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A guide to non-technical skills in emergency management

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Preface

About this resource

The idea for this book really came from three main sources. First, observations conducted by the authors that clearly indicated the need to better manage non-technical skills during emergency and incident management. Second, the alarming number of non-technical skills issues that are continually highlighted in investigation reports and inquiries. Third, discussions with our agency partners about how we might best help people to deepen their understanding of the non-technical skills literature.

While there are a number of good introductions to non-technical skills in other industries (such as: aviation, military and healthcare) there is not much available for people who are interested in emergency and incident management non-technical skills. This book is designed to address that gap.

We approached the Bushfire and Natural Hazards Cooperative Research Centre (the CRC), who provided funding to develop a guide to non-technical skills that can assist in the training and development of emergency and incident management team members.

The end product is a book that seeks to: introduce and highlight the importance of non-technical skills; identify some of the issues and pitfalls that can occur; and describe tools that can help people better manage non-technical skills in operational situations.

The content of the book necessarily draws heavily on research conducted during a project on teamwork, decision making and organisational learning sponsored by the CRC between 2014–2021.

By writing this book we hope to provide a consistent framework that allows agencies to manage the various aspects of non-technical skills in a more holistic way. This also encourages agencies to adopt a shared language to discuss, promote and manage these important but often neglected sets of skills.

Who is it for?

The book is designed for emergency management practitioners and instructors who wish to understand more about non-technical skills. This may be because they want to improve their own knowledge and practice or be better prepared to coach, mentor or instruct others. Learning and development practitioners may find the book a useful reference source for developing non-technical skills training materials or for enhancing these skills within more technically oriented training units (for example, teaching communication skills in the context of relay pumping).

In parallel to the writing of this guide, two emergency management non-technical skills workshops were developed. The first workshop (W1: Emergency management non-technical skills - key concepts workshop) provides an introduction to the key concepts for practitioners. The second workshop (W2: Emergency management non-technical skills - advanced workshop) provides more advanced content to help deepen senior practitioners' and instructors' understanding so that they are better prepared to deliver non-technical skills training and development activities. These two workshops and accompanying sets of instructors' notes are available on the CRC and CQU websites.

The approach

Some readers will be familiar with these skills and will have used them working in various teams. For others, it may be the first time they have encountered them. For the group who are encountering non-technical skills for the first time, we have provided a simple overview of each skill and how it can be observed in both training and real operations. For the more experienced practitioners of non-technical skills we have included a set of information and challenges to help people to think more deeply about that non-technical skill.

Chapter 1 introduces the concept of non-technical skills and demonstrates how non-technical skills can be operationalised. Chapters 2 through 8 are the central part of the book and use the Emergency Management Non-Technical Skills (EMNoTS) framework as the basis for discussion of the seven key non-technical skills critical to effective emergency and incident management. These non-technical skills are: communication, coordination, cooperation, situation awareness, decision making, leadership and managing stress and fatigue. Each of these non-technical skills is discussed in a separate chapter, with each chapter introducing the non-technical skill and identifying behavioural markers that can be used to observe the skill in action. For readers wanting more detail this is followed by a 'More Information' section and a section that discusses some of the challenges that may be encountered. Each chapter also offers suggested readings and links to relevant online resources, in addition to the many references. Chapter 9 highlights how to use a non-technical skills framework to manage performance and the final chapter (Chapter 10) identifies implications and opportunities for the management of the non-technical skills.

The authors

Dr Peter Hayes

Peter's working life commenced in the forestry sector, managing large forests in New Zealand and the United Kingdom. Peter's interest in the behaviour of people, teams and organisations led him subsequently to complete an MSc (Hons) in industrial and organisational psychology and a PhD in psychology. His Bushfire CRC supported doctoral research used simulation to investigate incident management decision making and teamwork. Between 2017 and 2021 he worked on a Bushfire and Natural Hazards CRC project examining non-technical skills in emergency and incident management. Peter currently works as a Research Fellow at Central Queensland University's Appleton Institute.

A/Prof Chris Bearman

Chris Bearman is an Associate Professor of Cognitive Psychology and a volunteer firefighter in South Australia's Country Fire Service. Between 2013 and 2021 he was a lead researcher in the Bushfire and Natural Hazards CRC examining non-technical skills in emergency and incident management. After completing his PhD, Chris joined the world-renowned research organisation NASA to examine non-technical skills in aviation and space missions. In 2012 he became one of the inaugural members of Central Queensland University's Appleton Institute, where he continues to work on non-technical skills in aviation, rail and emergency management. In 2019 Chris and colleagues won the Harry C Bigglestone Award for their effective communication of fire protection concepts.

Donald Gyles

Don was an operational Air Traffic Controller in Australia for 40 years as practitioner, training and safety specialist, operational supervisor and manager. During this time he completed a Diploma in Aviation (Air Traffic Services), B.Bus (HRD) specialising in training and development, a Masters of Human Factors and Safety Management Systems, as well as gaining his commercial pilots licence and flight instructor qualifications. Before retiring as an Air Traffic Controller in 2020, Don worked on a project developing an operational risk baseline. He is currently completing a PhD at Central Queensland University investigating collaborative work practices in the Air Traffic Controller context. During 2021 Don worked as a researcher on the Bushfire and Natural Hazards CRC's non-technical skills in emergency and incident management project.

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Finally, we particularly thank all of the people who participated in the research studies that we have conducted, many of whom took time out from very busy schedules to talk to us. We would not have been able to conduct the research and build the products without them.

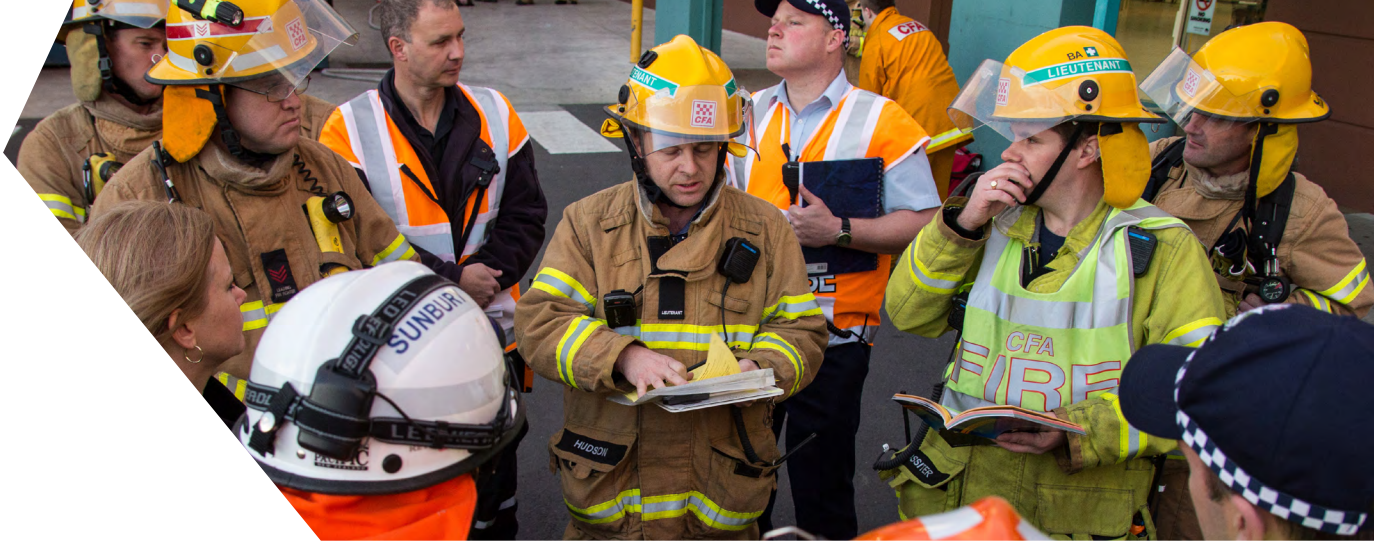


Photo: Country Fire Authority

Chapter 1. A brief background to non-technical skills

Non-technical skills are defined as the 'cognitive, social and personal resource skills that complement technical skills and contribute to safe and efficient task performance' (Flin et al., 2008, p. 1). In an emergency management setting technical skills may be, for example, mapping fire behaviour or developing an incident action plan. Non-technical skills support these technical skills, so that people have a commitment to working in the team and are using good communication to coordinate their activities effectively. Effective non-technical skills means that the technical skills produce outcomes that are both appropriate and timely.

The Flin et al. definition of non-technical skills highlights that in addition to thinking and perceptual skills, team performance is dependent on a range of social and personal skills. Organisations and work teams are influenced by many of the same social factors that govern human interaction and relationships outside of work settings. For example, people who are apprehensive about their relationship with someone else are less likely to ask questions to clarify their understanding of a task or activity. Similarly, our personal capabilities relating to the adverse effects of stress and fatigue are important to our performance in teams. Just as stress or fatigue can make us vulnerable to forgetting things or more irritable in our personal relationships, these factors have the same adverse effect with potentially greater consequences in work teams.

The importance of managing non-technical skills is widely accepted in many industries that have the potential to produce catastrophic outcomes (such as aviation, medicine and the military). In aviation, a series of tragic air crashes during the 1970s led to the realisation that non-technical skills were an essential element for aircrew to complement the technical 'stick and rudder' skills required to control the aircraft (Cooper et al., 1980). This led the development of non-technical skills training for aircrew called crew resource management (CRM). The term crew resource management reflects the underlying concept that improved flight crew training could reduce pilot error by enabling better utilisation of the human resources on the flight deck (Helmreich & Foushee, 1993).

Since the introduction of aviation CRM programs in the 1980s a range of other industries have recognised the opportunities that the development and use of non-technical skills offers for more effective management of their operations. Sectors such as healthcare, maritime, oil and gas, rail, nuclear energy and the military have all heavily invested in these types of programs (Hayes et al., 2021). Initial interest in non-technical skills from emergency management organisations began in the 1990s following the tragic Storm King Mountain, Hackensack and Cherry Road fires (IAFC, 2003). Since then there has been a gradual increase in interest in non-technical skills training and some European fire, rescue and ambulance services have developed programs for their frontline personnel (e.g., Griffith et al., 2015; Hagemann & Kluge, 2013; Rasmussen et al., 2019; Shields & Flin, 2013).

In Australian and New Zealand emergency management there has been growing evidence of the important role that non-technical skills play in enabling effective team performance. Although most incidents are well managed, various independent inquiries have identified shortcomings in the non-technical skills of emergency and incident management teams. Skills such as coordination, communication, decision making and the adverse effects of stress and fatigue have all been highlighted as problematic in public inquiries (e.g., Ellis, 2011; Johnstone, 2002; Schapel, 2007; Teague et al., 2010).

Over the last 10 years research by the Bushfire Cooperative Research Centre (CRC) and Bushfire and Natural Hazards CRC (the CRC) has identified that emergency and incident management teams are quite susceptible to breakdowns in coordination (e.g., Bearman & Bremner, 2013; Bearman et al., 2015; Brooks et al., 2018; Grunwald & Bearman, 2017). However, the effective use of non-technical skills can be used to reduce the likelihood of breakdowns and importantly, can be used to help identify and mitigate problems that may otherwise lead to adverse outcomes.

Hayes et al. (2021) reviewed the literature on non-technical skills in a variety of industries and considered how these skills apply to incident and emergency management. Based on this work they identified seven key non-technical skills (for more details about the process of identifying these skills see Hayes et al., 2021). These seven skills are presented in Table 1 below.

Table 1. Non-technical skills for emergency and incident management.

Communication
Coordination
Cooperation
Situation awareness
Decision making
Leadership
Coping, stress and fatigue management

Table 2. Example of a non-technical skill, including the category, elements and behavioural markers.

Non-technical skill category	Element	Behavioural marker
Leadership	**Creates a suitable team environment**	▪ Good behaviour is consistently modelled ▪ *Others are not treated with respect** ▪ Inclusive behaviours are modelled that enable others to speak up and offer suggestions and constructive comment
	Provides focus, direction and coordination	▪ There is a focus on the important tasks at hand ▪ Appropriate direction and guidance is provided ▪ *Activities are not well-coordinated within the team**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

Non-technical skills are typically described using a three-tier hierarchical taxonomy comprising categories, elements and behavioural markers (e.g., Flin et al., 2008) (see Table 2, p. 8). Focusing on these different tiers allows us to understand the non-technical skill in more detail and show how each skill might manifest in an operational setting.

Each category contains a number of sub-categories or elements that define the non-technical skill in more detail. Each element has a number of behavioural markers that provide an operational description of various facets of the skill's use in action. Behavioural markers usually include a mixture of positive and negative descriptors. The positive markers highlight the desired types of behaviour and the negative markers indicate problematic behaviours. In Table 2 (p. 8) an example of this taxonomy for the non-technical skill of leadership is shown.

The description of non-technical skills shown in Table 1 (p. 8) illustrates the approach used in this book, which is based on the Emergency Management Non-Technical Skills (EMNoTS) framework[1] developed by Hayes et al. (2021). The EMNoTS set of behavioural markers strike a balance between identifying behaviours that are important to manage in incident/emergency management and a system that is able to be used in real-time operations. It's aim is to be as comprehensive as possible without being unwieldy (Hayes et al., 2021). The seven non-technical skills, their elements and behavioural markers will be considered in detail in the next seven chapters. How to use the EMNoTS framework to manage non-technical skills is discussed in Chapter 9.

The following seven chapters each discuss one of the non-technical skills that are important for incident and emergency management. Each chapter starts with an introduction to the non-technical skill, identifies behavioural markers and lists some of the Bushfire and Natural Hazards CRC resources that have been developed to support this non-technical skill. This may be sufficient for readers who are looking for a basic level introduction to non-technical skills. For readers looking for more depth, additional information about the non-technical skill is provided and some of the challenges of managing it in operational settings are discussed. Each section ends with further reading and useful online resources.

1 See Appendix A and https://www.bnhcrc.com.au/sites/default/files/managed/emnots/

Photo: Chris Bearman

Photo: Chris Bearman

Chapter 2. Communication

A common factor cited in many after-action reviews when a team's performance is below par is poor communication. Communication plays a critical role in activities by enabling the exchange of information. This helps to build and maintain situational understanding, coordinate activities and share goals and objectives. Communication is one of the *3 Cs* of teamwork alongside coordination and cooperation.

The 3 Cs are closely linked meaning that poor performance in one of these processes will undermine the other two and adversely affect team performance (Kozlowski & Bell, 2003). The importance of communication is underlined by Bushfire and Natural Hazards CRC research which has highlighted how breakdowns in team effectiveness occurred when there was a failure in communication (Bearman et al., 2015).

Behavioural markers of communication

Table 3 below provides a summary of the elements and behavioural markers for communication. The first element is *effective communication*. The behavioural markers highlight four important aspects for this element, namely: timeliness, accuracy, closed-loop communication and correct use of procedures. Each of the behaviours support the effective sharing of information. In emergency

Table 3. Communication.

Non-technical skill category	Element	Behavioural marker
Communication	**Effective communication**	▪ Information is passed on in a timely manner ▪ Information is passed on accurately ▪ Team members ensure that information has been received and understood by others ▪ *Inappropriate communication procedures are used**
	Pro-active communication	▪ Situation updates are provided ▪ *Team members are not providing constructive comments to one another**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

and incident management timeliness and accuracy are key issues. Delayed sharing of information may mean the information becomes useless or that critical actions may be delayed, placing life or property at risk. The remaining two markers of *effective communication* identify the importance of closed-loop communication to ensure that information shared is understood as was intended by the sender and that appropriate procedures are followed (e.g., channel, reporting format, terminology). When working with new people or in unfamiliar situations closer attention may be required to language, terminology and the use of closed-loop processes to ensure effective communication is being achieved.

The second element outlines the importance of *pro-active communication*. This element frames information as a resource that should be appropriately shared with other team members. Sharing updates as the situation changes is key to ensuring the team is able to continue to make decisions with up to date information. The second marker points to the role that team members play in supporting each other and team performance by providing constructive comment to one another. This can be particularly valuable in helping capture biases, oversights or errors and in strengthening the quality of analysis and decision making.

More information about communication

Linear versus continuous communication

The traditional view of communication suggests it follows a relatively simple linear process and emphasises the central role of the sender distributing messages to largely passive recipients (e.g., Shannon & Weaver, 1964). These functional models highlight some important features of communication such as the idea that different communication modalities have different bandwidth (e.g, face-to-face, telephone or written) and the importance of the processes of encoding (constructing) and decoding (deciphering) messages. This approach also emphasises how noise can interfere with communication and the role of feedback loops. However, a limitation of these traditional models is that they do not adequately capture the range of internal and external factors that influence information sending, interpretation and response, especially in team contexts (Salas et al., 2015). Communication is in fact a complex process that is dynamic, continuous and circular (Barnlund, 2008).

Feedback

An important element of two-way (vs. one-way) communication is feedback. In its simplest form it may take the form of a nod or headshake to more complex written feedback provided on an Incident Action Plan. Feedback can take three main forms: informational, corrective and reinforcing (Flin et al., 2008).

- Informational feedback occurs when the receiver provides a non-evaluative response to the information received.
- A corrective response challenges or corrects information received.
- A reinforcing response provides acknowledgement the information has been received and checks on the understanding of the message.

Feedback helps ensure that the information has been received, plays a key role in capturing and correcting errors or oversights and improves the quality of a team's understanding to enable better coordination of activities. Feedback helps to create a team climate (see below) that is conducive for cooperation between members and other teams.

Challenges

Too much or too little communication

The nature and quality of communication varies within teams and for different types of activities. More routine tasks may require little explicit communication. For routine tasks more information is not always better. Particularly under conditions of urgency and high workload more communication can create an additional cognitive overhead that can undermine team performance. However, response to less routine events will require teams to communicate more, share unique relevant information, perhaps source additional expertise or information from beyond the team and ensure everyone knows the plan (closed-loop communication). Team research highlights that communication quality is more important than quantity (Tannenbaum & Salas, 2021). In addition there can be many points during the course of an event or incident where communication may be compromised by the effects of factors such as workload, stress, fatigue, distractions, lack of attention and information load.

Psychological safety

Team members' ability and willingness to speak up and offer ideas, provide constructive comment and share concerns is affected by team climate. The concept of psychological safety describes a team climate in which members feel willing and able to speak up without fear of embarrassment or retribution (Edmondson, 1999). Unfortunately, some teams lack psychological safety as highlighted in various high profile and tragic incidents (e.g., the Tenerife air crash) in which team members knew there were serious problems but felt unable to speak up (Edmondson, 2019). Research with a US wildland fire crew highlights that even highly skilled and experienced members can be reluctant to speak up even when it may be important to do so (Lewis et al., 2011). Inclusive leadership behaviours such as inviting and encouraging members to share ideas and speak up can contribute to creating a psychologically safe team climate. It should be noted that new team members may initially be hesitant to speak up, especially if they haven't worked with many of the other team members.

Handovers

A particular area of risk for problematic communication is during the handover between teams and shifts (ACSQHC, 2005; Lardner, 1996). During the course of a short briefing teams need to efficiently and effectively communicate key information to an incoming team that sufficiently outlines a complex situation and its likely trajectory. In effect this allows the sharing of situation awareness between teams or team members. Statistics from healthcare highlight how problematic handovers can be and show that communication failure is a contributor to 70% of mishaps that results in death or serious harm to a patient (ACSQHC, 2011).

Recommended reading

Flin, R., O'Connor, P., & Crichton, M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Ashgate. Chapter 4: Communication, pp. 69–91.

Tannenbaum, S. & Salas, E. (2021) *Teams that work: The seven drivers of team effectiveness*. Oxford University Press. Chapter 7: Communication, pp. 102–118.

Resources

Appendix B contains the Psychological Safety Checklist (Brooks & Curnin, 2020). This checklist provides some simple strategies to improve psychological safety in emergency management teams.

See also:

Building a psychologically safe workplace | Amy Edmondson

https://www.youtube.com/watch?v=LhoLuui9gX8

Communication in multidisciplinary healthcare teams

https://www.youtube.com/watch?v=W0ZbfsBOBUA

Photo: Chris Bearman

Chapter 3. Coordination

Coordination is seen as the cornerstone of effective team performance (Klein, 2001). This non-technical skill enables teams to organise the timing and sequence of interdependent tasks and activities. Similar to communication, ensuring good coordination among team members is not simple. This is because team coordination requires all team members to act in an appropriate and timely manner.

Basic coordination requires team members to share knowledge of the task, team and environment so that everyone knows what everyone else is doing. Beyond that to maintain effective coordination individuals need to seek assistance when overloaded and monitor others' performance to detect potential problems. It is also important to maintain vigilance so the team can adapt to changes in the situation (Wilson et al., 2007). Although it tends to be quite obvious when there is a lack of coordination in a team, it may be almost invisible when a team is well coordinated (Zalesny et al., 1995).

It can be seen then that other non-technical skills and team competencies play a role in team coordination such as task knowledge, teammate knowledge and adaptability (Salas et al., 2005; Xiao & Moss, 2001). As noted in Chapter 2, coordination is the second element of the 3 Cs of teamwork. Clearly without some degree of communication and cooperation it is difficult to coordinate and sequence interdependent tasks and activities. A team's efficiency is in part related to their ability to coordinate many of their routine activities with little explicit communication. Cooperation and coordination are also closely linked and this is discussed further in Chapter 3. The processes of communication, coordination and cooperation interact and operate in an iterative manner to enable shared awareness and collaboration (Fuks et al., 2008).

Behavioural markers of coordination

Table 4 (p. 14) provides a summary of the elements and behavioural markers for coordination. The first element focuses on ensuring there are *clear roles, responsibilities and expectations*. The behavioural markers highlight four important aspects, namely carrying out actions as expected, common purpose, common understanding and clear roles and responsibilities. Ensuring this clarity can be very challenging for a team particularly during the escalation phase or during a spike in activity for an event or incident.

The second element outlines the importance of *adjusting to demands*. This element highlights two behavioural markers important in enabling this. The first is the need for team members

to adjust their response as the demands of the situation changes. Emergency events and incidents are likely to evolve in unpredictable ways so that even a well-planned response is likely to need adjustment. The second behavioural marker identifies the need for team members to be mindful that omissions and errors are very likely to occur in these types of settings. Catching these mistakes before they become more problematic is a responsibility that all team members share.

More information about coordination

Different forms of coordination

Teams can be configured to work in different ways which means that coordination can take several forms (Salas et al., 2015). Members may be performing the same or complementary tasks and have differing degrees of interdependence. Higher levels of member and task interdependence will require greater coordination. Coordination may be explicit and use planning, procedures and communication to manage interdependencies. Coordination can also be implicit and based on shared knowledge of the situation, tasks at hand and each other. Implicit coordination occurs when members anticipate team requirements and adjust their behaviours to accommodate team goals without requiring instruction. A particular advantage of implicit coordination is its lower overhead, involving less team member time and cognitive capacity and thus assisting team performance during high workload periods (MacMillan et al., 2004). Explicit and implicit coordination are both key drivers of team performance. Research highlights that teams that utilise routines and distribute responsibilities are more effective than teams that do not (Gersick, 1988; Gersick & Hackman, 1990; Weick & Roberts, 1993).

Common ground

A shared understanding is an important requirement for teams to be able to coordinate both within the team and between different teams. This is referred to as common ground and captures the 'pertinent mutual knowledge, mutual beliefs and mutual assumptions that support interdependent actions in joint activity' (Klein et al., 2005, p. 146). Common ground can support efficient communication within a team. For example, it can enable team members to abbreviate intra-team communications yet still be confident that potentially ambiguous messages will be understood. 'Initial common ground' describes the relevant prior history and knowledge that members bring to a team. This can be facilitated through training/exercising and the use of pre-formed teams. In addition to common conventions or procedures for undertaking particular tasks, initial common ground includes team member knowledge of each other prior to the current assignment (e.g., other team members training, work experience, skills, habits and ways of working).

Directability

An important aspect of coordination is the ability for team members to be able to redirect each other's actions (Christoffersen & Woods, 2002). Directability involves the ability to modify the actions of other team members as conditions and priorities change. Sometimes this will involve a team member noticing that another team member has run into difficulties and altering their own activities to compensate. In other cases this may involve a team member signalling to the wider team that they are either ahead or behind schedule on an important task so that their colleagues can make suitable adjustments. The capacity to redirect enables teams to perform in a more resilient way, facilitating their ability to cope with changing conditions.

Table 4. Coordination.

Non-technical skill category	Element	Behavioural marker
Coordination	**Clear roles, responsibilities and expectations**	▪ Actions are always carried out as expected ▪ There is a clear and common purpose ▪ Everyone has a common understanding relating to the operation ▪ *The roles and responsibilities of team members are unclear**
	Adjusting to demands	▪ Everyone is adjusting to meet the demands of the situation ▪ *Team members are not correcting mistakes made by others**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

Challenges

Predictability

To coordinate their actions effectively team members need to be able to predict the actions of others with some degree of accuracy (i.e., interpredictability). It is also important that team members ensure that their own actions are sufficiently predictable to support effective coordination. Predictability can enable team members to accurately anticipate important features of the situation. For example, how much time is required to complete key tasks, the level of skill required and the degree of complexity and difficulty of tasks. Common operating frameworks (such as AIIMS and standard operating procedures) support interpredictability by creating expectations about how team members will behave. Interpredictability can be further improved when team members are able to take on the perspective of other team members.

Maintaining clarity of roles

It is important that people have a clear understanding of their roles and don't operate outside their role on their own initiative. However, it can sometimes be difficult for teams to maintain clarity of roles. There are often situations where there are insufficient numbers of people, meaning that team members are required to temporarily take on multiple roles. Members can also be asked to perform roles they are not skilled or qualified in. A further challenge can occur when the team consists of members who have different expectations and different approaches to managing incidents. Team members can even sometimes be working to different standard operating procedures and protocols if they are from different agencies. Thus, it is important to make sure that roles are clear and not to assume that people necessarily have exactly the same understanding of a role.

Recommended reading

Tannenbaum, S. & Salas, E. (2021) *Team that work: The seven drivers of team effectiveness*. Oxford University Press. Chapter 6: Coordination, pp. 80–101.

Coordination Resources

Appendix C contains the Key Tasks Cognitive Aid (KTCA) (Hayes et al., 2020). This cognitive aid identifies the must do activities for regional and state level emergency management teams.

Appendix D contains the Emergency Management Breakdown Aide Memoire (EMBAM) (Bearman, 2018a; Grunwald & Bearman, 2017). The EMBAM provides a guide to the types of issues that are likely to contribute to team breakdowns in communication or coordination.

See also:

Working Well Together: How coordination happens

https://www.youtube.com/watch?v=B85K_uklrTo

Photo: Country Fire Authority

Chapter 4. Cooperation

The members of a team can all be good communicators and take appropriate steps to coordinate their activities, but without a positive attitude and the motivation to cooperate with one another, a team will struggle to function effectively. Cooperative attitudes and beliefs play an important role by influencing team members' willingness and ability to communicate and coordinate with each other. Breakdowns in team cooperation occur when there is a lack of willingness to coordinate actions or ensure timely information flow.

An example of a cooperation breakdown occurred during the response to Hurricane Katrina (2005) in the United States, when a lack of cooperation in sharing information significantly undermined the coordination and effectiveness of search and rescue operations (Cooper & Block, 2006). This close connection with communication and coordination makes cooperation the third element of the 3 Cs of teamwork (Bearman et al., 2022; Kozlowski & Bell, 2003).

Behavioural markers of cooperation

Table 5 (p. 17) provides a summary of the elements and behavioural markers for cooperation. The first element focuses on *contributing to a positive team environment*. The markers highlight three types of behaviour that indicate members are: committed to working in the team, are straightforward to interact with and show confidence and trust in one another. These behaviours help create a positive and supportive vibe that encourages open communication, asking questions and offering suggestions and supports a sense of team efficacy, allowing team members to ask questions and offer suggestions.

The second element highlights the role that cooperation plays in *alignment of efforts and management of conflict*. The markers highlight the importance of ensuring members efforts are well aligned to the team's goals and that they can deal appropriately with conflict. In the case of task conflict, this needs to be carefully managed so that it remains constructive and any signs of relationship conflict needs to be dealt with quickly. More information on task and relationship conflict can be found in the section on Management of Conflict, p.17.

More information about cooperation

Team orientation

One of the basic requirements of teams is that they have a team orientation. This occurs when members have a clear interest and desire to work in a particular team and they put the interests of the team ahead of their own (Wilson et al., 2007). Members with a higher level of team orientation have an increased interest in working collectively and are more willing to demonstrate 'give and take' behaviours that assist team functioning. Team orientation enables effective coordination by facilitating input from other team members (Driskell & Salas, 1992).

Team efficacy

Team efficacy is the belief that the team has the capability to accomplish the work or task (Wilson et al., 2007). This belief provides confidence in the team's ability to get the job done and helps enable members to commit to the team and tasks at hand. A feature of high performing teams is that through shared experiences and belief in their fellow members they show a greater sense of collective efficacy and 'teamness'. This enables team members to more readily develop a shared understanding of the situation and recognise their interdependence (Salas & Cannon-Bowers, 2000). Teams whose members show higher levels of collective efficacy have been shown to: apply more effort; engage in more strategic risk taking; perform better; and report higher satisfaction levels (Knight et al., 2001; Lester et al., 2002).

Mutual trust

Trust is critical for team member coordination and is based on the shared perception that members will perform particular tasks and actions important to the team (Wilson et al., 2007). At the interpersonal level trust encapsulates confidence in the integrity, character and competency of another team member. Mutual trust supports sharing of information and makes it easier to provide or accept assistance. Without mutual trust valuable teamwork behaviours such as mutual monitoring and back up behaviours may be misconstrued (e.g., as a lack of confidence in a person's ability) and lead to dysfunctional member interactions that undermine team performance.

Team cohesion

Team cohesion is the tendency for a team to stick together and remain united in their pursuit of their objectives. Team cohesion can be valuable particularly during periods of high workload and stress. Team cohesion has been identified as an important factor in helping members want to remain part of a team. High levels of team cohesion leads team members to be more willing to share information, to increase their enjoyment of working in the team and to help them resolve conflict more effectively (Wilson et al., 2007).

Challenges

Management of conflict

Conflict occurs in almost all teams and although there is a common perception that it is problematic, in some instances it can be constructive. Two common forms of conflict that occur in teams are task conflict and relationship conflict. Task conflict occurs when there is disagreement over how a task or activity should be undertaken or achieved. Low to moderate levels of task conflict can be constructive because it enables team members to debate different ideas and approaches that can strengthen their analysis, problem solving and decision making (De Dreu, 2006; de Wit et al., 2012). To remain constructive this requires members to keep

Table 5. Cooperation.

Non-technical skill category	Element	Behavioural marker
Cooperation	**Contributes to a positive team environment**	▪ Everyone shows willingness to work as a team ▪ Team members are open and approachable ▪ *Team members do not exhibit confidence and trust in each other**
	Alignment of efforts and management of conflict	▪ Everyone is following team objectives without opting for independence ▪ Differences in opinions are resolved effectively ▪ *Individuals are creating unnecessary conflicts**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

their focus on the issues at play and not have hostile emotions triggered by personal criticisms. However, at some point there is likely to be an upper limit in task conflict at which the intensity of disagreement is no longer constructive.

In contrast, relationship conflict such as personal criticism, defensiveness (protecting self-concept), contempt (disrespect), or stonewalling (non-communication) is problematic behaviour for teams. Questioning or critiquing the personal characteristics or competence of another team member is likely to trigger a competitive response, reduce trust and shred any existing bond with the other member (Lau & Cobb, 2010). Relationship conflicts tend to escalate quite quickly as members become adversaries and less inclined to communicate and share information.

Positive team climate

To create an environment that enables members to feel comfortable to speak up without fear of criticism requires a cooperative team climate supportive of problem solving and learning (Edmondson, 2019). This is one of the foundations of psychological safety, which was discussed in Chapter 2. A psychologically safe environment enables team adaptation and learning which is important both for managing the incident at hand and for the longer term capability development of the team (Tannenbaum & Salas, 2021).

Recommended reading

Tannenbaum, S. & Salas, E. (2021) *Teams that work: The seven drivers of team effectiveness*. Oxford University Press. Chapter 5: Cooperation, pp. 58–79.

Cooperation resources

Appendix E contains the Team Process Checklist (TPC) (Bearman, 2018a; Bearman et al., 2022). The TPC provides a set of questions to help teams undertake a health check and identify any issues in the non-technical skill categories of communication, coordination and cooperation. The cooperation items shown emphasises the importance of team members demonstrating a positive orientation towards the team and other members.

See also:

Trusting Teams
https://www.youtube.com/watch?v=W5qQJhe7sLE

Build a tower, build a team | Tom Wujec
https://www.ted.com/talks/tom_wujec_build_a_tower_build_a_team

Photo: Country Fire Service

Photo: Ben Shepherd, NSW Rural Fire Service

Chapter 5. Situation awareness

Building and maintaining a sound understanding of what's going on and how the situation is likely to unfold is central to managing emergency incidents. Developing this ongoing appreciation of the situation enables teams to identify options, make decisions and continue to refine or adjust the response as events play out. Experience and skill levels can play a role in how quickly a person or team comprehends the situation (Endsley, 2018).

Strong knowledge and experience of a situation may mean that less information and time are required to assess what's going on. A less experienced team may need to gather more information, which requires more time to assess the situation. Situation awareness is closely linked to decision making, with effective decision making being based on sound situation awareness (McLennan et al., 2006; Mosier & Fischer, 2010).

Behavioural markers of situation awareness

Table 6 (p. 20) outlines the non-technical skill category of situation awareness, showing three elements and seven behavioural markers. The first element emphasises the importance of *gathering and analysing information*. The behavioural markers indicate the core activities of: timely analysis and identification of patterns and trends; liaison with others to share information and build understanding; and considering the consequences of the available options. In the early stages of an event or incident the initial focus will be building a basic, 'good enough' understanding of the situation (McLennan et al., 2007). As an event or incident develops and more resources and information becomes available, there is likely to be greater ability to develop and maintain a more complete understanding of the situation.

The second element focuses on understanding the evolution of an unfolding event or incident. This is based on the identification of contingencies, problems and expectations. The behavioural indicators focus on thinking ahead to anticipate the likely issues and ensuring that these expectations are articulated in planning and decision making.

The third element shown in Table 6 (p. 20) highlights the importance of *sharing information and insights* so that team members maintain a common understanding. This element captures two aspects important to team situation awareness. The first is ensuring that team members have the information they need to make effective decisions that are aligned and consistent with how to best resolve the incident(s). The second recognises that developing sound situation awareness can be challenging and that inter-member communication and team briefings are an important mechanisms to improve and ensure a common understanding.

More information about situation awareness

The three levels of situation awareness

An individual's or team's degree of understanding of a situation can vary considerable and this influences their ability to make sound judgements about what they are faced with and how this is likely to evolve. One approach to considering awareness is provided by Endsley (1995) who differentiates situation awareness in terms of three levels: (i) perception of elements of the current situation, (ii) comprehension of the current situation and (iii) projection of future status (Endsley, 1995, p.35).

These varying levels of awareness enable different degrees of decision making and response. Level 1 is the simplest and means that a person or team is aware of the basic characteristics of the environment or situation.

Level 2 offers a more thorough and holistic understanding of the situation. This involves recognising and comprehending patterns of information in relation to goals. This is aided by mental models (developed from previous experience) that allow us to understand the meaning of particular pieces of information.

Level 3 is the most sophisticated level of awareness and offers the ability to anticipate (or project) what will happen in the near future. This provides the knowledge required to make appropriate decisions. The ability to be able to anticipate future states is particularly important in dynamic work environments such as emergency management (Flin et al., 2008).

Team situation awareness

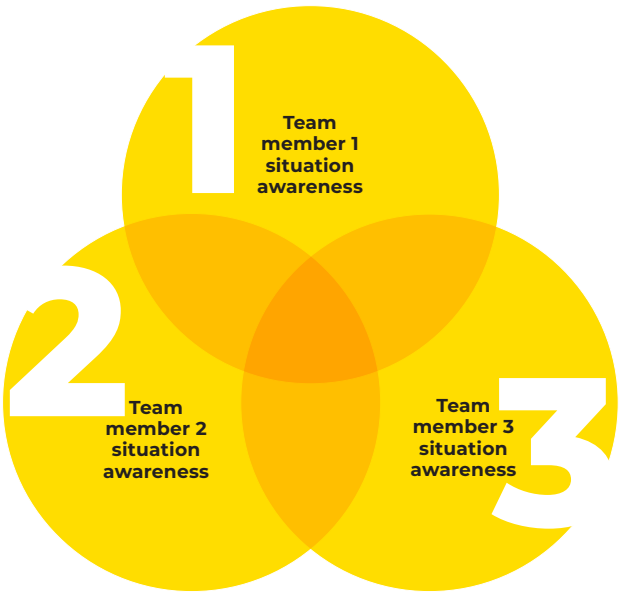
Situation awareness is formed by each individual within a team. This situation awareness needs to be shared with other team members so that shared or team situation awareness can be developed. Within the team each member must have both individual situation awareness appropriate to their particular role and team situation awareness to understand their actions in the broader context of what the team is trying to achieve. This view of team situation awareness can be conceptualised as overlapping circles with the shared understanding shown in the overlap area and the unique understanding shown in the remainder of each circle (Endsley & Jones, 1997). The degree of shared situation awareness will tend to vary depending on the team size and type and scale of event.

Table 6. Situation awareness.

Non-technical skill category	Element	Behavioural marker
Situation awareness	**Gathering and analysing information**	▪ Patterns and trends are identified in a timely manner ▪ Team members ask others about the situation to improve their situational awareness ▪ *The consequences of the options available are not identified**
	Identifies contingencies, problems and expectations	▪ Contingencies are discussed and future potential problems identified ▪ *Expectations are not articulated (i.e. goals and potential event evolution)**
	Sharing information and insights	▪ Views are shared of the current situation with others ▪ *Team members do not effectively participate in team briefing to build and share situational awareness**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

Figure 1. Team situation awareness: shared and unique elements within a team (adapted from Endsley & Jones, 1997, p. 37).



Developing situation awareness within teams is more complex than it is for an individual, requiring much more than just combining members' situation awareness (Salas et al., 1995). Members each contribute to developing the team's situation awareness through communicating, cooperating and coordinating with one another. This requires active management of information and intelligence and ensuring that pertinent information is shared with the appropriate team members in a timely fashion.

Anticipatory thinking

The first and second elements in Table 6 (p. 20) link to the concept of anticipatory thinking (Klein et al., 2007). There are three common forms of anticipatory thinking: pattern matching; trajectory tracking; and convergent thinking. Pattern matching involves matching aspects of the current incident to previously experienced events. This form of thinking not only helps to diagnose the situation but is valuable in providing early warning of the likely problems ahead (Klein et al., 2011). A common example of pattern matching for bushfire in south eastern Australia is where strong north west winds are forecast to be followed by a south westerly change (Hayes & Birch, 2009). This pattern of weather is recognised as classic conditions conducive for large and difficult bushfires.

Trajectory tracking involves noticing and extrapolating trends so that a team can get 'ahead of the curve'. In other words, preparing for how the situation is likely to unfold and taking account of the time it may take for the organisation to respond. This approach integrates the assessment of external events with the preparations required to manage them (Klein et al., 2011). A simple example of trajectory tracking is the warm start of IMTs during days of extreme fire risk (Hayes & Birch, 2009).

Convergent anticipatory thinking occurs when the connections between events and consequent implications are identified. This enables a team to understand the significance of the different events and to recognise interdependencies among them. In some instances, convergent thinking may be identified by inconsistencies in events (Klein et al., 2011). For example, effective convergent thinking during the 2003 Californian bushfires (Cedar Fire) would have recognised that fire suppression activities were ultimately dependent on continuity of the supply of electrical power to pump reticulated water. Unfortunately this contingency was not recognised until too late and municipal reservoirs emptied because the pumps providing supply stopped working (Hayes & Birch, 2009).

Challenges

Incomplete situation awareness

The quality of a team's situation awareness will influence the ongoing effectiveness with which aspects of the environment, activities, and/or the situation are monitored. If a team develops a faulty understanding of the situation, then they may continue to monitor the wrong or inappropriate sources of information (Edgar et al., 2010). This will undermine the team's ability to develop an understanding of the true situation and thus limit the effectiveness of their decision making. It is important then to focus on strategies that help people build an appropriate understanding of dynamic situations and the pitfalls inherent in this process.

Cognitive biases

Situation awareness is developed by each individual based on their unique training, experience and knowledge. Moreover, how we attend to, perceive and use information in our environment is subject to a number of basic cognitive limitations, biases and heuristics.

A heuristic is a rule of thumb that has low demand for cognitive resources but produces solutions that will be mostly effective (Gigerenzer & Gaissmaier, 2011). The use of a heuristic enables an individual to simplify situation

assessment and decision making by ignoring part of the information available, helping to reduce the time and effort required (Gigerenzer & Gaissmaier, 2011). The use of heuristics is a valuable strategy to make efficient use of a team's cognitive resources but this can lead to biases in situation assessment and decision making.

Brooks et al. (2020) interviewed 58 of Australia's leading marine spill disaster experts to identify the cognitive biases[2] they were susceptible to in their work. These experts were found to be vulnerable to nine biases including well-known ones such as confirmation, anchoring, availability and planning fallacy. Biases occurred during two distinct phases: 1) the judgement phase when the experts were assessing information and intelligence to understand the situation and 2) during the decision phase when the experts were determining the meaning of information for potential options to resolve the incident.

Dynamic risk assessment

Dynamic risk assessment (DRA) is closely associated with building and maintaining situation awareness. Appreciating the dynamic risks that are at play in a situation is recognised as a significant challenge for teams managing incidents.

Many fire services have procedures for conducting dynamic risk assessments. For example, the South Australian Country Fire Service (CFS) defines dynamic risk assessment as the 'continuous assessment and control of risk in the rapidly changing circumstances of operational incidents and training' (CFS, 2017, p. 1). The CFS's Standard Operating Procedure for DRA outlines four main steps.

1. **STOP** – evaluate the situation, tasks and persons at risk
2. **THINK** – select systems of work
3. **ASSESS THE RISK** – assess the chosen system of work
4. **TALK TO SOMEONE ABOUT IT** – decide and modify

Research on experienced UK firefighters using DRA during operations (Okoli et al., 2016) highlights that DRA it is not simply a process of balancing the risks of a proposed course of action against the likely benefits. DRA requires sound situation awareness and decision making, supported by mental models and heuristics (rules of thumb) developed through training, experience and knowledge (Sadler et al., 2007).

While DRA can be an valuable strategy it is important to remember that DRA can be subject to cognitive biases and is only as good as the mental models and heuristics that it is based on. So, if a situation has not been encountered before and cannot be reasonably anticipated based on a person's training, experience and knowledge then the DRA can be faulty. A particularly dangerous occurrence is where a situation is treated as familiar but has not in fact been experienced before and differs in fundamental ways to the familiar experience.

Integrating different sources of information

Building sound situation awareness for incidents can be very challenging. Information relevant to the incident may be held by people in a variety of roles and may need to be elicited from a number of sources (Bearman et al., 2013). Usually no single individual has a complete overview of the situation. Developing situation awareness requires integration of the various and possibly contradictory or incomplete accounts of events in order to form a coherent understanding of the evolving situation.

At tactical or strategic levels there are also a number of elements outside the immediate situation that may need to be taken into account. This could include maintaining situation awareness for: the resourcing available; capability and status of the IMT; community, economic and political sensitivities; and the likely consequences that may result from the incident and the response efforts. Some Australian emergency agencies use the acronym PESTEL (Political, Economic, Social, Technical, Environmental and Legal) to remind emergency and incident managers of the various contexts that they need to consider and manage risk for (Hayes, 2014).

2 Brooks and Curnin (2020) define a bias as 'a mistake in reasoning, evaluating or remembering that often occurs because we hold onto our preferences and beliefs regardless of contrary information or intelligence. The extent to which we hold on to our biases can be influenced by factors such as stress, fatigue or time pressures.'

Recommended reading

Flin, R., O'Connor, P., & Crichton, M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Ashgate. See Chapter 2: Situation awareness, pp. 17–40.

Adams, R., Owen, C., Scott, C., & Parsons, D. (2017). *Beyond command and control: Leadership, culture and risk*. CRC Press. Chapter 5: Leadership and situation awareness, pp. 41–58.

Elliott, G., Omodei, M., & Johnson, C. (2009). How human factors drive decisions at the fire ground level. *Fire Note*(44), 1–4, Bushfire CRC. http://www.bushfirecrc.com/managed/resource/0909_hf_firenote44_lowres.pdf.

Situation Awareness resources

Human factors for pilots – Situational awareness
https://www.youtube.com/watch?v=pAx1v7nQmss

Whodunnit
https://www.youtube.com/watch?v=ubNF9QNEQLA

Awareness test
https://www.youtube.com/watch?v=Ahg6qcgoay4

Photo: Fire and Rescue NSW

Photo: Country Fire Service

Chapter 6. Decision making

Emergency and incident management teams can face considerable challenges in making decisions. There are often uncertain and dynamic conditions and the need to make time-sensitive decisions with major consequences for peoples' lives and property. Decision making is intimately linked with situation awareness. It is very difficult to make effective decisions without a good understanding of what is going on (McLennan et al., 2006; Mosier & Fischer, 2010). Similarly, making decisions and taking action can generate valuable feedback and insights that may enhance a team's situation awareness. It is also important to be able to communicate the decisions that have been made in an effective way.

An important part of good decision making is communicating decisions in an effective way. Without effective communication of decisions team members may become frustrated or mistakenly act in ways that are at odds to the plan that has been developed (Bearman et al., 2015). Decisions also need to be effectively communicated to communities, media and political representatives. Finally, stress and fatigue can undermine decision making by adversely affecting situation awareness and social interaction (Sandi, 2013). This is discussed further in Chapter 8.

Behavioural markers of decision making

Table 7 (p. 25) provides a summary of the elements and behavioural markers for decision making. The first element highlights the need to make *sound and timely decisions*. This requires a balance between needing to act and obtaining more information (that may or may not improve decision making outcomes). This element also captures the need to identify which aspects of an incident require swift decisions and which aspects have more time available to make decisions.

The second element emphasises the importance of ensuring that an *appropriate decision making approach* is employed to address the situation at hand. The behavioural markers describe the requirement to use suitable decision making approaches (see section on More information about decision making on p. 25) and the importance of adjusting plans as the situation changes. The second behavioural marker highlights two particular issues for teams. The first is ensuring that situation awareness is maintained so that plans can be adjusted to respond to

significant changes. The second identifies the occurrence of plan continuation errors, which is the tendency to continue with a course of action that is no longer viable (plan continuation errors are discussed in more detail on p. 27).

The third element *engaging others in decision making* is an important aspect of working in teams. Incorporating others' perspectives where practicable can strengthen the quality of decision making and help increase the shared ownership of decisions. The climate within a team and inclusive leadership behaviour play a central role in enabling members to speak up, offer suggestions and share helpful information. This is discussed further in the section on psychological safety in Chapter 2, p.12 and in the section on positive team climate in Chapter 4, p.18. Decisions need to be clearly communicated to personnel who will be responsible for implementing those decisions and to the various other parties who may be affected by the decisions. This may require different communication styles for different audiences.

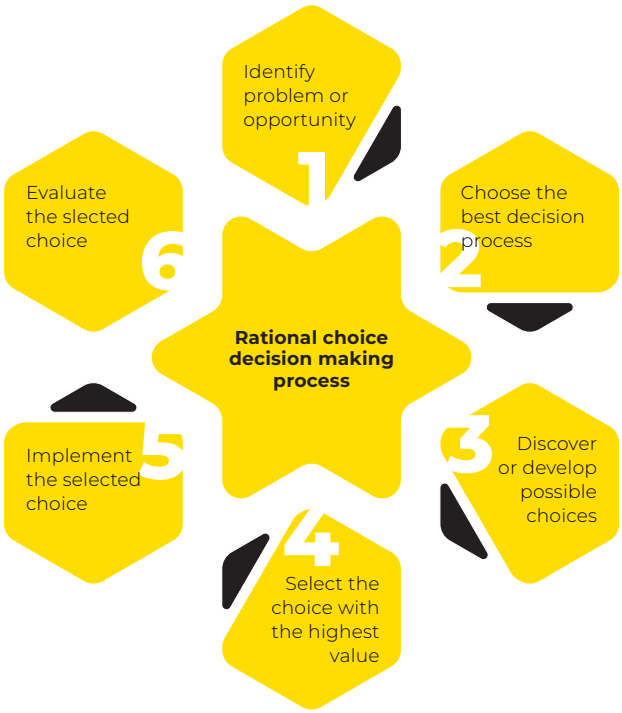
More information about decision making

Decision making is based on situation awareness and is supported by communication. Like situation awareness effective decision making is based on mental models developed through training, experience and knowledge. A number of approaches to decision making have been proposed and are briefly reviewed in the following sections.

Classical decision theory

One of the most common approaches used to describe decision making is classical decision theory. The origins of classical decision theory are from economics and these approaches outline a series of steps and rules, that if followed, will lead to the best decision in a given set of circumstances (Simon, 1959). Classical decision models are also described as analytical or rational approaches because they assume that the decision maker is seeking to maximise the return or outcome based on probability. These models typically follow 6 or 7 steps as shown in Figure 2 below.

Figure 2. Rational choice decision making process (Adapted from: McShane et al., 2019).



Versions of the rational choice model can sometimes be found in emergency management agencies' operational doctrine.

Table 7. Decision making.

Non-technical skill category	Element	Behavioural marker
Decision making	**Sound, timely decision**	▪ Decisions are being appropriately prioritised ▪ *Decisions are not being made on a timely basis**
	Appropriate decision making approach	▪ Appropriate decision making approaches are applied to the situation at hand (e.g. speed vs thoroughness) ▪ *Plans are not readily adjusted as the situation changes**
	Engaging others in decision making	▪ Others' ideas and inputs are incorporated into decisions when practicable ▪ There is flexible matching of communication style to the audience ▪ *Decisions (and intent) are not clearly communicated**

(Note: items marked with an * are negative behavioural markers. Source: adapted from Hayes et.al., 2021; p.197)

The classical or rational approach indicates how decisions should be made rather than what decision makers actually do (Adams et al., 2017). These approaches make various assumptions that generally do not match the conditions which most decision makers operate under. The classical or rational approaches assume that decision makers operate in what has been described as *small world* situations (Gigerenzer & Gaissmaier, 2011). In this situation there is the ability to gather complete information for all of the relevant alternatives, their consequences and probabilities, the future is certain and therefore the optimal solution to a problem can be identified. However, most emergency management decisions are made in *large world* situations (Gigerenzer & Gaissmaier, 2011) where some of the relevant information is unknown or needs to be estimated and the future is uncertain, which undermines the conditions for classical decision making.

Biases and heuristics

Rather than attempting to make decisions that are rational according to classical decision theory a different approach to making decisions has focused on biases and heuristics (e.g., Tversky & Kahneman, 1974). Biases and heuristics are mental shortcuts that help individuals and teams to make decisions more quickly using less cognitive resources (also see the section on cognitive biases in Chapter 5, p.21). By only considering a subset of the available information, heuristics assist people make decisions quickly and can enable skilled performance.

McLennan et al. (2007) have highlighted some of the simple and robust heuristics that are used by more effective fire service commanders to assist their decision making. Two of the more frequently used heuristics are *minimaxing* and *means-end analysis*. Minimaxing occurs when decision makers select the course of action least likely to lead to the worst outcome. Means-end analysis is a strategy that seeks to reduce the distance to the goal state from the current situation.

Using heuristics can be a fast and effective strategy that provides workable solutions but heuristics do have limitations. The solution that is produced may not be the best solution and can in fact be flawed because not all of the important dimensions of the problem are necessarily considered.

Naturalistic decision making

Rather than focusing on how decisions should be made, naturalistic decision making (NDM) models have been developed to describe the actual behaviours of decision makers in complex real world settings. Klein (1993) observed firefighting crews' response to emergency callouts and found that rather than choosing between options as envisaged in classical decision theory, fire commanders focused on the assessment and appropriate categorisation of the situation (Klein, 1997).

These observations led to the development of the *Recognition-Primed Decision* (RPD) model, one of the best known NDM frameworks. The RPD model is used by experts who have seen large numbers of operational situations. In RPD the person making the decision recognises a situation as familiar (something they've seen before) and retrieves a stored solution from memory. When a situation is recognised as familiar the decision maker understand what types of goals are plausible, what to expect next and the typical ways of responding to the situation (Hutton & Klein, 1999; Klein, 1999). When a solution to the problem or course of action is uncertain or isn't recalled from memory the decision maker can use mental simulation to imagine how a particular approach may (or may not) work. This can be repeated multiple times by the decision maker to select and refine a suitable course of action.

RPD approaches are commonly used in emergency and incident management. Research undertaken with IMTs found that recognitional strategies were used for almost 3 out of 4 (72%) critical decisions (Taynor et al., 1990). RPD approaches offer a number of advantages such as speed, little conscious thought, satisfactory and workable options and are resistant to the effects of stress (Flin et al., 2008). However, RPD approaches also require users to be experienced, may be difficult to justify and can lead to confirmation bias. Confirmation bias occurs when decision makers only look for evidence that supports their situation assessment or proposed course of action and ignore contrary evidence (Flin et al., 2008).

Metacognition

An important part of making effective decisions is knowing the limitations of one's information processing abilities. Thinking about and managing our own thought processes is known as metacognition (Flavell, 1979). Two important aspects of meta-cognition relevant to managing emergencies are self-awareness and self-regulation. Self-awareness is about knowing the limits of our own thinking, whereas self-regulation is about being able to manage our limitations.

Frye and Wearing (2014) found that effective decision makers utilised metacognition by adopting a repetitive and adaptive type of thinking to manage incidents. These decision makers incorporated feedback from their previous decisions to improve their situation awareness and decision making. This decision making pattern was based on a metacognitive loop of monitoring, deciding and acting. Figure 3 below outlines this metacognitive loop and some of the typical decision trade-offs considered for each element. The metacognitive loop provides helpful questions which can be used to help calibrate timely decision making for personnel newer to incident management (Frye & Wearing, 2014).

Figure 3. Meta-cognitive loop and decision trade-offs for building situational awareness, making timely decisions and putting decisions into action. (Adapted from Frye & Wearing, 2014, p. 66)

Challenges

Complex, dynamic and time constrained environments

Incident and emergency management personnel often face a number of challenges in relation to decision making. Decisions are made in real time to achieve the outcomes; earlier decisions tend to constrain later decisions; and the environment changes both as a consequence of the nature of the emergency and because of the decision makers actions (Brehmer, 1992). In addition, emergency management teams are usually working under considerable time pressure and need to make decisions based on incomplete information of varying quality from multiple sources. These types of environments generate significant workload and pressure on the teams. Teams are often juggling multiple priorities such as: minimising the impact of the event or incident(s), providing community warnings, tasking responders, ensuring adequate resources are being mobilised and interacting with the media and politicians (Hayes et al., 2020). The high-stakes nature of these events further exacerbates the demands on the team (Douglas, 2014; Paton, 2003). This means that emergency management teams need to be mindful of their decision making, have developed principles and procedures for making good decisions under pressure and be aware of the potential pitfalls in decision making in such situations.

Cognitive limitations

The capacity of our working memory constrains how much information we can hold, utilise and be mindful of at any moment (Baddeley, 2001). If there is too much information that needs to be processed then the result is cognitive overload and decisions will be made on only partial information. The need to manage the amount of information that we can process at any one time has led McLennan et al. (2007) to make a number of suggestions. First, that incoming information is managed to allow team members to focus on information that is most relevant to them at that time. Second that tools such as note taking and maps are used to reduce the load on working memory. Third, that teams anticipate how an incident is likely to develop to reduce the need to react to changes in a short-space of time. Fourth, teams actively manage their level of cognitive and emotional arousal so that they can remain focused on decision making processes. Examples of activities used to dampen arousal and stress include physical activity, deliberate physical relaxation and positive self-talk.

Plan continuation errors

Plan continuation errors occur when there is a marked reluctance to change a plan, even if there is clear evidence that it is no longer working. Omodei (2012) has found clear evidence of plan continuation errors in fireground personnel in Australia. A tool that can be used to help reduce plan continuation errors is the pre-mortem. Originally developed by Gary Klein (2003), Claire Johnson refined the use of this tool for incident management (Johnson, 2011, 2014). The approach requires teams to consider what factors or events might be 'fatal' to their proposed plan. This enables decision making teams to recognise key assumptions and contingencies and to identify

the indicators that will early on show whether the plan is effective or not. This pre-mortem approach can also be used to develop backup plans should the initial approach become no longer tenable.

Fixation and fibrillation

Frye and Wearing (2014) have identified that novices in incident management are vulnerable to two main types of decision making error: fixation errors and fibrillation errors. A fixation error occurs when a person becomes overly-focused on one aspect of the incident. This is a form of tunnel vision that can lead to important aspects of the incident being overlooked. In contrast fibrillation errors occur when a person keeps on shifting their attention so frequently that they cannot make progress on any critical tasks. One way to overcome these errors is to encourage more reflection on decision making using techniques such as the metacognitive loop (see the section on metacognition on p. 26).

Recommended reading

Frye, L. M., & Wearing, A., J. (2014). What were they thinking? A model of metacognition for bushfire fighters. In C. Owen (Ed.), *Human factors challenges in emergency management: Enhancing individual and team performance in fire and emergency* (pp. 57–78). Ashgate.

Hayes, P. (2014). *Decision making under pressure: A resource for incident management teams*. AFAC.

Johnson, C. (2011). How bushfire firefighters think about worst case scenarios. *Fire Note* (77), Bushfire CRC. http://www.bushfirecrc.com/sites/default/files/managed/resource/worst_case_scenarios.pdf

Johnson, C. (2014). Expert decision making and the use of worst case scenario thinking In C. Owen (Ed.), *Human factors challenges in emergency management: Enhancing individual and team performance in fire and emergency* (pp. 35–55). Ashgate.

McLennan, J., Omodei, M., Holgate, A., & Wearing, A. J. (2007). Human information processing aspects of effective emergency incident management decision making. In M. Cook, J. M. Noyes, & Y. Masakowski (Eds.), *Decision making in complex environments* (pp. 143–151). Ashgate.

Decision making resources

Appendix C contains the Key Tasks Cognitive Aid (KTCA) (Hayes et al., 2020). The KTCA outlines the important tasks that regional and state-level emergency management teams need to complete during the various phases of coordinating multiple incidents.

Appendix F contains the Cognitive Bias Aide Memoire (CBAM) (Brooks et al., 2020; Brooks & Curnin, 2020a). The CBAM provides a simple set of nine questions that help manage common cognitive bias such as confirmation, anchoring, availability and planning fallacy in emergency management.

See also:

Human factors for pilots – Decision making

https://www.youtube.com/watch?v=UhfA1pCImlQ

Why we make bad decisions | Dan Gilbert

https://www.ted.com/talks/dan_gilbert_why_we_make_bad_decisions

Photo: NSW Rural Fire Service

Chapter 7. Leadership

Leadership plays an important role in team effectiveness through activities such as setting direction, encouraging the team, coordinating activities and establishing a positive team atmosphere (Salas et al., 2004). Although leadership is often described as an innate quality, leadership skills can be learned and developed. The concept of leadership has developed over time evolving from the early trait-based approaches (that saw leadership as innate) to more contemporary approaches that emphasise the importance of ethical practice, engagement, inclusiveness and how leadership can be shared or distributed in a team (Alimo-Metcalfe, 2016).

Behavioural markers of leadership

Table 8 (p. 30) provides a summary of the elements and behavioural markers for leadership. The first element highlights the role that leadership plays in *creating a suitable team environment*. The markers outline behaviours that are conducive to creating a supportive environment and emphasise the importance of consistently modelling sound, respectful and inclusive behaviour.

The second element outlines the importance of *providing focus, direction and coordination* of team activities. This set of markers index behaviours that effective leaders use to support and guide the team so that activities are well coordinated and an appropriate focus is maintained on the task at hand.

More information about leadership

Leadership is an area that has been extensively researched and many different theories of leadership have been proposed. We will discuss four approaches to leadership here that are most relevant to incident and emergency management.

Leadership by incident commanders

Based on interviews with incident commanders, Flin (1996) has found that the most effective emergency management leaders are those who are able to:

1. diagnose the situation (the task or problem, the mood, the competence and motivation of the team);
2. have a range of styles available (e.g., delegative, consultative, coaching, facilitating, directive); and
3. match their style to the situation at hand.

Flin's (1996) observations highlight the importance of context and the requirement for leadership to be guided by a sound understanding of the situation, both in terms of the event or incident and what shape the team is in. A second point identified in this analysis is that to become an effective leader requires developing a broad repertoire of leadership styles that can be readily and appropriately deployed to address the situation at hand. As individuals we tend to have our preferred style of interacting with others. Flin's analysis highlights the importance of developing various leadership styles.

Developing these different styles will take time and practice for most people to become proficient and comfortable in their use.

AFAC Leadership Capability Framework

Many emergency management organisations use leadership capability frameworks to outline the broad range of leadership capabilities most relevant for their various operations. For example, the AFAC (2017) Leadership Capability Framework shown in Figure 4 below identifies the seven capability areas of ethics, relationships, strategic agility, people, results, self and influence. These frameworks are fairly generic given they are designed to span a range of emergency management organisations and various activities. However. In addition to leadership, these frameworks typically highlight the importance of a range of other non-technical skills such as situation awareness, communication and decision making.

Figure 4. AFAC Leadership Capability Framework. Source: AFAC Leadership Capability Framework (2017), p. i.

Action-Centred Leadership

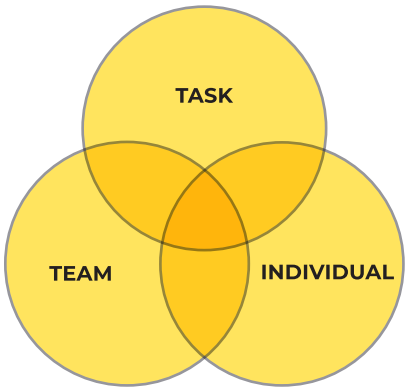
Another view of leadership is provided by the theory of Action-Centred Leadership (known as Adair's 3 Circles). This is one of the better known leadership frameworks used in emergency management (Adair, 2009). This framework states that to be effective, leadership needs to consider three areas of need. The first of these is achieving the task, the second building and maintaining the team and third is developing the individual. These can be conceptualised as three overlapping areas (circles) of focus for leadership as shown in Figure 5 below. Team members expect leaders to empower them to achieve tasks, improve team synergy and respond to member needs. Adair's model indicates that no matter what level leadership operates at, task, team and individual needs must be considered.

Table 8. non-technical skill of leadership.

Non-technical skill category	Element	Behavioural marker
Leadership	**Creates a suitable team environment**	▪ Good behaviour is consistently modelled ▪ *Others are not treated with respect** ▪ Inclusive behaviours are modelled that enable others to speak up and offer suggestions and constructive comment
	Provides focus, direction and coordination	▪ There is a focus on the important tasks at hand ▪ Appropriate direction and guidance is provided ▪ *Activities are not well-coordinated within the team**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.197)

Figure 5. Adair's 3 Circles (or Action-Centred) leadership. Source: Adapted from Adair (2009), p.38.



Distributed and inclusive leadership

Clearly within emergency management settings there is a need to work within organisational hierarchies, structures and doctrine such as AIIMS. Generally, these arrangements indicate a form of vertical leadership. However, there is recognition that utilising the leadership capability of team members is an important way to strengthen team performance. A simple approach to utilising this capability is the use of shared or distributed leadership (Pearce, 2004). This occurs when skilled team members are engaged to help assist in providing leadership for particular aspects of the team's activities. A second approach that enables team members to more fully contribute is inclusive leadership. Inclusive leadership behaviours such as showing fallibility and inviting input from team members helps to create a team environment more conducive to members feeling able to speak up with observations, questions or concerns (Edmondson, 2003). In other words, a psychologically safe team climate. This is discussed further in the section on psychological safety in Chapter 2, p.12 and in the section on positive team climate in Chapter 4, p.18.

Challenges

Overcoming dysfunctional momentum

A challenge for leadership can be the pressure they may face to 'get the job done'. Owen et al. (2015) observes that there can be a tendency for leaders to get caught up in the moment with a strong desire to act. This tendency to want to act with limited thought and assessment of weak signals warning of danger has been described as goal seduction (Bearman & Bremner, 2016) and reflects a 'can do' cultural norm. This can lead to what has been described as 'dysfunctional momentum'(Barton & Sutcliffe, 2009). Dysfunctional momentum occurs when a leader or team continues to engage in a failing action that leads to undesired or incomplete outcomes. The first mechanism that can reduce the likelihood of dysfunctional outcomes is ensuring team members can speak up and raise concerns. The second mechanism is leaders actively seeking alternative perspectives from team members (Owen et al., 2015).

Leadership needs to change to reflect teams changes

As a team changes and matures the leadership of that team will need to change (Kozlowski et al., 2009). For example, as a team becomes more expert leaders should empower more capable team members to use and refine their skills and adopting a more consultative and less directive leadership style. As Flin (1996) notes, more effective leaders develop a range of leadership styles that allow them to match their style to that required by the situation and the capability of the team.

Recommended reading

Flin, R., O'Connor, P., & Crichton, M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Farnham: Ashgate. See Chapter 6, Leadership, pp. 129–156.

Lantz, A., Ulber, D., & Friedrich, P. (2020). *The problem with teamwork and how to solve them*. Abingdon: Routledge. See Chapter 8, The teams do not perform well because of a lack of good leadership, pp. 189–216.

Owen, C., Scott, C., Adams, R., & Parsons, D. (2015). Leadership in crisis: Developing beyond command and control. *Australian Journal of Emergency Management, 30*(3), 15–19.

West, M.A. (2012) *Effective teamwork: Practical lessons from organisational research* (3rd ed). Wiley and the British Psychological Society. See Chapter 4, Leading teams, pp. 60–86.

Leadership resources

Great leadership starts with self-leadership | Lars Sudmann | TEDxUCLouvain

https://www.youtube.com/watch?v=vlpKyLklDDY

Photo: New Zealand Fire Service

Chapter 8. Coping, stress and fatigue management

Work in emergency and incident management teams can be very demanding (Paton & Flin, 1999). The event or incident may involve injury or death, destruction of property or loss of community resources. Teams dealing with these situations will also experience other stressors, such as high workload, acute time pressures, high-stakes decision making, close media scrutiny and the requirement to manage political and community interests. Furthermore, the management of events or incidents may not always go to plan, so further coping may be required to deal with the frustration and concerns that can occur when there are significant problems or adverse outcomes. Fatigue can also adversely affect the performance of emergency and incident management teams (Aisbett et al., 2012; Andrei et al., 2020; Bendak & Rashid, 2020; Brooks & Owen, 2012; Gregory & Shanahan, 2017; Vincent et al., 2016). Taken together stress and fatigue can negatively impact all of the other non-technical skills, such as communication, cooperation, communication, situation awareness, decision making and leadership.

Behavioural markers of coping, stress and fatigue

Table 9 (p. 33) provides a summary of the elements and behavioural markers for coping, stress and fatigue management. The first element highlights the importance of managing the pressure from stress and fatigue commonly experienced in team settings. The markers outline behaviours focus on the need for the team to remain composed, maintain an appropriate level of focus on key activities and remain flexible despite challenging conditions. These markers emphasise the importance of ensuring thinking remains suitably focused as this can be undermined by stress and fatigue.

The second element outlines the importance of *employing effective coping strategies* to enable monitoring and management of the effects of stress and fatigue. The markers outline behaviours that identify the impact of stress and fatigue on the team, recognise the need to use strategies to mitigate stress and fatigue and promote helping/

accepting help from others. Similar to the first element, these markers highlight the value of team members knowing and understanding their own limits and taking active steps to manage these when they become stretched. The management of stress and fatigue within a team also requires members to maintain a degree of awareness of how other team members are travelling so that potential issues can be identified early.

Types of stress

Emergency management is an inherently stressful activity. There is often time pressure, ambiguity, performance pressure, unpleasant situations and high stakes decisions that need to be made. The various stressors in emergency management can be classified into four broad categories (Dietz et al., 2017):

Task demands are related to various aspects of the work being undertaken by the team and its members, such as concurrent task performance and shifting between tasks. Stressors include time pressure, task load and fatigue.

Coordination demands are related to the need to coordinate tasks with team members up, down and laterally through the chain of command. Stressors include role ambiguity, coordination requirements and command pressure.

Threat demands are related to operating effectively under conditions of threat and maintaining composure whilst working in difficult environmental conditions. Stressors include threat and related risk factors.

Novelty demands are related to coping with unusual and novel situations and uncertain task environments. Stressors include novelty, task uncertainty and task ambiguity.

Acute & chronic stress

Stress can have both acute and chronic effects. Acute stress, also known as critical incident stress, is 'sudden, novel, intense and of relatively short duration' (Salas et al., 1996, p. 6). Acute stress is most pronounced as a response to a sudden life-threatening or traumatic scene. Acute stress creates strong physiological and psychological reactions and disrupts an individual's ability to perform goal-oriented behaviour (Flin, 1996). The classical behavioural responses often associated with acute stress are fight, flight or freeze although more recent literature suggests that freeze, flight, fight or fright may be a more apt description (Bracha et al., 2004).

Chronic stress is related to various factors which are part of life (such as jobs and family) (Salas et al., 1996). Chronic stress tends to occur over longer periods and is described as 'persistent negative experiences or exposure to threat or excessive demand' (Baum et al., 1993, p. 274). Unfortunately, workplace related factors are often a key source of chronic stress. Recent research by Bancroft (2019) has found that in addition to potentially traumatic events at work, more routine operational and organisational factors are often significant stressors for firefighters.

Effects of stress on individuals

Stress interferes with the performance of complex tasks and teamwork in a variety 'of ways. At the individual level, stress adversely affects cognitive, emotional, behavioural and physiological processes.

Table 9. non-technical skill of coping, stress and fatigue management.

Non-technical skill category	Element	Behavioural marker
Coping, stress and fatigue management	**Manages pressure**	▪ A suitable level of focus is maintained when under pressure ▪ *Team members do not remain composed when under pressure** ▪ Team members remain flexible when faced with sub-optimal or novel conditions
	Employs effective coping strategies	▪ The effects of fatigue on oneself and others are recognised and appropriate actions are taken to manage this ▪ Coping strategies are used to manager sub-optimal conditions (e.g., takes notes, prioritises tasks, delegates) ▪ *Team members do not request (and offer) assistance from (to) others, when necessary**

(Note: items marked with an * are negative behavioural markers. Source: Adapted from Hayes et.al., 2021; p.198)

Cognitive. Stress negatively impacts cognitive processes such as attention, memory, problem solving, judgement and decision making (McLennan et al., 2014; Staal, 2004). This typically leads individuals to narrow their attention, increase reliance on heuristics (rules of thumb and mental shortcuts), reduce vigilance, show greater rigidity in their performance and decreased problem solving ability (Salas et al., 1996).

Emotional. From an emotional perspective, stress activates individual reactions such as anxiety, fear and frustration (Driskell & Salas, 1991).

Behavioural. The impact of stress on cognitive and emotional processes in turn impact individual-level task and social behaviours. For example, behaviour such as increased irritability and reduced sociability are common reactions (Sandi & Haller, 2015).

Physiological. From a physiological perspective common stress responses include elevated cortisol levels, increased heart rate and increased systolic blood pressure (Allen et al., 2014).

Effects on teams

Similar to individuals, teams can be adversely affected by stress (Dietz et al., 2017). At the team level, the effects of stress on individual members and the team collectively can lead to decreased cooperation, ineffective communication and reduced coordination. As noted in the previous chapters, these 3 Cs of teamwork are central to situation awareness, decision making, leadership and the overall effectiveness of a team. Of course reduced cooperation, ineffective communication and decreased coordination are most likely to make working in a team a more frustrating experience and further increase stress levels. The relationship between the individual and team effects of stress are shown in Figure 6 below.

Challenges relating to stress

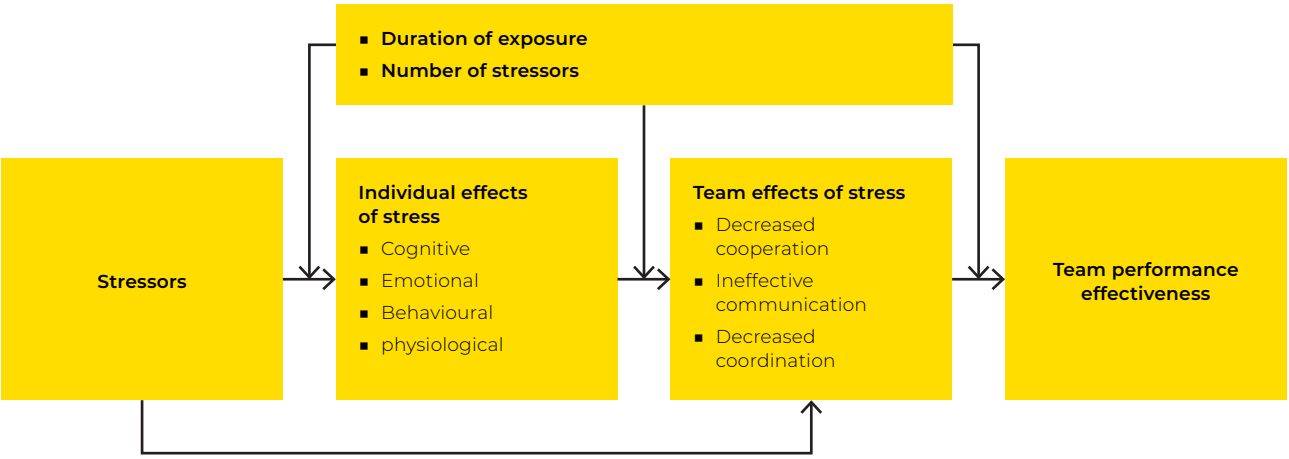
Increased distraction and reduced attentional focus

There is strong evidence that increased stress compromises a person's ability to focus on the key issues at hand (Dietz et al., 2017). Stress can lead to narrowing of a person's breadth of attention or mean they are less focused and more susceptible to distraction. For more complex activities, this narrowing of attention means that the person (or team) may focus on a more limited set of salient cues and miss key task relevant information, which can compromise task performance. Similarly if stress leads to a person or team being susceptible to distraction they may not focus long enough to identify important cues, understand the implications of cues or may be less able to implement and follow through on the required decisions and actions. In addition to the adverse impact of reduced attentional focus, stress can have both social and interpersonal consequences. The tunnelling of attention or increased distractability can mean team members miss important social and interpersonal cues indicating that other members require assistance to coordinate interdependent tasks and activities (Driskell et al., 1999).

Negative emotions and frustrations

As stress levels increase, emotional reactions such as subjective feelings of annoyance, tension and frustration are also likely to increase.

Figure 6. A model framework of the effects of stress on performance (Source: Dietz et al., 2017, p. 298).



Part of the challenge for team members is that despite the challenging conditions and potential threats they need to remain composed and keep their emotions in check so that they stay focused on the task at hand. Emotional stability not only helps team members stay more composed but is important in maintaining the cooperative interaction required to effectively undertake more complex tasks and activities (Driskell et al., 1987; Mount et al., 1998).

Social impairment

Stress can impair a range of social behaviours that are important for teamwork. In teams, stress reduces cooperativeness and the tendency to help others, increases aggression and attenuates sensitivity to social or interpersonal cues. This impairment may be less of a concern for simpler and more routine tasks. However, more dynamic tasks often require skilled mutual adjustment between the team members (Larson Jr & Schaumann, 1993) and this can be critically undermined if team members are socially impaired by the effects of stress.

Increased cognitive load and demand on capacity

Various aspects of work contribute to the cognitive load on an individual. The first is the perception of the work demands imposed by a task environment, which is sometimes referred to as workload. The second is task load, the number of concurrent tasks that need to be undertaken. The third relates to the nature of the tasks and environment within which the tasks are undertaken. The volume of work required, pace of work and task complexity are important (Spector & Jex, 1998) as are the environmental conditions under which the tasks are undertaken. In particular, increases in task load contribute to overall stress levels for team members, requiring them to manage multiple activities, switch tasks, respond to queries and information requests and maintaining situation awareness. Cognitive load increases for novel tasks, which require greater use of conscious thinking processes. These processes are slower, require more effort and are more susceptible to the adverse effects of distraction or interruption. In the work environment, distractions (e.g., irrelevant speech in open plan work settings) and interruptions are stressors that adversely affect the time taken to complete tasks and increase error rates (Lee & Duffy, 2015; Smith-Jackson & Klein, 2009).

More information about fatigue

Fatigue is a state of impairment that can include physical and mental elements. It is associated with lower alertness, reduced performance and impaired decision making (Fan & Smith, 2020). Fatigue can be caused by a variety of factors such as the demanding nature of the work, extended shift lengths, insufficient recovery time between shifts, poor sleep quality and different shift patterns (Vincent et al., 2016; 2018). Stress arising from work demands causes fatigue when a person's work capacity is exceeded (Bridger, 2009).

The term fatigue has three different meanings (Bridger, 2009). The first is sleepiness (fatigue) from sleep deprivation or disruption of circadian rhythms[3]. The second meaning is tiredness as a consequence of undertaking an intensive and heavy workload of physical or mental activities. The third refers to the habituation that occurs from prolonged execution of a mental task. This type of fatigue is task specific (e.g., driving for extended periods) and a person may be quite capable of undertaking a different type of task. These three different forms of fatigue are all relevant to emergency and incident management teams. Moreover it is quite likely that some team members will be affected by two or even all three of these forms of fatigue.

Generally, people are not very good at estimating their fatigue levels and tend to underestimate their level of impairment (Flin et al., 2008). Behavioural indicators of sleepiness and fatigue are things like yawning, micro-sleeps, inability to concentrate, irritability, loss of energy, reduced alertness, moodiness, or decreased social interaction (MTDC, 2003).

Challenges relating to fatigue

Similar to stress, the adverse impact of fatigue on a person's performance can be quite marked. Table 10 (p. 36) summarises the multiple effects of fatigue. From an emergency and incident management team perspective, the dimensions outlined in Table 10 will affect both the individual's and team's performance. Fatigue causes impairment to thinking which can cause problems for situation awareness and decision making, particularly in dynamic, uncertain and high stakes environments. Reduced communication ability may have an impact on sharing information, building situation awareness, cooperation and

3 Circadian rhythm is a person's natural internal process that regulates their sleep-wake cycle over a circa 24 hour period.

coordination. The social impairment from fatigue is likely to adversely impact various aspects of cooperation, communication and coordination. If fellow team members are distracted, irritable or withdrawn, this may have a negative effect on the team and reduce the ability or willingness of other members to speak up, offer ideas or raise concerns.

Table 10. Summary of the effects of fatigue.

Thinking (cognitive) ▪ Adverse effect on innovative thinking ▪ Reduced ability to cope with unforeseen rapid changes ▪ Less able to adjust plans when new information becomes available ▪ Tendency to adopt more rigid thinking and previous solutions ▪ Lower standards of performance become acceptable
Motor skills ▪ Less coordination ▪ Poor timing
Communication ▪ Difficult in finding and delivering the correct word ▪ Speech is less expressive
Social ▪ Becoming withdrawn ▪ Less tolerant of others ▪ Neglect smaller tasks ▪ Less likely to converse ▪ Increasingly irritable ▪ Increasingly distracted by discomfort

(Source: Adapted from Flin et al., 2008, p. 195)

An analogy used to describe the impairment created by fatigue is comparing its effect to that of alcohol. Being awake for 20–25 hours leads to the same degree of impairment as having a blood alcohol concentration of 0.10% (Dawson & Reid, 1997; Lamond & Dawson, 1999). This level of intoxication would be deemed as unacceptable for driving or operating machinery.

Recommended reading

Flin, R., O'Connor, P., & Crichton, M. (2008). *Safety at the sharp end: A guide to non-technical skills*. Ashgate. See Chapter 7, Managing stress, pp. 157–190 and Chapter 8, Coping with fatigue, pp. 191–214.

McLennan, J., Strickland, R., Omodei, M., & Suss, J. (2014). Stress and wildland firefighter safety-related decisions and actions. In C. Owen (Ed.), *Human factors challenges in emergency management: Enhancing individual and team performance in fire and emergency management* (pp. 19–33). Ashgate.

Coping with stress and fatigue resources

Sleep is your superpower | Matt Walker

https://www.ted.com/talks/matt_walker_sleep_is_your_superpower

Photo: Country Fire Service

Chapter 9. Applying emergency management non-technical skills

The Emergency Management Non-Technical Skills (EMNoTS) framework can be used in several ways to monitor and assess non-technical skills. The simplest approach is to use the 44 behavioural markers as a checklist to assess the non-technical skills being used by a team during real life or simulated operations. It can be used proactively as a health check to ensure that the team is functioning well or it can be used reactively to detect problems in the team.

The checklist can be used to collect more detailed data on a team's non-technical skills so that the team's performance can be more formally evaluated. When collecting more detailed data it is important that there is an adequate number of skilled observers relative to the team size being observed so that a sound assessment of the team's behaviours can be captured. In a larger team with functional sub-teams such as a large IMT, EMNoTS can be used to assess each of the functional teams and/or the IMT as a whole. The regular collection of non-technical skills data enables an organisation to identify areas. This can then feed into training and development activities on non-technical skills.

The checklist can also be used to facilitate debriefs and after-action reviews at the end of a shift or training exercise. This allows the participants to reflect on their non-technical skills and develop ways to improve their performance.

A sample of the checklist is shown in Figure 7 (p. 38) and the full checklist is available in Appendix A. Additional copies may be obtained from the authors or from the Bushfire and Natural Hazards CRC website[4]. The positive markers highlight helpful types of behaviour and the negative markers indicate unhelpful behaviours.

To support EMNoTS in each of these different uses it is worthwhile introducing the concepts to team members beforehand so they are familiar with the ideas and language. This means there are no surprises and that interventions can be made during the operation without needing lengthy explanation. Introducing the concepts of EMNoTS also serves to highlight the importance of good non-technical skills in emergency management.

The types of non-technical skills required by a particular team will vary depending on the progress of the event or incident. The activities of

4 https://www.bnhcrc.com.au/emnots

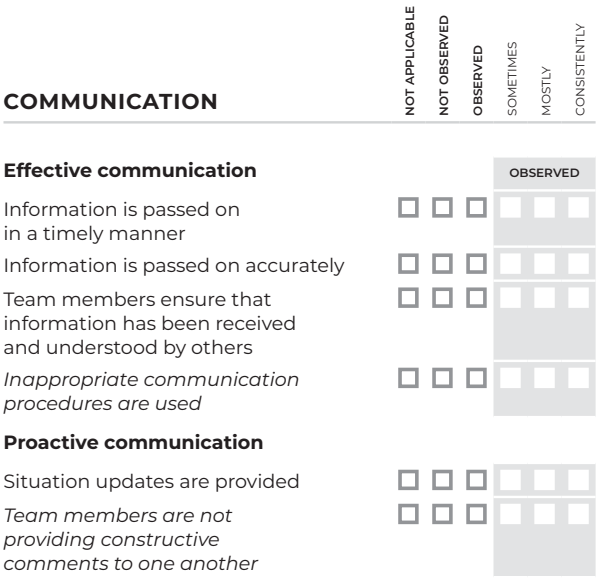
Table 11. Shifting emphasis of non-technical skills used in emergency management.

Phase	Readiness	Escalation	Incident management	De-escalation	Termination
Description of phase	**Preparing for the likely escalation of incidents**	**Responding to escalating incident activity**	**Coordination of resourcing and response to the incidents**	**Scaling back activities to match the requirements of current incidents**	**Termination of the SCC and RCC operations**
▪ Main types of non-technical skills used	▪ Situation awareness ▪ Communication ▪ Coordination ▪ Decision making	▪ Situation awareness ▪ Communication ▪ Coordination ▪ Cooperation ▪ Decision making	▪ Situation awareness ▪ Communication ▪ Coordination ▪ Cooperation ▪ Decision making	▪ Communication ▪ Coordinaton ▪ Cooperation ▪ Decision making	▪ Communication ▪ Coordination

Source: adapted from Hayes et al., (2021)

regional and state-level emergency management teams can be sorted into five phases, as shown in the Key Tasks Cognitive Aid in Figure 12 (p. 47). The non-technical skills requirements shifts between these five phases as shown in Table 11 above.

Figure 7. Example of a response scale for assessing non-technical skills.



Notes: (i) the items in *italics* are markers for negative (unhelpful) behaviours; (ii) Not applicable: this behaviour is not relevant to the task or situation; (iii) Not observed: this behaviour is relevant to the task or situation, but is not observed; and (v) Observed: this behaviour is relevant to the task or situation and is observed. If selected, a prompt will appear to determine the extent to which this behaviour is observed.

Using the EMNoTS to assess non-technical skills in a team

The EMNoTS framework can be used to assess teams in two modes. The first is as a simple checklist and the second is as a more detailed assessment. Figure 7 (left) shows a sample of the EMNoTS framework. Beside the skill of communication, the first three vertically written criteria are NOT APPLICABLE, NOT OBSERVED and OBSERVED. If an observer is using EMNoTS as a checklist, the first criteria is used to identify whether particular behaviours are relevant for the current situation. If this first box is ticked then the corresponding behaviours are not considered further. However, if this box is not ticked, the second and third criteria are used to identify whether this behaviour was observed or not. The remaining three vertically written criteria can be used for a more detailed assessment. These criteria ask the observer to record whether the particular behaviours were used SOMETIMES, MOSTLY, or CONSISTENTLY.

The EMNoTS behavioural markers provide observers with guidance on the types of team member interactions, decision processes and shared knowledge states to consider. Many of these behaviours can be observed directly (e.g., whether inappropriate communication procedures are used or situation updates are provided). For some EMNoTS behavioural markers, observers may indirectly assess these from evidence such as the nature of shared situation awareness within a team or the quality of team products such as situation reports or incident action plans.

EMNoTs can also be used to conduct debriefs and after action reviews so that NTS information can be collected after the event. As an example, we provide a brief analysis of an extract from the ACT Coroners Court Inquiry into the Canberra Firestorm. Before reading further, please review the information in Figure 8 below and consider which non-technical skills are likely to be relevant?

Figure 8. Extract from the ACT Coroners Court Inquiry into the Canberra Firestorm (Source: Bearman et al., 2015; p. 20)

> "There is in the evidence some conflict about whether or not it was agreed that at the meeting that using Baldy Range trail as the eastern containment line would be reconsidered the following morning. Mr <A>'s memory was that they were going to try to use the Baldy Range trail as the first option, the fall-back option being Dingo Dell Road. He was definite that at no stage did he convey any opinion that, on the basis of the information he had from Mr <B>, the Baldy Range trails could not be used as a containment line because of the intensity of the fire burning across it." (ACT Coroner's Court, 2006, p. 148)
>
> "In contrast, Ms <C>'s recollection of the meeting was that the Baldy Range trail was 'just wiped' as a consideration for an eastern containment line. In her evidence, however, she agreed that, although at the meeting she had dismissed the Baldy Range fire trail as a viable eastern containment line, she accepted that, if fire on Baldy Range could have been contained, the Baldy Range trail would have become an eastern control containment line." (ACT Coroner's Court, 2006, p. 148–149)

Readers will quickly recognise from this excerpt that there are clearly communication issues at play. By applying EMNoTS communication criteria (see Figure 7), we can identify two behaviours that are likely to have contributed to this situation. The first concern is that information may not have been passed on accurately and the second is that suitable steps may not have been taken to ensure that information has been received and understood by others.

Applying the remainder of the EMNoTS framework to this scenario (see Appendix A) highlights that other skills may be relevant here. In addition to communication, skills such as coordination, leadership, situation awareness, decision making and coping may also be implicated. Examples of relevant behavioural markers from each of these skills are outlined below.

- Coordination — not everyone had a common understanding relating to the operation
- Leadership —appropriate guidance and direction may not have been provided
- Situation awareness — contingencies may not have been discussed and potential problems don't seem to have been identified. It also seems that the consequences of options available may not have been identified
- Decision making — decisions (and intent) don't appear to have been clearly communicated
- Coping, stress and fatigue management — it seems that that application of coping strategies (e.g., taking notes) weren't used effectively to manage the possible effects of stress or fatigue

When using the EMNoTS framework to assess teams, it is likely that that observers may note some clusters of related behavioural markers as shown in the above example. These clusters can provide useful insights to help teams understand the links between the different non-technical skills (e.g., inadequate communication can impact situation awareness and decision making) and how mitigation measures can help counter risk factors (e.g., employing effective coping mechanisms to reduce the adverse effects of stress and fatigue).

It should be noted that EMNoTS provides a subjective analysis of non-technical skills. This means that people may differ in their interpretation of events or in their application of the behavioural markers. EMNoTS is designed to create points for discussions with and between team members about what occurred during the response and why, so that lessons can be identified by the team. In this way the non-technical skills of the team can be improved, leading to reduced conflict between team members and improvements in operational effectiveness.

Photo: Mark Thomasson, Country Fire Service

Chapter 10. Implications for the use of non-technical skills

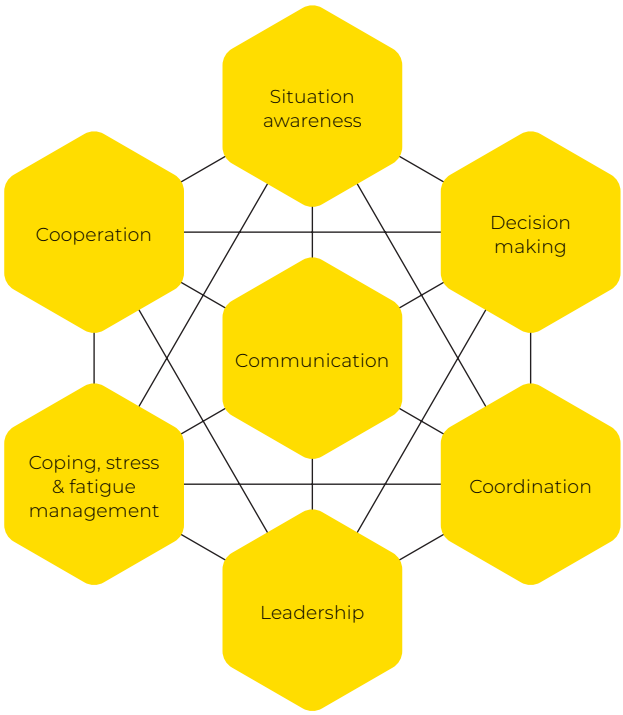
The previous chapters have highlighted that the different non-technical skills have a high degree of interdependence and that each skill is closely linked to two or more of the other skills. There are important relationships between skills such as: situation awareness and decision making; communication and leadership; stress, fatigue and decision making; communication, cooperation and coordination; and communication (quality) and situation awareness (Hayes et al., 2021).

The level of interdependency emphasises the need to consider a broad repertoire of non-technical skills. Further, poor performance of even a single non-technical skill can be problematic for member and team performance. This means that agencies should take a holistic approach to managing non-technical skills rather than focusing on individual skills (such as leadership, decision making or fatigue management) in a piecemeal way.

Figure 9 (p. 41) conceptualises the relationships between the seven non-technical skills. The non-technical skill of communication has been positioned in the centre of this diagram because of its direct relationship with all of the other skills.

The teamwork and leadership literature was used in Chapter 2 to describe the type of team environment conducive to effective team performance. An implication of this discussion is that teams whose members consistently use well-developed non-technical skills are better able to create a functional team climate to support effective performance. There are likely to be a range of other benefits for teams and organisations who develop and use non-technical skills. Well-functioning teams are more straightforward and satisfying places to work and this tends to reduce some of the friction associated with demanding work which can reduce member turnover and employee/volunteer attrition.

Figure 9. Conceptual relationship between the EMNoTS non-technical skills.



More generally, the use of a non-technical skills framework such as EMNoTS provides the opportunity for organisations to:

- articulate clear specifications of the types of non-technical skills expected,
- identify training content for developing non-technical skills,
- provide a common vocabulary for discussing and providing constructive feedback on non-technical skills, and
- provide framework for teams and organisations to collect data and monitor trends in non-technical skills.

In terms of providing effective non-technical skills training for emergency management organisations, crew resource management (CRM) programs provide much helpful guidance. CRM programs embed non-technical skills training though three phases: awareness, practice and feedback (Flin et al., 2008). The awareness phase focuses on developing a common understanding of the key concepts and language of non-technical skills and is usually delivered through the classroom or online. The practice and feedback phases provide opportunities for personnel to use the non-technical skills. This typically occurs in simulation-based training so these skills can be practiced in various situations. Reasonably simple role play based exercises can also be quite effective for this type of training. Finally, a regular reinforcement loop in conjunction with organisational practices such as performance monitoring, standard operating procedures and learning and development systems helps refresh and maintain these skills.

To be most effective non-technical skills training programs need to be supported by the following organisational initiatives. The first is to implement non-technical skills into initial recruit training programs and at key career or role transition points. The second is to regularly revisit and assess these skills through various exercises and team-based activities. This is particularly pertinent to emergency and incident management personnel given they tend to have a reasonably fluid membership. Lastly, successful organisational implementation of non-technical skills programs requires embedding these skills in all work activities, not just when a team is managing an incident (Okray & Lubnau, 2004).

Other resources

Further reading

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2 Edmondson, A. (2019). *The fearless organization: Creating psychological safety in the workplace for learning, innovation and growth*. Wiley.

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16 Thomas, M. J. W. (2018). *Training and assessing non-technical skills: A practical guide*. CRC Press.

17 West, M.A. (2012). *Effective teamwork: Practical lessons from organizational research* (3 ed.). Wiley.

18 Zaccaro, S.J., Heinen, B., & Shuffler, M. (2009). Team leadership and team effectiveness. In E. Salas, G. F. Goodwin, & C. S. Burke (Eds.), *Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches* (pp. 83–111). Routledge.

Web resources

1 How to turn a group of strangers into a team https://www.ted.com/talks/amy_edmondson_how_to_turn_a_group_of_strangers_into_a_team.

2 Team tools https://www.bnhcrc.com.au/driving-change/tools.

Appendices

Photo: New Zealand Fire Service

Appendix A: Emergency Management Non-Technical Skills (EMNoTS) checklist

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Figure 10. Emergency Management Non-Technical Skills (EMNoTS) checklist (Adapted from Hayes et al., 2021)

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Emergency Management Non-Technical Skills

PURPOSE

This tool helps emergency and incident management teams enhance non-technical skills (such as communication or leadership skills) to develop more effective teamwork capabilities.

There are seven core non-technical skill categories, divided into elements and behavioural markers.

To help ensure that both positive (helpful) and negative (unhelpful) behaviours are considered, there are negative behavioural markers included in the checklist – these are marked *in italics*.

The EMNoTS can be used in several ways:

- as a **simple checklist**, by completing the unshaded columns to quickly capture which non-technical skills are in play for a team
- to facilitate an **after-action review** at the end of a shift or training exercise
- to collect **more detailed data** to ascertain how well non-technical skills are being used, by completing the shaded columns.

COMMUNICATION

	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Effective communication			OBSERVED			
Information is passed on in a timely manner	☐	☐	☐			
Information is passed on accurately	☐	☐	☐			
Team members ensure that information has been received and understood by others	☐	☐	☐			
Inappropriate communication procedures are used		☐	☐			
Proactive communication						
Situation updates are provided	☐	☐	☐			
Team members are not providing constructive comments to one another	☐	☐	☐			

COORDINATION

	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Clear roles, responsibilities and expectations			OBSERVED			
Actions are always carried out as expected	☐	☐	☐			
There is a clear and common purpose	☐	☐	☐			
Everyone has a common understanding relating to the operation	☐	☐	☐			
The roles and responsibilities of team members are unclear		☐	☐			
Adjusting to demands						
Everyone is adjusting to meet the demands of the situation	☐	☐	☐			
Team members are not correcting any mistakes made by others	☐	☐	☐			

COOPERATION

	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Contributes to a positive team environment			OBSERVED			
Everyone shows willingness to work as a team	☐	☐	☐			
Team members are open and approachable	☐	☐	☐			
Team members do not exhibit confidence and trust in each other	☐	☐	☐			
Alignment of efforts and management of conflict						
Everyone is following team objectives without opting for independence	☐	☐	☐			
Differences of opinion are resolved effectively	☐	☐	☐			
Individuals are creating unnecessary conflict	☐	☐	☐			

LEADERSHIP

	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Creates a suitable team environment			OBSERVED			
Good behaviour is consistently modelled	☐	☐	☐			
Inclusive behaviours are modelled that enables others to speak up and offer suggestions and constructive comment	☐	☐	☐			
Others are not treated with respect		☐	☐			
Provides focus, direction and coordination						
There is a focus on the important tasks at hand	☐	☐	☐			
Appropriate direction and guidance are provided	☐	☐	☐			
Activities are not well-coordinated within the team	☐	☐	☐			

EXAMPLE

Emergency Management Non-Technical Skills

SITUATION AWARENESS	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Gathering and analysing information				OBSERVED		
Team members ask others about the situation to improve their situational awareness	☐	☐	☐			
Patterns and trends are identified in a timely manner	☐	☐	☐			
The consequences of the options available are not identified	☐	☐	☐			
Identifies contingencies, problems and expectations						
Contingencies are discussed and potential future problems identified	☐	☐	☐			
Expectations are not articulated (for example, goals and potential event evolution)	☐	☐	☐			
Sharing information and insights						
Views are shared of the current situation with others	☐	☐	☐			
Team members do not effectively participate in team briefings to build and share situational awareness	☐	☐	☐			

DECISION-MAKING	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Sound, timely decisions				OBSERVED		
Decisions are being appropriately prioritised	☐	☐	☐			
Decisions are not being made on a timely basis	☐	☐	☐			
Appropriate decision-making approach						
Appropriate decision-making approaches are applied to the situation at hand (for example, speed vs. thoroughness)	☐	☐	☐			
Plans are not readily adjusted as the situation changes	☐	☐	☐			
Engaging others in decision-making						
Others' ideas and inputs are incorporated into decisions when practicable	☐	☐	☐			
There is flexible matching of communication style to the audience	☐	☐	☐			
Decisions (and intent) are not clearly communicated	☐	☐	☐			

COPING, STRESS AND FATIGUE MANAGEMENT	NOT APPLICABLE	NOT OBSERVED	OBSERVED	SOMETIMES	MOSTLY	CONSISTENTLY
Manages pressure				OBSERVED		
A suitable level of focus is maintained when under pressure	☐	☐	☐			
Team members remain flexible when faced with sub-optimal or novel conditions	☐	☐	☐			
Team members do not remain composed when under pressure	☐	☐	☐			
Employs effective coping strategies						
The effects of fatigue on oneself and others are recognised and appropriate actions taken to manage this	☐	☐	☐			
Coping strategies are used to manage under sub-optimal conditions (for example, taking notes, prioritising tasks, delegating)	☐	☐	☐			
Team members do not request (and offer) assistance from (and to) others, when necessary	☐	☐	☐			

Using the EMNoTS ratings:

Not applicable: this behaviour is not relevant to the task or situation being observed.

Not observed: this behaviour is relevant to the task or situation, but is not observed.

Observed: this behaviour is relevant to the task or situation and is observed. If selected, a prompt will appear to determine the extent to which this behaviour is observed.

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EXAMPLE

Appendix B: The Psychological Safety Checklist

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Figure 11. Psychological Safety Checklist (Source: Brooks & Curnin, 2020b).

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Psychological Safety Checklist

PURPOSE

This checklist can be used to create a psychologically safe decision making environment. The checklist acknowledges that there are simple strategies to use so that people can feel safe while enhancing or establishing trusting relationships very quickly.

WHAT IS PSYCHOLOGICAL SAFETY?

Psychological safety is a shared belief that the team is safe for interpersonal risk taking, where people feel that they can speak up in the face of authority or power gradients, disagree with a preferred option, or identify and then talk about something that just doesn't feel quite right.

Creating a psychologically safe environment requires the following strategy:

It is suggested that the team leader adopts the following actions when the team is first formed, and repeats the steps when new members join the team or at the beginning of a new shift.

ACTIONS

- 01 ☐ Ensure that everyone has introduced themselves.
- 02 ☐ Clarify roles and make them visible.
- 03 ☐ Confirm future interaction (availability, meeting times, methods of communication).
- 04 ☐ Encourage the team to speak up if they have any concerns or doubts.
- 05 ☐ Acknowledge your own fallibility (you may make mistakes and can sometimes be wrong).
- 06 ☐ Ask the team if anyone has any questions or concerns.

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EXAMPLE

Appendix C: The Key Tasks Cognitive Aid (KTCA)

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Figure 12. Key Tasks Cognitive Aid (Source: Hayes et al., 2020).

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CFS

Key Tasks Cognitive Aid

PURPOSE

This tool is designed as a prompt to help regional and state-level incident and emergency management teams. It ensures they are undertaking tasks important to effective performance, especially when under stress, fatigue or pressure. It is a cognitive aid, providing a checklist of key tasks that need to be completed during an emergency.

USING THE AID

The checklist is reasonably high level and is divided into five phases of incident management that are common to regional control centres (RCC) and state control centres (SCC).

The actual tasks required in each phase, and the order that they are undertaken, will differ between centres, depending on jurisdictional arrangements, agency protocols and hazard type. It is likely that managers will work through each phase several times in a cyclical manner.

1

READINESS PHASE

Preparing for the likely escalation of incidents

- ☐ Understand what resources[1] are available for incident(s) vs. those likely to be required
- ☐ Reviewed the current and forecast weather conditions
- ☐ Reviewed relevant intelligence (e.g. planned community or other events)
- ☐ Reviewed the incidents currently underway and their respective status
- ☐ Identified the potential risks to the community
- ☐ Reviewed any precautions or restrictions in place (e.g. fire bans, road closures)
- ☐ Checked for existing information relevant to likely incidents (e.g. preaction review)
- ☐ Ensured the control centre:
  - ☐ is suitably resourced (e.g. activation level, staffing and facilities)
  - ☐ is organised (e.g. personnel know their roles and are working in them)
  - ☐ is suitably configured (e.g. no significant constraints to information flow or collaboration)
- ☐ Ensured adequate liaison and coordination is occurring with the internal (e.g. other regions or state) and external parties (e.g. other agencies)
- ☐ Issued Chief Officer's or Commissioner's Intent

1 Note: resources might include SCC/RCCs/ICCs, general and specialist response resources (e.g. swiftwater rescue, HAZMAT, heavy rescue, urban search and rescue), aviation (available and on standby), other agencies such as police, fire, SES, local government, health, environmental protection, agriculture, Bureau of Meteorology, Australian Defence Force and utilities (gas, electricity, water, sewage), communications, fire towers, control centre food supplies and backup power.

2

ESCALATION PHASE

Responding to escalating incident activity

- ☐ Reviewed the resources available for incident(s) versus those likely to be required (i.e. gap analysis)
- ☐ Reviewed the forecast weather conditions and other relevant intelligence
- ☐ Reviewed the incidents currently underway and their respective status
- ☐ Reviewed the potential risks to the community and identified the likely consequences
- ☐ Ensured the control centre:
  - ☐ is suitably resourced (e.g. activation level, staffing and facilities)
  - ☐ is organised (e.g. personnel know their roles and are working in them)
  - ☐ is suitably configured (e.g. no significant constraints to information flow or collaboration)
- ☐ RCC – Ensure adequate liaison is occurring with the ICs in terms of the resourcing needs for their IMT, the incident or other support required
- ☐ Ensured adequate liaison and coordination is occurring with internal parties (e.g. state and other regions)
- ☐ Ensured adequate liaison and coordination is occurring with external parties (e.g. other agencies, media) who we need to work with or keep informed

3

EXAMPLE

COORDINATION PHASE

Coordination of resourcing and the response to the incidents

- ☐ Understand what is happening (e.g. prediction, situation reports, IMT reports, broader regional/ state intelligence)
- ☐ RCC – Understand the resourcing needs for incidents and liaise with SCC or other regions
- ☐ RCC – Review trajectory and options developed by the IMT and consider implications, success and risk
- ☐ Identified the likely risks and impacts posed by the incidents as well as by the response to the incidents
- ☐ Implementing consequence management
- ☐ Assure warnings and public information is accurate and being provided in a timely manner
- ☐ Implemented a clear plan to coordinate, allocate, and procure resources (addressing any shortfalls)
- ☐ Ensured the control centre is adequately resourced, operating effectively (i.e. meeting task requirements) and is being appropriately briefed
- ☐ Updating the SCC, Chief Officer or Commissioner with situation reports
- ☐ Ensured adequate liaison and coordination is occurring with the internal (e.g. state and regions) and external parties (e.g. other agencies, media)
- ☐ SCC – Arrangements been made for any incident related investigations (e.g. arson, workplace health and safety, environment)
- ☐ Ensured workplace health and safety and wellbeing concerns are being adequately addressed (e.g. fatigue management)
- ☐ Review the plan in place to resolve the incidents and for de-escalation of the incidents
- ☐ Ensured appropriate support is provided for planning community recovery and rehabilitation activities (e.g. share intelligence of the impact of incidents with other agencies)
- ☐ Ensured the collection of information required for a possible post-incident report or inquiry

DE-ESCALATION PHASE

Scaling back activities to match the requirements of current incidents

- ☐ Identified what level of activation is required to support the incidents in play
- ☐ The control centre been appropriately reconfigured for the reducing workload
- ☐ Ensured the control centre is operating effectively
- ☐ Assure warnings and public information is accurate and being provided in a timely manner
- ☐ Adequate liaison is occurring with the internal and external parties who we need to maintain dialogue with or otherwise keep informed
- ☐ Ensured coordination with community recovery and rehabilitation activities
- ☐ Ensured appropriate postincident recovery (and rehabilitation) activities are planned for agency personnel (e.g. fatigue and stress management, injuries)
- ☐ Debriefs planned

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TERMINATION OR CLOSE THE RCC PHASE

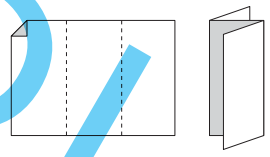
Termination of SCC and RCC operations

- ☐ The appropriate debriefing for control centre staff has been completed
- ☐ All required administration activities been completed
- ☐ All other parties been informed that the control centre has been stood down or in the case of the SCC returned to standard operational duties

CLEAR FORM

TIP

If you've printed this out, you might find it easier to focus on each phase by folding along the dotted line and creating a concertina-fold.



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EXAMPLE

Appendix D: Emergency Management Breakdown Aide Memoire

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Figure 13. Emergency Management Breakdown Aide Memoire (Bearman, 2018; Grunwald & Bearman, 2018a).

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CQUniversity AUSTRALIA

MAY 2018

Emergency Management Breakdown Aide Memoire

PURPOSE

This guide is proposed to help people recognise breakdowns within co-located and distributed teams, and provide some practical resolution strategies.

WHAT ARE BREAKDOWNS?

A breakdown occurs when teams lose the ability to coordinate or communicate effectively.

Breakdowns are caused by differences in understanding between teams. For example, not having a shared understanding across teams may lead to teams developing different operational plans, which in turn can lead to operational dysfunction. This guide aims to assist you in identifying breakdowns across the various organisational levels by listing some of the key indicators of breakdown. It also lists some strategies you may find useful in resolving a breakdown should one be detected.

WHAT TO LOOK FOR WHEN IDENTIFYING BREAKDOWNS...

- ☐ **Missing information:** How confident are you that you have the relevant information about the incident?
- ☐ **Conflicting expectations:** Is the information consistent with what you would expect to be happening in that situation?
- ☐ **Consistent information:** Is the information you have consistent across all sources?
- ☐ **Intuition:** Does your gut tell you something isn't right about the situation?
- ☐ **Familiarity:** Is someone familiar to you not behaving in a manner you have come to expect of them?
- ☐ **Networks:** Have you spoken about plans and problems with key personnel recently?
- ☐ **Feedback:** Have you received confirmation that the tasks you delegated have been completed?

HOW YOU MIGHT RESOLVE BREAKDOWNS...

1. **Delegate:** Find someone who is close to the breakdown or has the most appropriate skills and have them re-solve the issue. Remember to receive confirmation.
2. **Resource:** Breakdowns can be caused by missing resources. Find out what is missing, or what will assist the other teams, and get it to them.
3. **Mentor:** A subtle form of resolution, mentoring allows you to suggest alternatives, opinions and strategies without stepping on people's toes.
4. **Assert:** If you've tried more subtle strategies and they haven't worked you can use your authority to resolve the problem.
5. **Replace:** If breakdowns are occurring because of disruptive personalities in the management team, or even things like fatigue, you can stand them down or give them alternate duties.

LASTLY, ENSURE THOSE UNDER YOUR COMMAND UNDERSTAND WHAT A BREAKDOWN IS AND TO REPORT IT TO YOU.

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EXAMPLE

Appendix E: Team Process Checklist

Figure 14. Team Process Checklist (Bearman, 2018b; Bearman et al., 2022).

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MAY 2018

Team Process Checklist

PURPOSE

This tool is designed to provide a health check for teams, and if there is a problem, to help determine what that problem is. It assists people to think through three aspects of teamwork: communication, coordination and cooperation. If a 'no' response is recorded for any of the items this should be used as the starting point for a discussion with members of the team. Please note that while this tool is as comprehensive as possible, it will not detect all of the ways teams can become impaired.

COORDINATION

- ☐ Are the roles and responsibilities of team members clear?
- ☐ Are actions always carried out as expected?
- ☐ Does everyone have a common understanding of information relating to the operation?
- ☐ Is there a clear and common purpose?
- ☐ Is everyone adjusting to meet the demands of the situation?
- ☐ Are team members requesting assistance from others, where necessary?
- ☐ Are team members correcting any mistakes made by others?

COMMUNICATION

- ☐ Is information being passed on in a timely manner?
- ☐ Is information being passed on accurately?
- ☐ Are team members ensuring that information has been received and understood by others?
- ☐ Are appropriate communication procedures being used?
- ☐ Are situation updates being provided?

COOPERATION

- ☐ Does everyone show a willingness to work as a team?
- ☐ Do team members exhibit confidence and trust in each other?
- ☐ Is everyone following team objectives without opting for independence?
- ☐ Are any differences of opinion being resolved effectively?
- ☐ Is anyone creating unnecessary conflict?

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EXAMPLE

Appendix F: Cognitive Bias Aide Memoire

Figure 15. Cognitive Bias Aide Memoire (Brooks et al., 2020 & Brooks & Curnin, 2020a).

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Cognitive Bias Aide Memoire

PURPOSE

This aide memoire can be used by teams to identify cognitive biases in the decision-making process. A nominated person should become familiar with the aide memoire and act as the 'devil's advocate' so they can read out the biases to the team and challenge them to identify if they have made any effort to mitigate the effect of these biases. The aide memoire is best used for key decisions and involves two steps.

WHAT IS COGNITIVE BIAS?

A cognitive bias is a mistake in reasoning, evaluating or remembering that often occurs because we hold onto our preferences and beliefs regardless of contrary information or intelligence. The extent to which we hold onto our biases can be influenced by factors such as stress, fatigue or time pressures.

STEP ONE: ASSESS AVAILABLE INFORMATION, INTELLIGENCE AND DECISIONS	01	☐ Are we favouring intelligence that confirms our understanding or preferred options or dismissing or downplaying evidence that doesn't? (confirmation bias)
	02	☐ Our decisions can be anchored by early intelligence. Have we assessed credibility of the intelligence to the same standard over time? (anchoring bias)
	03	☐ Are we making decisions based on our previous experience of similar incidents and if so, are these incidents really the same? (availability bias)
	04	☐ Have our options/decisions been biased by pictures, maps or other visual media? Has this effect discounted other intelligence? (picture superiority effect)
	05	☐ Are we committing to a decision or option because we are familiar with it, instead of committing because it is the best option or decision? (mere exposure bias)
STEP TWO: DETERMINE THE MEANING OF THE INFORMATION, INTELLIGENCE AND DECISIONS	06	☐ Have we deferred to or given greater weight to the opinions of people in authority without assessing those opinions rigorously? (authority bias)
	07	☐ Have we made efforts to make sure everyone truly understands the decision and reasons for it? (curse of knowledge)
	08	☐ We typically underestimate the time needed to perform our own tasks. What are the implications if this is true for these decisions/options? (planning fallacy)
	09	☐ Are we just agreeing because others agree? Have we properly considered alternatives or intelligence that does not support the dominant opinion/option? (bandwagon effect)
	10	☐ Are we avoiding information to shield ourselves from possible situations by pretending that they do not exist or that particular outcomes could not eventuate? (ostrich effect)

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EXAMPLE

Photo: NSW Rural Fire Service

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