Investigators handbook – level 3 investigations

This is a companion document to the procedure, *Safety hazard and incident management*. 
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Introduction

This document is one of two handbooks provided for the technical guidance of safety investigators. The other is the *Investigators handbook – level 1 and 2 investigations*¹.

For information about how and why safety investigations are initiated, investigation types and levels are set and investigation processes are managed, see the procedure *Safety investigation*.

To conduct a level 3 investigation, you must be a Grade 3 investigator or above. (Further information on grades of investigator and their competence requirements is available in the procedure *Safety investigation*.)

The 5-whys technique (also called the ‘Logic Tree’ technique) is used for level 3 investigations in Roads and Maritime. It is a useful technique for investigators who work around the front line, as the analysis is quick and often relies on the knowledge of the investigator.

¹ Under development.
Preparing for an investigation

Logistics

Before visiting the site, contact the manager in control to inform them that you will be coming and, if necessary, ask about:

- The location, environment and accessibility of the site
- What kind of work is going on there?
- Site terrain and any limitations it may impose on the on-site activity
- What hazards will you encounter, for example, is there mobile plant in operation? Are hazardous substances in use?
- What PPE will you need?

Consider:

- Items to take to the site
- Weather conditions
- Whether there are SMEs who may need to be consulted before or during the investigation.
- Contingency plans.

Health and safety

Safety on site

When you arrive, depending on the type of site, report to reception, the site office, or identify yourself and ask to speak to whoever is in charge. Never enter a construction site unaccompanied if work is in progress.

On construction sites, at workshops and at some offices, you will be required to undergo an induction. If you are not offered an induction you should politely request one.

The induction should tell you:

- What kind of work is going on during the time of your visit
- What hazards you are likely to encounter during your visit (for example, mobile plant, hazardous substances, deep excavation and noise)
- Any safe work method statements (SWMS) in place
- What the emergency procedures are
  - Who is the emergency controller?
  - Where is the emergency assembly point?
  - What is the emergency signal?
You may:

- Arrange a site guide (escort) if you are unfamiliar with the site
- Request other work cease if it will interfere with your investigation.

**Stress**

Be aware that an investigation can be stressful to everyone involved in the occurrence – and the investigation, including yourself.

There are different sources of stress and people will cope in different ways.

Stress overload can lead to fatigue and exhaustion, and prolonged overload may cause deterioration in psychological health.

Monitor your own wellbeing, seek support from your peers and remember that the Employee Assistance Program (EAP) is available. EAP offers:

- Short-term solution-focused counselling – call 1300 360 364
- Self-help tools and resources via eapdirect® – go to the EAP page on Compass for details.
The investigation methodology

An investigation comprises three main phases:
1. Data collection
2. Analysis

Figure 1 shows the proportion of effort dedicated to each of the phases over the length of the investigation. Note how the phases of an investigation do not happen in series.

![Figure 1 – Phases of an investigation](image)

1 Data collection

At the start of an investigation, the investigator is essentially a gatherer of the facts. The resulting analysis and conclusions can be no better than the facts gathered.

Figure 1 shows that data collection can be an iterative process and can occur late in an investigation. Data collection can also be needed in the analysis process, where more data is required to explain the analysis.

Data comes in numerous forms but can be split into four high level categories:
- Accounts of witnesses and those involved
- Physical evidence at a scene
- Previous occurrence records and investigations
- Documents and records.

All data should be stored in SRIMS\(^2\) to ensure there is a permanent record of the data collected.

\(^2\) Roads and Maritime’s safety risk information management system
1.1 **Accounts of witnesses and those involved**

An individual’s recollection is an important (and sometimes the only) source of information for most investigations. In safety investigations, we do not take statements from witnesses or those involved, but instead take notes from an interview.

The underlying philosophy is that the interview is centred around the interviewee. The principles of a successful interview are:

- The development and maintenance of good rapport
- Encouraging the interviewee to be actively involved
- Helping the interviewee to concentrate
- Using open, simple and unbiased questions
- Active listening
- Using a communication style that suits the interviewee
- Working as a team with other interviewers.

1.1.1 **Preparing to interview**

It is important to prepare before an interview, so that you have the information you need and don’t appear unprepared. Obtaining as many facts as possible beforehand will help in thinking about suitable questions to ask.

Consider:

- Who you need to interview
- Whether you know the interviewee
- That the desired outcome of the interview is to increase the amount of information elicited about the occurrence
- Any materials required to support the interview
- How you will accommodate a support person for the interviewee if they ask for one. (For example, this could be a health and safety representative, union representative or a colleague but they cannot speak for the interviewee or take part as an advocate for them.)

1.1.2 **Conducting interviews**

**Setting the scene and developing rapport**

- Speak to interviewees separately
- Understand this can be a stressful time for the interviewee
- Ask if they’ve ever been involved in an interview before – this will allow you to determine whether they are receptive or defensive and to act accordingly
- Set expectations and explain what happens
- Create confidence that they are in a position they can share; describe the concepts of just and fair – not looking to blame someone but to understand what happened.
• If the interviewee has a support person present, explain that the support person is not there to participate in the interview
• Let the interviewee tell the story first before asking any questions.

Questioning style

Figure 2 – Hierarchy of questions

Figure 2 outlines different types of questions. In an interview, it is not ideal to use closed questions, and inappropriate to use leading questions.

• Ask the interviewee to give you a step-by-step account of what happened.
• Also ask them to talk about what happened before the occurrence, not just the occurrence itself.
• Use cues to help the interviewee access their memory
• Get them to return to the place of the event, even if just in their mind (for example, suggest they close their eyes)
• Elicit information on things that might seem irrelevant, as they could still have a bearing on the investigation
• Consider asking the interviewee to look at the occurrence from the perspective of someone else – such as a bystander, someone directly involved, supervisor, member of the public

1.2 Physical evidence at the scene

When an investigation team goes on site, the key object of data collection is to capture any perishable evidence. Perishable evidence is information that can be lost due to factors such as time, weather and movement. It is essential to collect perishable evidence before it is lost and can be disputed.

Perishable evidence can include:
• Physical marks (skid marks, damage etc.)
• Switch positions on plant items
• Weather conditions
• Data recordings
• CCTV or video footage
• Positions of vehicles, plant and other equipment
• Mobile phone data.

Perishable and other physical evidence can be recorded in numerous forms including photographs, videos, diagrams, sketches and notes. The investigation team must take all reasonable steps to record physical evidence on site and put those recordings into SRIMS.

1.3 Previous occurrence records and investigations

SRIMS holds a substantial amount of information on previous occurrences and in many instances an occurrence is not unique. A search of SRIMS is likely to turn up similar occurrences with factual or investigation reports that will provide additional information or a direction for the investigation. In addition, our industry partners may have experienced similar occurrences and may be able to provide useful information.

1.4 Documents and records

Relevant documents and records which should be collected may include:
• Training records and curriculums
• Work history
• Policies, procedures, local procedures, work instructions
• Equipment manuals
• Equipment maintenance records.

1.5 Records of data collected

The investigator should develop a record of data that includes what the evidence is, where it was found or obtained, when it was found or obtained, and any unusual aspects that might require further investigation. All such data should be recorded in SRIMS.

2 Analysis and findings

Analysis is at the centre of a safety investigation. The analysis phase provides the link between the collected data and the findings of an investigation.

Analysis is structured and occurs throughout an investigation – it is an iterative process, not something that is done once (see Figure 1).

2.1 Building a timeline of events

A timeline of events can be developed from the details captured in SRIMS fleshed out by information provided by eye witnesses and those involved in the occurrence.

The starting point for the timeline will not necessarily be the time of the occurrence – events leading up to the occurrence may be important. In some cases, the timeline may start well before, such as on the date of the last maintenance check on an item of plant; or the date that a new SWMS was introduced.
A working timeline, developed during the data collection phase, can help to identify gaps and point to where additional data is needed.

### 2.2 Identifying contributing factors

A contributing factor is defined as an event, condition or factor in the absence of which:
- The occurrence would probably not have occurred
- If it had occurred, its consequences would probably not have been as significant
- Another contributing factor would probably not have existed.

Contributing factors may be identified during the data collection phase or in the process of the 5-whys analysis (see section 2.3).

There are four major categories of contributing factors – work area environment; plant, equipment and tools; procedures, task and training; individual factors.

#### 2.2.1 Human factors

Some contributing factors are described as ‘human factors’ – issues such as human performance, error, workload, situation awareness, fatigue, physical layouts, geometry and environment of the workplace, system of work/task analysis, interface design (e.g., signage, markings, traffic lights, intelligent transport system), lighting, noise, vibration, biomechanics, ingress/egress, and associated safety and effectiveness aspects.

Examples of how human factors can contribute to an occurrence are:
- A worker losing concentration due to fatigue
- A worker taking shortcuts in order to get a job done on time
- A worker's intense focus on the task in hand means that they miss other information in their surroundings (‘information exclusion’).

### 2.3 The 5-whys technique

The 5-whys technique is an iterative question-asking technique that explores the contributing-factor-and-effect relationships for an occurrence to identify potential safety issues.

The basic premise of the approach is to repeatedly ask the question 'Why?' until any safety issues are identified. The technique was originally developed by Sakichi Toyoda and used by the Toyota Motor Corporation in managing production issues; however, the technique can also be used in safety investigation.

The ‘5’ in 5-whys is based on empirical observations of the number of times ‘Why?’ must typically be asked to resolve the problem or identify the safety issue.

Each time the question ‘Why?’ is asked, an answer is required that is an account of things that have happened, not events that might happen. This prevents the 5-whys becoming just a process of deductive reasoning, which can generate a number of outcomes and often creates more confusion.

The process involves:
1. Describing the occurrence accurately and writing the description down
2. Asking why the occurrence happened and writing the answer down
3. If the answer doesn’t identify a safety issue or the source of the occurrence, asking ‘Why?’ and writing down that answer
4. Repeating step 3 until a safety issue has been identified.

### 2.3.1 Example 5-whys analysis

The following example of a 5-whys analysis shows that with 5 simple, targeted questions, and by gathering the necessary data, safety issues can be identified and subsequent safety action implemented.

**Problem**
A worker slipped in the kitchen

<table>
<thead>
<tr>
<th>Why did the worker slip?</th>
<th>There was water on the kitchen floor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why was there water on the kitchen floor?</td>
<td>It leaked from the dishwasher.</td>
</tr>
<tr>
<td>Why did the dishwasher leak?</td>
<td>The seal was broken.</td>
</tr>
<tr>
<td>Why was the seal broken</td>
<td>The dishwasher hadn’t been properly maintained.</td>
</tr>
<tr>
<td>Why hadn’t the dishwasher been properly maintained?</td>
<td>The company had no maintenance schedule for the dishwasher.</td>
</tr>
</tbody>
</table>

### 2.3.2 How far to go

The 5-whys technique asks “why?” until a safety issue is identified. In the example above, the safety issue is that the company had no maintenance schedule for the dishwasher.

While the technique is called 5-whys, it may take fewer or more iterations of asking ‘Why?’ to reach a safety issue or the source of the defined occurrence.

### 3 Safety action development

‘Safety actions’ or ‘agreed actions’ are the actions that the organisation takes in response to the identification of safety issues and to prevent occurrences.

When the 5-whys technique has asked ‘Why?’ until there is a level of confidence that safety issues have been identified, an appropriate safety action should become evident.

Roads and Maritime uses an ‘agreed actions’ process in which identified safety issues are addressed by the relevant business unit. The agreement must be made by a person in the business unit who is in a position to ensure that the action can be completed. Agreed actions are formulated in consultation and seek to ensure effectiveness, feasibility and reasonableness. The process of agreed actions is usually done at the stage when the draft investigation report is made available for comment but may start earlier if significant safety issues are identified.
‘Further investigation’ should be avoided as an agreed action. However, if it is considered reasonable that effective actions cannot be formulated without further review or investigation then this will be acceptable as an initial agreed action.

4 The investigation report

All investigations result in a final report, which is prepared by the lead investigator. The report is documented directly in SRIMS or on the form Safety investigation report – level 3 investigation.

Note: Investigation reports do not include the names of individuals involved or apportion blame but look for the system issues in an occurrence with the aim of preventing recurrence.

Once the analysis has been completed, the final version of the report is reviewed by the responsible manager before it is released.

Once the final version of the report has been approved for release, the lead investigator ensures that all investigation data and actions are recorded in SRIMS.
References

Doc no

PN066P02 Procedure: WHS risk management
PN066P41 Procedure: Safety hazard and incident management
PN066P29_1 Investigators handbook – level 1 and 2 investigations

Form: Safety investigation report – level 3 investigation
[Contact WHS Branch for access]

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Change history

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<td>15/08/2018</td>
<td>Updated to align with changes to the procedure Safety hazard and incident management.</td>
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<tr>
<td>1.2</td>
<td>01/08/2017</td>
<td>Updated to align with training course and role title changes.</td>
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<tr>
<td>1.1</td>
<td>07/07/2017</td>
<td>Updated to align with changes to the procedure Safety investigation (investigation levels, investigator grades, template); section 3.1 Report format removed; incorporated material from workbook used in pilot training.</td>
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<tr>
<td>1.0</td>
<td>09/08/2016</td>
<td>First issue</td>
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Feedback

Contact WHS Branch with feedback on this document at: onermssms@rms.nsw.gov.au