (e.g., high reliability organisations (Weick, Sutcliffe, & Obstfeld, 2005), and naturalistic decision making (Orasanu & Connolly, 1993)). In addition, work undertaken through the Bushfire CRC and Bushfire and Natural Hazards CRC was studied (e.g., Hayes & Omodei, 2011; Owen, 2014) along with synthesis of that research work over a ten year period (e.g., Ferguson *et al.*, 2015). Finally, findings from industry initiatives (e.g., the Victorian Incident Management Team Training Project; IMTTP, 2014) were also reviewed. The review effectively kept the material included in Version 1.1 of the EMPS Professional Standard – Incident Controller capabilities, but restructured it as well as addressed some gaps.

Cited research papers should be read for a more detailed discussion. A starting point includes:

- *Decision making under pressure* (Hayes, 2014a) – a research utilisation resource explaining many fundamental concepts; and
- *Enhancing emergency incident management: A synthesis of disciplinary and stakeholder knowledge. A human factors perspective* (Ferguson *et al.*, 2015) – a Bushfire CRC and AFAC sponsored project and publication.

In addition, the Bushfire CRC and Bushfire and Natural Hazards CRC websites should be reviewed for a more detailed explanation of various research projects mentioned in our supporting evidence.

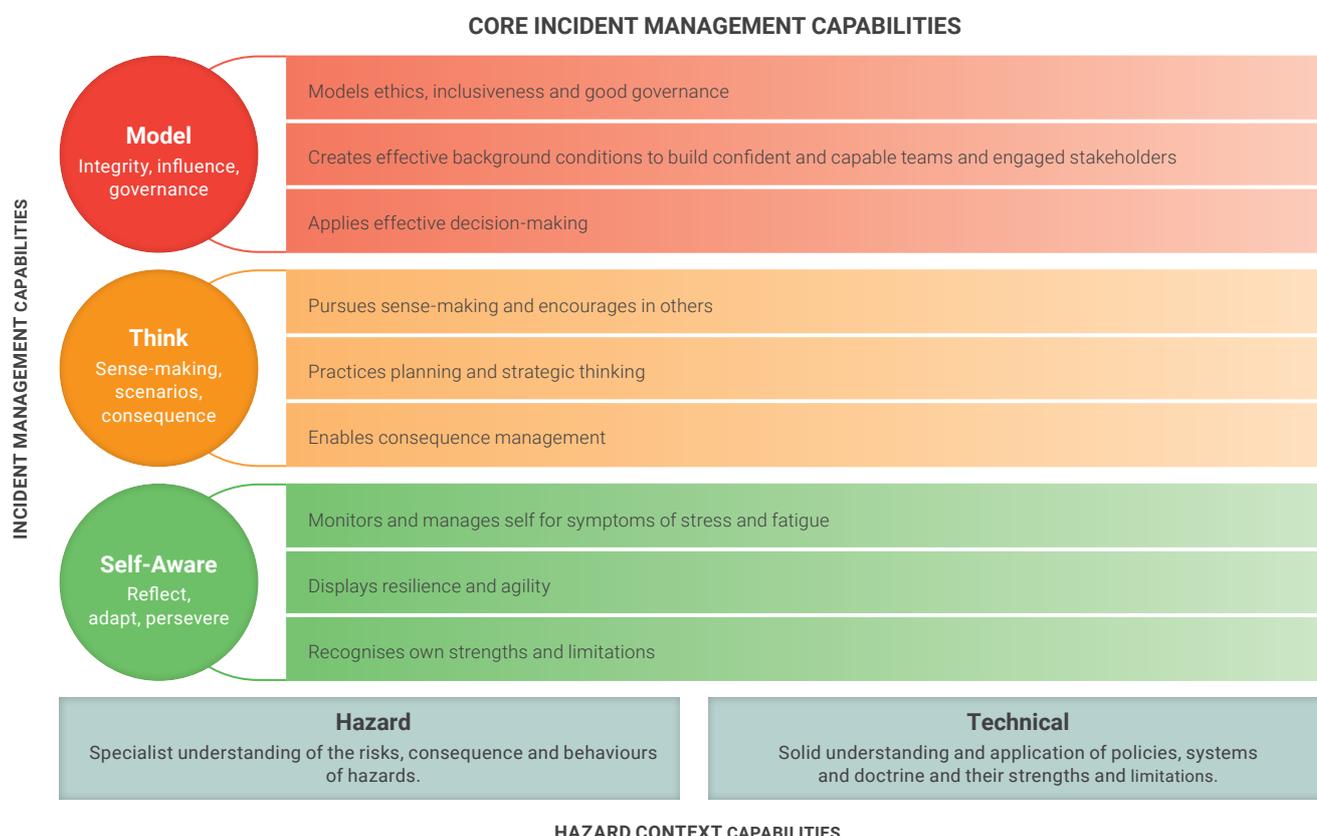


Core incident management capabilities

The task of IMT members is to assess the incident, set objectives for those responding, choose suitable strategies to achieve set objectives, develop and implement a plan and monitor the effectiveness of that implementation.

The review has identified three capability categories, each with three sub-capabilities important in managing the incident:

- 1) Model leadership and teamwork:** the ability to act with integrity, influence others and facilitate team efforts towards the achievement of common goals. Sub-capabilities are:
 - models ethics, inclusiveness and good governance;
 - creates effective background conditions to build confident and capable teams and engaged stakeholders; and
 - applies effective decision making.
- 2) Plan and think strategically:** the ability to consider multiple perspectives and scenarios to engage in strategic planning and consequence management. Sub-capabilities are:
 - pursues sense-making and encourages sense-making in others;
 - practices planning and strategic thinking; and
 - enables consequence management.
- 3) Demonstrate self-awareness:** the ability to monitor stress and fatigue, display resilience and agility and reflect and adjust to feedback. Sub-capabilities are:
 - monitors and manages self for symptoms of stress and fatigue;
 - displays resilience and agility; and
 - recognises own strengths and limitations.



Description of core capabilities

Each of the core capabilities noted above are explained and supported by four components.

1. description
2. behavioural indicators
3. evidence-based rationale
4. key references

Evidential outlines for each capability are purposely brief; readers are encouraged to read cited papers for more detailed discussion. Behavioural indicators are in no way exhaustive, but do capture core performance expected by members of incident management teams.

Model leadership and teamwork

The ability to act with integrity, influence others and facilitate team efforts towards the achievement of common goals.

Modelling ethics, inclusiveness and good governance

Description – this capability includes:

- behaving in ways consistent with the Code of Ethics and Standards of Professional Conduct;
- engaging in building partnerships with multiple stakeholders through establishing collaborative goals with agreed parameters and treating stakeholders with respect;
- ensuring good governance;
- demonstrating resilience and moral courage; and
- accepting scrutiny as a naturally occurring process during a crisis.

Behavioural indicators – examples include:

- acting in accordance with Code of Ethics and Standards of Professional Conduct;
- acting in alignment with organisational frameworks (e.g., OH&S policy);
- communicating compellingly to deliver key messages with integrity;
- treating others with respect;
- applying governance processes and procedures for the greater good;
- displaying courage to make difficult decisions; and
- establishing and maintaining appropriate governance processes in place – including processes to engage in upward chain of command and lateral multi-agency coordination – along with whole-of-government processes.

Evidence-based rationale

Managers play an important role in ensuring integrity and providing ethical leadership. Paine (1994) observed that 'ethics has everything to do with management. ... [and] is as much an organizational as a personal issue'. Here it is noted that, by their nature, the responses to incidents create public and media judgement on what is right, wrong, excusable, rationalisable or inappropriate (Jurkiewicz, (2014). Questions considering resource distribution, triage, and media coverage and funding may be judged in terms of ethical behaviour. In particular, the political dimensions of emergencies call for ethical responsibility (Altay & Green, 2006).

The International Association of Emergency Managers (IAEM) recognises the importance of ethical behaviour, requiring its members to adhere to a respect, commitment and professionalism code (Canton, 2007). The US Federal Emergency Management Agency (FEMA) (2005) describes the components of ethical decision making – commitment, consciousness and competency – and the required incident management skills of ethical competency – evaluation, creativity, and prediction. Incident managers must be able to demonstrate resilience and courage to ensure ethical standards are adhered to (Jurkiewicz, 2014; Owen, Scott, Adams, & Parsons, 2015).

Closely aligned with ethical behaviour is the requirement for incident management personnel to ensure good governance of the systems, processes, resources and people that they are responsible for.



Emergency incidents increasingly require effective collaboration with a variety of parties. Recently, increasing interdependence between social, technical and infrastructure systems has required incident managers to collaborate beyond traditional emergency service organisations (Owen *et al.*, 2015). Successful collaboration with these wider non-emergency stakeholders requires networking, alliances and horizontal coordination mechanisms instead of the more traditional vertical control mechanisms (Owen *et al.*, 2015). This type of collaboration requires incident managers to model more inclusive behaviours, enabling all stakeholders to speak up and contribute.

Key references

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Creating effective background conditions to build confident and capable teams and engaged stakeholders

Description – this capability includes:

- creating safe team communication where all members feel safe to speak up about any concerns without fear of ridicule or recrimination;
- engaging team members and stakeholders to foster motivation to achieve the outcomes sought and to cultivate a climate of team confidence;
- ensuring that community householders and business operators are engaged and provided with the necessary information and warnings;
- recognising and contribute critical information to support cross-functional team work and decision-making; and
- proactively seeking opportunities to help achieve team goals.

Behavioural indicators – examples include:

- creating a collaborative team climate (e.g., communicates in a way that is open, direct, measured and approachable);
- pursuing honest and open input and feedback;
- responding promptly and constructively to questions and concerns raised;
- communicating compellingly to advocate for the needs of the team; and
- monitoring team member capability and addressing any dysfunctional behaviour or gaps.

Evidence-based rationale

This capability focuses on creating a supportive environment where individuals are able to function effectively. Creating a suitable team climate enables and encourages participation, and modelling appropriate behaviour helps set norms to support high standards of team performance (Sundstrom, McIntyre, Halfhill, & Richards, 2000). Effective IMT leaders are aware of both the 'formal' and 'informal' organisation, and are attuned to the requirement to create suitable conditions for a team to develop and perform well in all circumstances. Fundamentally, this requires IMT leaders to consistently demonstrate excellent leadership and interpersonal skills.

The IMTTP (2014) described team leadership and people management as core knowledge and skills required by IMT leaders. Hayes and Omodei (2011) identified leadership, communication, calmness and management skills as key competencies for incident management personnel. The behavioral indicators identified by Hayes and Omodei include approachability, openness, behaviour supportive to the team, willingness to listen (and hear) what is being said by others and consistently modelling appropriate behaviour.



Leadership plays a critical role in shaping team activities and employing the best use of team resources (Hayes, 2014a). Although there is often a focus on the ‘leader’, the creation of a suitable team climate will enable other members to also undertake and share leadership. For example, an experienced and skilled team member may help maintain standards, manage workload and resources, and plan and prioritise key activities. Flin’s (1996) study of incident commanders found that the most effective leaders:

- diagnosed the key elements of the situation (see the following section on pursuing sense-making);
- drew from a broad repertoire of leadership styles (e.g., delegative, consultative, coaching, directive); and
- chose a leadership style appropriate to the situation.

Leadership plays an important role in influencing team communication patterns (e.g., background conditions) (Nembhard & Edmondson, 2006). Edmondson (1999) highlighted the importance of cultivating psychological safety in a team environment where members may speak up and offer constructive comments to their teammates. Psychological safety develops in teams with shared experience, and involves the development of trust and mutual respect within a team. Research conducted in the US highlighted that even experienced and senior firefighters may face social pressures that prevent them from speaking up in situations where it is important to do so (Lewis, Hall, & Black, 2011).

Leadership inclusiveness has been shown to influence the development of psychological safety (Nembhard & Edmondson, 2006). Leader-inclusive behaviours invite and show appreciation for team member contributions. Edmondson (2012) also recommends that leaders model fallibility to help encourage a safer, more open climate. In psychologically safe teams, members feel accepted and respected. Members feel comfortable to speak up, ask questions, propose new ideas, or report an error (Edmondson, 2004; Edmondson & Roloff, 2009). Psychological safety has been shown to support team learning, providing the opportunity to improve team performance (Edmondson, 1999; Edmondson, Bohmer, & Pisano, 2001).

Owen’s (2014) research with Australian IMT personnel highlighted the importance that leaders play in providing coaching and feedback to team members, and how this led to improved team performance in simulation. Owen found that the more effective leaders provided feedback and coaching on communication behaviour than their less effective counterparts. The type of feedback provided by effective leaders focused on what team members needed to do – or be thinking about – in order to contribute. This leader feedback also coached team members to communicate their observations, suggestions, concerns and requests to others in a clear and direct manner. For example, ‘can you make sure you’re talking with X in resources and let them know ...’ (Owen, 2014, p.132).

Owen (2014) found that Incident Controllers effectively build team performance when they manage their teams through:

- boundary riding (assisting team members to adjust to the temporal demands of managing tasks);
- boundary spanning (ensuring functional work roles are integrating their activities); and
- boundary crossing (ensuring where necessary that members are reporting to and seeking cooperation with others outside the team).

Team coaching is defined by Hackman and Wageman (2005) as ‘direct interaction with a team intended to help members make coordinated and task-appropriate use of their collective resources in accomplishing the team’s work’ (p. 269).

Developing the team is an important component of IMT leader responsibilities. Effective team building involves:

- encouraging (and monitoring) interaction within and between teams and monitoring communication for breakdowns and gaps in messaging as well as the communication climate within the team (Entin & Entin, 2001; Fischer et al., 2007);
- mutual performance monitoring (e.g., supporting team members to recognise when another team member makes a mistake and to take remedial action to address that mistake (Bearman, Grunwald, Brooks, & Owen, 2015; Wilson, Salas, Priest, & Andrews, 2007)); and
- using adaptive and supportive behaviour (e.g., team members step in and help out other teammates when needed (Rosen et al., 2011; Salas, Rosen, Burke, Nicholson, & Howse, 2007)).

The previous section notes how the ongoing changes to the incident management environment means that incident managers must engage with an increasingly wider range of stakeholders (Owen *et al.*, 2015). Successful interaction with these non-traditional stakeholders requires more inclusive behaviours (e.g., networking and alliances) than the traditional approach of vertical command. To effectively engage with stakeholders, incident managers must be approachable, and show that they wish to support robust relationships to achieve multiagency cooperation and coordination.



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Applying effective decision making

Description – this capability includes:

- making effective decisions in a timely manner under conditions of uncertainty, incomplete information, tight deadlines and pressure and to acknowledge the limitations of these conditions;
- balancing operational needs with government, community and stakeholder expectations with team requirements;
- collaborating with others in decision-making to reach an agreed approach;
- recognising and articulate the triggers that would require a decision change; and
- monitoring progress to assess alignment with the objectives and reset as necessary.

Behavioural indicators – examples include:

- timely decision making that can be assessed as likely to be reasonable at a given point in time;
- employing decision making styles appropriate to the context and that demonstrates flexibility (e.g., balances the need for speed, thoroughness and inclusiveness with the time available);
- explaining, when asked, the reasons for the decision made as well as the processes used (e.g., can articulate how team and stakeholder needs have been taken into consideration in the decisions made);
- outlining clearly the triggers that would require a decision change;
- proactively looking for early signs of when a decision requires adjustment;
- employing conflict resolution and negotiation strategies to balance competing stakeholder needs and priorities, to achieve an agreed decision; and
- clearly communicating decisions made and to ensure intent is achieved.

Evidence-based rationale

Decision making is fundamental to emergency management, and industry knowledge of this skill has improved substantially over the past 20 years. AFAC and the Bushfire CRC have already synthesised research herein, available now as an IMT training resource – see *Decision making under pressure* (Hayes, 2014) for an explication of the concepts. This includes research into how effective decision makers are able to:

- recognise the differences in decision making approaches and styles (see for example Flin et al., 2008; Omodei, 2012; Rasmussen, 1983);
- effectively utilise metacognition to regulate their own thinking and monitor metacognition in others (see for example Cannon-Bowers & Bell, 1997; Frye & Wearing, 2014; McLennan, Omodei, Holgate, & Wearing, 2007);
- apply the various styles of decision-making depending on the context (Flin et al., 2008; Lauder & Perry, 2014);
- take into account the available time, resources, degree of ambiguity, options available and the number and degree of risks associated with the options (Brehmer, 1992; Brooks, 2014); and

- recognise the limitations and impacts of decisions made under conditions of fatigue and stress. (Brooks & Owen, 2012; Cannon-Bowers & Salas, 1998; Omodei, 2012).

Effective IMT leaders swiftly recognise the type of emergency situation challenging their team and apply suitable decision approaches (McLennan *et al.*, 2007). A recent study of urban fire and rescue Incident Commanders found that they used a mixture of recognition-primed, value-based, procedural and formal decision strategies throughout the course of an incident (Lauder & Perry, 2014).

It is important to note that the capabilities outlined in this document are closely interrelated. For example, sense-making, planning and strategic thinking, consequence management and self-monitoring / management are all imperative for effective decision making. A key observation from the literature (e.g., Canton-Thompson *et al.*, 2008; Orasanu & Connolly, 1993; Frye and Wearing 2014) is that decision making is directly informed by analysis, action and evaluation. People in complex situations often 'think a little, act a little, and then evaluate the outcomes and think and act some more' (Orasanu & Connolly, 1993, p.19). Instead of gathering and analysing all of the relevant data, decision making in complex situations tends to follow this iterative approach. Frye and Wearing (2014) found that the most effective fire commanders in their study used a recurring metacognitive loop of monitoring (see Pursuing sense-making capabilities), deciding (see Consequence management capabilities) and acting.

The McLennan *et al.* (2007) research highlights key behaviour common to effective and less effective incident commanders, and is outlined under the 'Pursuing sense-making and encouragement in others' capability.

Organisational, cultural and political constraints and expectations (Canton-Thompson *et al.*, 2008) mean that IMT leaders must demonstrate a high level of political acumen and judgement in their decision making (CFA-DSE, 2006). Many IMTs are faced with a decision making environment that has multiple goals, some of which may be politically incompatible. In these conditions, the pursuit of some goals may result in others having to be sacrificed. Omodei (2012) described how incident management is 'riddled with tensions', such as:

- high risk vs low risk objectives;
- short-term vs long term objectives;
- quick, low-impact actions vs delayed, high-impact actions;
- being efficient vs being thorough; and
- logic vs intuition.

Some of these tensions will be explicitly resolved for an incident, however other tensions may remain as implicit considerations and create possible confusion or disagreement. Omodei (2012) observed that 'it is inevitable that from a slightly different perspective or priority set, the decision making will be judged by others to be in error' (p. 15).

Bosomworth, Owen and Curnin (2016) interviewed 34 senior emergency managers, and reported that participants perceived that an increasingly important challenge is political involvement in management of significant events. While it is well-recognised that in times of emergency or crisis, political leaders are expected to be informed and show visible leadership (Boin & t Hart, 2010; Boin, t Hart, & McConnell, 2009), this study's participants argued that some political responses are inconsistent, ad-hoc and are concerned with 'messages for the media' or a political position. Tensions between the political and operational aspects of emergency management were described as being driven by a lack of shared understanding and agreed processes.

The study's participants proposed that their cohort seek to understand the socio-political environment in which politicians operate, and suggested a need for secondments to ministerial offices as well as leadership development in diplomacy. They advocated for establishing agreed understandings, arrangements and relationships well before any major event such that a coordinated approach to political and operational rhythms is enabled.

The findings also suggested that the most effective political leaders sought briefings from agency staff and were careful in not raising community expectations beyond those which emergency services could meet. Issues of roles, responsibilities and expectations between emergency services and politics are interspersed with questions of how emergency management performance is evaluated by politicians and communities.

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Plan and think strategically

The ability to consider multiple perspectives and scenarios and to engage in strategic planning and consequence management.

Pursuing sense-making and encouraging sense-making in others

Description – this capability includes:

- making meaning from sometimes incomplete or conflicting information in high pressure environments;
- making timely choices with confidence that they will lead to the desired outcome;
- listening carefully and recognise discrepancies between expectations and reality;
- critically evaluating information and intelligence promptly, assess its risk, weigh alternative choices and diagnose the decision most likely to lead to a positive outcome;
- understanding the sensitivity of various pieces of intelligence and gaps;
- identifying what is not being considered or said;
- proactively attuning to subtle signals that conditions are deteriorating and ask good questions to ascertain what is happening; and
- engaging in continuous ongoing monitoring to identify gaps in the implementation of the plan and assess the significance of those gaps on the outcome sought.

Behavioural indicators – examples include:

- establishing mechanisms for testing and improving situational awareness;
- identifying knowledge gaps, uncertainty, threats and emerging issues so that these can be managed
- identifying patterns and trends in a timely manner;
- encouraging (coaching if needed) other team members to engage in critical questioning and frank discussion to test assumptions and to process conflicting information;
- seeking alternative opinions and perspectives including contra-indicators;
- outlining how a judgement has taken into account personal and group biases; and
- projecting possible outcomes based on information and intelligence gathered, weighing up difference sources of credibility.

Evidence-based rationale

Sense-making is the act of rationalising or reassessing ongoing activities in order to make meaning of them (Barton & Sutcliffe, 2011). Klein *et al.* (2006) described sense-making as ‘motivated, continuous effort to understand connections (which can be among people, places, and events) in order to anticipate trajectories and to act effectively’ (p. 71). Sense-making is most necessary when individuals or teams face a discontinuity in their experience; this is to say when activities have been disrupted or when an incident has moved from routine to novel, for example.



Sense-making precedes action (Weick, 1988, p.305), and is most important when managing at the edge of chaos (Renaud, 2010).

Sense-making is supported by metacognition; simply defined as ‘thinking about thinking’. According to Flavell (1979, 1987), metacognition consists of both metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes – knowledge that can be used to control cognitive processes. Frye and Weaving (2014) have studied metacognition in bushfire fire-fighters, producing a domain-specific model for the environment. Frye and Wearing observed that effective Incident Commanders use a metacognitive loop – e.g., self-regulation – to monitor their own movement between detail and the big picture in thinking (such as focusing on big picture vs ground truths; or what is happening right now vs what is happening next).

Flavell (1979) further divides metacognitive knowledge into three categories: knowledge of person variables, task variables and strategy variables.

Knowledge of person variables refers to general knowledge about how humans learn and process information – this includes an understanding of biases as per the work of Kahneman and Tversky (1974).

Knowledge of task variables includes knowledge about the nature of the task as well as the type of processing demands that it will place upon the individual – this might include AIIMS processes for functional groups, legislative responsibilities / triggers.

Knowledge about strategy variables includes knowledge about both cognitive and metacognitive strategies, as well as conditional knowledge about when and where it is appropriate to use such strategies. This could include the application of decision-making styles and when / where they might be appropriate.

Effective engagement in sense-making (Flin, 2008; Weick, 1995) requires reflective individuals who:

- acknowledge their own identities as fallible (Weick, 1995);
- are reflective on what has happened in the past as well as the present (Weick, 1995);
- extrapolate cues from these reflections and project these as plausible scenarios into potential futures (Endsley, 1994; Johnson, 2014; Weick, 1995);
- recognise the cognitive biases and social norms that may constrain sense-making processes in themselves and in others (Barton & Sutcliffe, 2009);
- recognise that sense-making can be impacted by other attentional and workload demands, and will also only reveal part of the picture (Renaud, 2010; Weick, 1995; Weick & Sutcliffe, 2007); and
- recognise that in complex and novel cases, acknowledging and considering different perspectives and multiple discourses will yield optimal outcomes (Kurtz & Snowden, 2003).

(Barton, Sutcliffe, Vogus, & DeWitt, 2015) noted that sense-making is important to overcome the challenges of uncertain environments, enabling the use of more flexible and improvisational approaches. In particular, they observed two important sets of sense-making behaviour. The first was identifying and articulating important discrepancies as a situation unfolds (e.g., anomalising). Examples provided were:

- actively looking for instances of small things going wrong to try and learn what was happening;
- thanking or rewarding team members for spotting potential trouble spots;
- encouraging others to express differing points of views; and
- assessing each situation on its own rather than assuming it would be the same as other previous situations.

The second set of behaviour identified was oriented around developing a richer understanding of a situation (e.g., proactive leader sense-making). Examples provided were:

- actively seeking input from a broad range of team members;
- actively encouraging personnel to question decisions that do not make sense to them; and
- encouraging personnel to bring up potential problems.

One term used to describe the product of sense-making is ‘situation awareness’. Salmon *et al.* (2008) described situation awareness as ‘dynamic awareness of the ongoing situation’ (p. 229). Some researchers have defined these two concepts as essentially the same (e.g., Leedom, 2001) but, herein, sense-making is described as the ‘process’ and situational awareness is the ‘knowledge state achieved’ (e.g., Klein *et al.*, 2006).



Evidence for the requirement to encourage sense-making within the team comes from a study conducted with wildland fire IMTs in the USA. Taynor, Klien and Thordsen (1990) observed that decision makers could rarely rely on their own direct perception of events to stay up to date with the situation. IMT personnel had to rely on their colleagues and various other written, verbal and visual materials available, both formal and informal. Observations also highlight the challenges of using multiple information sources to develop an adequate understanding of the situation.

Research completed with fire commanders by McLennan *et al.* (2007) highlighted the important role an Incident Controller has in sense-making. Effective fire commanders swiftly extracted the most important – though not always most striking – features from information that was often incomplete, inconsistent and of dubious accuracy or timeliness. McLennan *et al.* observed that the effective commanders in his study used four types of actions to help achieve this.

1. Manage incoming information so that personnel can focus on the most relevant information.
2. Use tools to reduce the demands on working memory, for example, by taking notes and using maps and sketches.
3. Anticipate key developments in the incident, thereby reduce the need to react in the situation.
4. Monitor levels of cognitive arousal and emotional stress, and work to minimise performance-interference.

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Practices planning and strategic thinking

Description – this capability includes:

- converting sense-making into a course of potential action;
- articulating objectives, strategies and actions determined through sense-making so that they provide a good basis for planning and decision making for all involved;
- prioritising multiple time and space issues; to identify what is important to plan for and to filter what is not;
- recognising the strengths and weaknesses of those who will be implementing plans so that tasks are allocated to best effect; and
- employ strategies to avoid being distracted by minutia and to maintain a wider focus, canvassing future outcomes, options and potential impact.

Behavioural indicators – examples include:

- predicting future options that reflect the information gathered through sense-making and evaluate those options;
- recognising the consequences of options available;
- clearly explaining the significance and potential consequences of predictions;
- explaining clearly, concisely the planning strategies chosen;
- explaining the assumptions on which plans are based and the triggers for reassessing plans;
- acting quickly to adjust the strategy as the context changes; and
- demonstrating creativity and flexibility in adapting plans to improvise in novel situations.

Evidence-based rationale

The practice of sense-making helps develop individual and team cognitive resources for planning and strategic thinking, and is supported by gaining an awareness of the situation. Situation awareness may be characterised as the perception and comprehension of salient cues in the environment in order to predict future developments (Endsley, 1994). Situation awareness is fundamental to making decisions in complex real-world environments and is the basis on which people form plans, develop strategy, allocate resources and schedule their behaviour (McLennan, Holgate, Omodei, & Wearing, 2006). In this respect, it is a dynamic process resulting from various cognitive activities (Golightly, Wilson, Lowe, & Sharples, 2010; Woods & Sarter, 2010). Developing and maintaining situation awareness is especially challenging when the situation is ambiguous and dynamic (Hayes & Birch, 2009; Orasanu, 1995). Using this approach IMT leaders draw upon information from an incident control centre and other associated units, produce an understanding of the current state of the emergency and then produce plans to act on the emergency both now and into the future.

Effective IMT leaders, therefore, model constructive thinking ability to solve problems (e.g., Katz & Epstein, 1991; Salas, Rosen, Burke, Goodwin, & Fiore, 2006) and are able to identify the associations amongst conflicting multiple issues so they can be dealt with concurrently (e.g., Flin *et al.*, 2008; Yukl & Van Fleet, 1992).

A key element for successful incident management is identifying the likely ways that an incident may unfold, and planning corresponding responses (McLennan, Elliott, & Holgate, 2009). The term commonly used to describe this form of forward thinking is 'anticipatory thinking' and is described as 'a critical macrocognitive function of individuals and teams ... the ability to prepare in time for problems and opportunities' (Klein, Snowden, & Pin, 2007, p. 1). Anticipatory thinking involves three important elements (Klein *et al.*, 2007). First, it entails looking ahead to identify the likely trajectory that an incident may follow. Secondly, it requires active attention management by the individuals and teams involved (e.g., monitoring). When attempting to understand and predict the likely development of an evolving problem or opportunity, the often complex and uncertain nature of the situation means that decision makers need to be selective as to the information they consider and use. Effective anticipatory thinking involves identifying and attending to the most likely sources of critical information. The third feature of anticipatory thinking is its functional nature. Individuals and teams are not just predicting the likely future, they are also preparing for these events. Anticipatory thinking is not only likely to lead to the development of more effective strategy, it is also important in helping identify the possible risks that an IMT will need to consider (Hayes & Birch, 2009).

Expertise helps decision makers to swiftly recognise important patterns and cues in the environment (Klein, 1999). For more complex situations, or where time allows, predictive models and analytical tools are increasingly enabling 'what if scenarios', sensitivity analysis, and prediction of which communities may be affected by an incident (e.g., flood, plume, and fire spread models) (Hayes, 2014a). IMT leaders require some familiarity with these models and assumptions if they are going to effectively use these tools for incident analysis and decision making. Moreover, these analytic and predictive tools increase the amount of information that may need to be handled by IMT leaders.

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Enabling consequence management

Description – this capability includes:

- maintaining a focus on consequences of the incident and actions and assess the consequences of actions to resolve the incident;
- identifying and evaluate the consequence for communities of what is happening, and what is likely to happen;
- assessing the incident and the proposed actions of responders so that decision making and implementation leads to the best possible outcome for those affected by the incident;
- engaging in contingency planning and to adjust strategies; and
- assessing broader issues beyond the immediate incident.

Behavioural indicators – examples include:

- identifying all those who are potentially affected by the incident;
- explaining the long term impacts of the incident including the consequences of actions to resolve the incident;
- anticipating what might go wrong and any unintended adverse effects;
- explaining contingency planning for adverse effects; and
- flexibly matching communication style to audience.

Evidence-based rationale

Senge (1990) noted in his monograph on organisational learning that ‘today’s problems come from yesterday’s solutions’ (p. 57). The author’s observation highlights a challenge that all organisations face – trying to make sound decisions without unforeseen adverse consequences. Crossweller (2015) observed that the purpose of consequence management is to ‘ensure that response and recovery efforts not only deliver positive outcomes but that action – or inaction – does not exacerbate adverse consequences’ (p. 42). IMT leaders are increasingly required to ensure that they take account of the direct and indirect effects related to an incident. Effective consequence management has been described as involving ‘the ongoing assessment and management of the potential or actual effect of the emergency on communities. The safety of community members is the primary consideration in consequence management’ (Emergency Management Victoria, 2014, p. 3-23). Potential consequences may have immediate, short, medium and long term effects, and may extend well beyond response and relief into the recovery phase (Boin & t Hart, 2010). Incident management can best be understood in terms of cross-agency coordination between various organisational (and inter-organisational) levels (Paton & Owen, 2013).

A particular challenge of managing incidents is dealing with the complex demands they place on decision makers (Flin, 1996; Flin & Arbutnot, 2002). In particular, the spatial and temporal dimensions of an incident may require IMT leaders to frequently shift between the detail and big picture, the now and the later (Omodei, 2012). Although the immediate tends to capture our attention and rules-of-thumb such as ‘fight the fire you have not the fire you might have’ may guide us in focusing on the present, many members of the IMT need to manage multiple time horizons and competing priorities (Brehmer & Svenmarck, 1994). Moreover, the number and difficulty of the complex interdependencies IMT leaders may need to contend with can increase rapidly as incidents move from simple (known) to complex or even chaotic conditions (Kurtz & Snowden, 2003).

Recent research conducted with helmet-mounted cameras on UK fire and rescue Incident Commanders provides interesting evidence on the issue of maintaining focus on strategic consequences (Cohen-Hatton, Butler, & Honey, 2015). Observation of incident commanders managing 33 incidents showed that ‘little evidence of prospecting about the potential consequences of actions’ existed (p. 793). The findings from the Cohen-Hatton *et al.* study indicate that incident commanders are susceptible to being caught by the immediate events and therefore may lose focus on strategic consequences.

Johnson’s (2014) research on the use of worst-case scenarios by bushfire incident management personnel provides useful insights on the challenges of maintaining a focus on strategic consequences. Johnson observed that incident managers needed to consider multiple scenarios, multiple timeframes and multiple perspectives. Some 83% of participants in Johnson’s study reported the use of worst-case scenario thinking.



The results were highly variable across participants, with some participants not reporting the use of worst-case scenario, and others reporting several worst-case scenarios (up to ten). Johnson identified a range of barriers to worst-case scenario thinking.

1. Underestimation of risk, time or space
2. Tunnel vision
3. Lack of appropriate experience
4. Lack of local knowledge
5. Sub-optimal attitudes to risk and safety
6. Situational characteristics
7. Interpersonal issues
8. Standard procedures

The responses from Johnson's (2014) interviews indicated that even expert incident managers could sometimes overlook the use of these considerations in their planning and be influenced by the barriers to worst-case scenario thinking. However, the experts in Johnson's study recognised their susceptibility to these barriers and had developed their own strategies to minimise the effect of these. In essence, these expert strategies can be distilled into the following themes:

- what if thinking (e.g., imagined how things could go wrong);
- back up planning (e.g., developed back-up plans to handle a range of possible outcomes);
- self-management (e.g., employed metacognitive strategies to manage their thought processes and emotions);
- plan critiquing (e.g., encouraged respectful discussion and dissent);
- adaptive decision making (e.g., adapted standard procedures if required);
- focusing on fundamentals (e.g., ensured fundamental safety rules were maintained); and
- motivation to learn (e.g., reflected on how their own decision making could be improved).

Strategic consequence analysis is likely to be cognitively demanding (e.g., multiple issues and dimensions, interdependencies and limited information availability). This may require IMT leaders to allocate dedicated resources to undertake this work. Identifying the consequences is part of the challenge, and considerable judgement may be required in deciding how to best mitigate or manage these consequences. As noted earlier in the discussion on decision making, incident management requires reconciling competing priorities and timelines (Omodei, 2012).

The 2009 Victorian Bushfire Royal Commission emphasised the importance of ensuring that potentially affected communities are given suitable warnings and advice (Teague, McLeod, & Pascoe, 2010). An increasing number of models and tools are now available to assist with identifying consequences and their management (e.g., flood and fire spread models). These tools require IMT leaders to prioritise how this information is best used for various activities including operations, planning, community warnings and other types of consequence management.

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Photo: Fire & Rescue NSW

Demonstrate self-awareness

The ability to monitor stress and fatigue, display resilience and agility and to reflect and adjust to feedback.

Monitoring and managing self for symptoms of stress and fatigue

Description – this capability includes:

- developing effective strategies to manage psychological and physiological demands;
- employing strategies to identify and manage personal limitations and impact of biases;
- recognising and remain vigilant for the signs and symptoms of stress and fatigue on both self and other team members; and
- managing emotion and display empathy.

Behavioural indicators – examples include:

- maintaining focus and remains grounded when under pressure;
- using coping strategies to manage under sub-optimal conditions;
- self-regulating emotions under pressure of challenging circumstances; and
- monitoring self-behaviour and its impact on others.

Evidence-based rationale

A key skill discussed earlier in the document, metacognition, is important in supporting the capability to monitor and manage oneself. Bremner, Bearman and Lawson (2014) emphasised the importance of monitoring the physical and mental state of incident management personnel. The background literature associated with this capability is derived from a number of domains, supporting the recognition of physiological and cognitive impairment (via fatigue or stress) and the importance of self-management (McLennan, Strickland, Omodei, & Suss, 2014).

One approach to understanding performance monitoring is to consider the role of workload in the context of capacity-based models of human cognition (Baddeley, 1992; Wickens, 2008). These models hold that, as task demands increase, the individual is required to exert an increasing amount of his or her limited cognitive resources to maintain a steady level of performance. Thus, senior incident management personnel must manage both their own and others' workloads. In order to achieve this they must acknowledge a variety of factors that affect workload. They include:

- **attentional demands** – whereby the demands of having to pay attention to increasing amounts of information increase overall workload;
- **multiple competing tasks** – whereby increasing the number of concurrent tasks that are required to be performed increase overall workload;
- **expertise** – whereby tasks undertaken by a novice requires significantly more mental resources than the 'automatised' tasks undertaken by an expert; and
- **physiological interference** – whereby factors such as fatigue and stress reduce the available cognitive resources.

The AFAC Leadership capability framework (2007) and IMTTP (2014) highlighted the importance of self-management. The AFAC framework also highlights the need for senior incident management personnel to model sound behaviours.

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Displaying resilience and agility

Description – this capability includes:

- adapting and overcoming adversity;
- employing personal strategies to operate effectively in challenging conditions to maintain well-being;
- quickly absorbing information and operating effectively in rapidly changing conditions without the complete picture; and
- responding to pressure and setbacks whilst remaining focused on objectives and outcomes.

Behavioural indicators – examples include:

- engaging in a realistic assessment of predicted tough days;
- coping with flux, the unexpected and incomplete information;
- recovering quickly from setbacks and persevere to get things done despite difficulties;
- remaining flexible when faced with sub-optimal or novel conditions and improvises in response;
- accepting that things do go wrong and sometimes there are limits to what can be controlled; and
- acting promptly to signs that action is not producing the desired outcomes.

Evidence-based rationale

Successful IMT operation requires resilient personnel. Various projects and publications have highlighted the central role that resilience plays in effective incident management (e.g., AFAC, 2007; CFA-DSE, 2006; IMTTP, 2014; McLennan *et al.*, 2007). A report on the capabilities required by Level 3 Incident Controllers and Operations Officers described the requirement for personnel to have the personal qualities of stress tolerance, perseverance, and the ability to stand alone (CFA-DSE, 2006). The AFAC leadership framework (2007) describes resilience as the capacity to overcome adversity. Resilience involves:

- sustaining effort;
- maintaining an optimistic outlook in challenging situations;
- dealing with sustained pressure; and
- staying in control of emotions.

Similarly, the (IMTTP, 2014) highlighted resilience as an important personal quality for senior Level 3 IMT personnel. It also noted the importance of personnel being able to respond to pressure in a controlled and composed manner while remaining focused on objectives and outcomes. As Wieck and Sutcliffe (2007) observed, incidents do not 'play by the rules' and thus require agile and adaptive responder. The IMTTP (2014) identified agility as a critical capability for incident management and highlighted that agile incident managers are able to:

- cope with changing circumstances;
- operate without the complete picture;
- quickly absorb information;
- make decisions collaboratively; and
- forecast and pose possible solutions and potential associated risk.

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Recognises one's own strengths and limitations

Description – this capability includes:

- recognising and monitoring personal limitations, motivations and biases;
- critically reflecting and identifying areas of self-improvement in action and in review;
- analysing own performance and seeking feedback so that they can continue to improve; and
- proactively extending their knowledge, skills and experience.

Behavioural indicators – examples include:

- appreciating limitations and avoids arrogance and hubris;
- accepting of feedback or criticism and adjust appropriately and objectively;
- objectively evaluating what went well and what did not;
- critically reflecting on own performance and takes responsibility;
- demonstrating learning from feedback and experience;
- seeking opportunities to extend knowledge, skills and experience; and
- enacting plans for continued professional development.

Evidence-based rationale

Most professional bodies expect that their members have self-awareness and can acknowledge their respective strengths and weaknesses (Friedman, 2012). This requirement stems from the principles that professionals are expected to undertake work that are competent to perform, and maintain and develop their expertise (e.g., professional development) (Hall, 2002). Clearly, both of these behaviours require a professional to maintain an understanding of their respective strengths and limitations.

Self-aware professionals also need to be mindful of the loss of expertise if not practiced regularly. The intermittent nature of emergency events may make it difficult for incident managers to practice and maintain key skills. Incident management skills and knowledge decay over time (Hayes, 2014b) without use or practice. Further, ongoing changes to emergency systems and processes may mean that personnel can quite quickly lose currency with important tools and procedures. By being aware of their strengths and limitations, an incident management professional can plan the continuing professional development (CPD) activities important in maintaining expertise and currency, and also address any significant shortfalls.

The AFAC leadership capability framework (2007) and the IMTTP (2014) outlined the importance of understanding one's own strengths and weaknesses. The AFAC capability framework also highlighted the need to reflect on one's own performance and the requirement for lifelong learning. The AFAC framework's emphasis on self-awareness and self-development parallels the Cheetham and Chivers (1996, 1998) model of professional competence, which emphasises the central role of reflection and self-development for acquiring and maintaining professionalism.

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Conclusion

The supporting evidence contained in this document underpins the capability requirements for IMT personnel who wish to have their expertise registered and credentialed as part of AFAC's Professionalisation Scheme. This evidential review centred on human factors, germane emergency management literature and the research conducted through the Bushfire CRC.

This analysis identified three broad capability themes, each with three sub-capabilities important in managing incidents. These include the ability to act with integrity, influence others and facilitate team efforts towards the achievement of common goals (Model leadership and teamwork); consider multiple perspectives and scenarios to engage in strategic planning and consequence management (Plan and think strategically); and to monitor stress and fatigue, display resilience and agility and reflect and adjust to feedback (Demonstrate self-awareness).

As with any professional scheme, these capabilities must be reviewed on a regular basis. It is recommended that a thorough review be conducted again three years from the adoption of these IMT core capabilities.

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