Demystifying Human Factors: Building confidence in human factors investigation

understand

facilitate

Acknowledgements

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Demystifying Human Factors: Building confidence in human factors investigation

Contents

Scope

The oil and gas industry is committed to learning from operating experiences and incidents, and using that information to prevent harm to people and the environment. An important part of learning from incidents is to understand the role that people play. Investigation presents a unique opportunity to understand the systems and conditions that lead ordinary people into complex situations, or provoke simple errors.

The field of Human Factors (HF) can seem mysterious and complicated. Even those with training and tools to address HF in investigations can be reluctant to put them to use, believing that it is something that only experts can do. This document aims to 'demystify' human factors and help those involved in the investigation process gain confidence by successfully incorporating human factors into investigations.

Foreword

This document does not assume any pre-existing training in human factors investigation. It will be helpful whether your company has extensive processes, tools and resources, or nothing at all. The advice in this guide will help those involved in investigation create the conditions for human factors to surface, and become more comfortable using human factors to explain how the event occurred. This guide was written with two audiences in mind:

- Those that lead and participate in the investigation process – the investigator
- Those that receive and act on the recommendations produced by investigations – the client

Let's also talk a bit about what the guide is not about.

For a start, the document is not intended to be a game-changer. It does not seek to spell out new theories or push the boundaries of what can be done with HF. There is a lot of excellent writing and research out there that is doing just that. Instead, the guide simply tries to explain some important aspects of HF in a reassuring and helpful way that gives confidence to those involved in the investigation process so that they can use HF to learn and improve.

The document is also not intended to provide an investigation process or methodology. We have assumed a basic series of investigation steps only as a way of structuring the guide. The guide is intended to compliment investigation methods in use within your own organisation.

The guide is organised in three parts, so that you can select the appropriate advice, depending on where you are in the investigation process, and what your role is.

This document has three main sections

1) Roles, in which we look at the role of the investigator, and the investigation client, in understanding human factors as part of an investigation

2) The investigation, in which we look stage-by-stage at an investigation, and what can be done at each stage to maximise human factor learning

3) Implementation, in which we look at some ways that you can improve the implementation of some of the ideas in this document

Throughout the document we will use a number of icons:

Translate Jargon

This icon will show when there is a commonly used human factor term that describes what is being talked about in the text. You don't need to remember it, but it may help you if you hear people using the term.

Worked example

A single worked example will run throughout the document. This icon shows when we are returning to that example.

Key points

Brings out a small number of key points that will be particularly useful to you in this section.

1. How to use this document

There are a number of ways we suggest using this document:

- Understand your role. Whether you are an investigator or a client, it is helpful for you to understand what the role is for both parties.
- Overview the stages before an investigation.
- During an investigation, revisit the appropriate stage for advice.
- After an investigation, use the stages to consider how you might approach things differently.
- Consider how you can embed this advice in your organisation using the Implementation section.

1.2   Why understanding human performance matters

People interact with each other, plants, and process as part of a complex system. Human beings are essential in maintaining our barriers and safeguards. They can, and often do, "save the day".

But we also know that people will make mistakes. Their actions are rarely malicious and usually make sense to them at the time. We know that mistakes are typically due to underlying conditions and systems. Since **human error** will never be eliminated entirely, we try to make sure that our most critical tasks and barriers are resistant to error.

Understanding why mistakes happen can help us prevent or cope with them. Investigation is central to understanding why people did what they did. We use what we learn from investigation to design plants, tools, and activities to reduce mistakes and better manage risk.

Finally, we know that leaders help shape the conditions that influence what people do. It matters how leaders respond when things go wrong. This document will demonstrate how leaders can educate others about human factors roles in incidents.

Human error/Mistakes: Simply put, terms that describe the natural variability of human beings, i.e., "we're all human". In Human Factors these terms can describe a range of different human failure mechanisms, including forgetting, misperceiving, or accidentally or intentionally taking the wrong action or decision.

The important thing to remember is that when an investigation discovers human error or mistakes contributed to the chain of events, the inquiry does not stop there. The team keeps searching for the conditions and systems that made them likely to happen.

1.3   What are 'Human Factors?'

'Human Factors' are simply those things that can influence what people do.

They may include factors relating to the job people do (e.g., time available or control panel design) personnel factors (e.g., fatigue, capability) and organisational factors (roles, manning levels). This list of factors is often referred to as **"Performance Shaping Factors"**.

If a **behaviour** was causal or contributory to the incident, Human Factors analysis can help the investigator understand why human performance suffered, and help develop meaningful recommendations to reduce that risk in the future.

1.4   How do human factors relate to incidents?

People are involved in all of our barriers and safeguards. People design, operate, and maintain engineered barriers. They also perform tasks, checks and monitoring that we rely on to prevent, detect, and respond to risk events. We rely on humans in every aspect of our business:

- Engineers and planners in project design
- Crafts in construction
- Operators in the control of processes
- Maintenance technicians in maintaining the kit
- Inspectors in checking the kit
- Managers and leaders who oversee and influence the conditions for all of the above actions

If people do not perform as anticipated, it can have a negative effect on the outcome, including causing or contributing to an incident. Human performance can directly affect the effectiveness of a barrier that relies on a human to sense, decide, and/or act to make it work.

Performance shaping factors: Also known as "preconditions", or Performance Influencing Factors (PIFs),these are the characteristics of the job, the individual, and the organisation that influence human performance. Addressing these factors reduces the likelihood of all types of human failure. For examples of PSFs, see appendix A.

Behaviour: In human factors, this simply refers to an observable action, or the thing that somebody did or did not do. It is not associated with "good" or "bad" behaviour".

1.5   Introducing the worked example

Throughout this document, you will see the magnifying glass icon ((🔍)), where we apply what we have been discussing to the worked example. This is the first description of the example.

First contact

Imagine that you have had a call from a site. There has been a spill of oil from a vessel. The person on the telephone is keen to tell you what happened.

"The early indications are that an operator was draining water out of a vessel, which had a layer of oil floating on the water. The operator was supposed to watch the drain and close the valve as soon as traces of oil appeared, but they wandered off to do something else. While they were away the water layer drained out and the oil layer began to drain out. The spill was discovered by another operator."

Vessel
Oil
Water
Open drain valve

"The operator was supposed to watch the drain, and close the valve when traces of oil appeared"

Vessel
Oil
Open drain valve
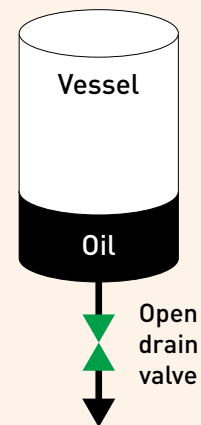
"But the operator did not watch the drain, and oil flowed through the valve and caused a spill"

2. The roles of investigators and clients

In this document we have referred to two roles which are central to uncovering the human factors that underlie an incident:

- The **Investigator**, who leads or is part of a team that examines the incident to understand its causes and contributory factors
- The **Client**, who receives the investigation's results or acts on its findings. This is likely to be a manager or leader

As well as being part of an incident story, human factors can also influence your investigation. We are all human, and investigators and clients can be subject to biases and judgments that can lead to unhelpful conclusions in an investigation.

Why do you think the operator left the valve unattended?

The chances are that the first explanations you thought of were that the operator was not competent, forgetful, or maybe even lazy.

It is a normal human reaction to assume that the reasons for a person's actions are due to a personal characteristic or personality. However, studies show that in most instances, people's actions and decisions are due to external factors. For instance, the operator may have been told to leave the drain and do another job, they may have been doing the task the way everybody did it, or they may have accidentally closed an identical valve.

If we automatically assume that the operator was at fault, we miss the very high chance that there were external factors which can lead others into the same situation.
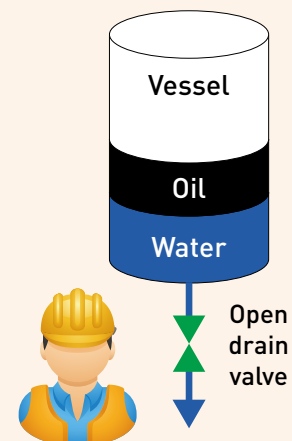
Vessel

Oil

Water

Open drain valve

"The operator was supposed to watch the drain, and close the valve when traces of oil appeared"

As investigators and clients we may tend to:

- Assume peoples behaviours result from their personality or character, rather than the systems or conditions they work in (**Fundamental Attribution Error**)
- Believe that we would have acted differently in the same circumstances (**Overconfidence Bias**)
- Over-rely on what we know now, to make judgements about what people knew then (**Hindsight Bias**)
- Only search for and accept evidence to confirm what we already believed (**Confirmation Bias**)

As an investigator or client you need to be particularly cautious not to jump to conclusions. Keep an open mind and evaluate a wide range of possible explanations to avoid bias.

2.1   What the investigation is trying to do

In any investigation we want to understand the conditions that influenced the event, in order to change them so that we can avoid that event happening again, as well as any other that could be made more likely by the same circumstances.

The goal of human factors (HF) in investigation is to understand what influenced the behaviours that were causal or contributory to the incident. Plants, tools, and activities can be designed to reduce mistakes and manage risk better.

Understanding what underlies the actions and decisions of individuals, teams, or leaders can seem difficult, but it needn't be. Simply put, we are looking to understand the context in which people did what they did. What aspects of plant or job design might have influenced people? What were the underlying organisation conditions and systems? What motivations might have influenced them? What earlier decisions or actions laid the foundations for what happened?

This presents us with the best chance of helping anybody who finds themselves in a similar situation in the future.

Fundamental Attribution Error (FAE): The natural tendency to 'attribute' a person's behaviour to their personal characteristics (e.g.,"this is just the operator being lazy and not paying attention"). Unfortunately incident data suggests the reverse – that the majority of behaviours are due to external factors (the systems and conditions people work with).

Overconfidence bias: The tendency for us to believe that we would handle a situation differently. The majority of drivers believe themselves to be "above average" – which can't be true!

Hindsight bias: The tendency to assume that things that we know now were available to people at the time of the event, e.g., "they must have known there was oil in the vessel"

Confirmation bias: The tendency to search for and accept only evidence that supports your initial assumptions about what happened, e.g., "we found evidence to support our original theory"

2.2   The role of the investigator

Investigators carry out the inquiry that establishes the facts involved in an incident, gather evidence to support their conclusions, and make recommendations for action by the client. How the investigator goes about this can lead to the human factors becoming visible, or being hidden from the investigator.

Do	Don't
• Always put yourself in the position of the person whose behaviour you're analysing. It's easy to apply your 'hindsight bias' when looking at behaviours, applying what you know from the investigation, which often is more than what the individual(s) involved knew at the time of the incident ("**local rationality**"). Remember, we want to understand why this person did what they did (right or wrong), so we can make recommendations that will help others perform better.	• You are not being asked to psychoanalyse individuals. HF analysis is not about getting to the psychological definition. It is about understanding why the individual behaved as they did at the time.
• This may mean <u>physically</u> putting yourself in the same location or situation (in a safe way). Visit the accident site, see the actual field conditions, distances, noises/lighting/heat. Get as close as possible to the "**work as done**".	• Never raise the subject of blame or discipline with those involved, even if you are trying to be reassuring. Telling someone that you are "not trying to establish blame" can actually lead a person to worry about blame.

Local Rationality: The idea that during the events leading up to accidents, people are acting in a way that makes sense to them at the time. All of their knowledge, training, experience, organizational culture, and input from the environment combine to influence the decisions made and the actions taken.

Work As Imagined/Work As Done: Procedures, rules, permits and expectations are all part of how leaders, engineers and task designers imagine the work is going to be conducted, under ideal circumstances – this is *Work as Imagined*.

Work As Done is how work actually happens, in the cold and rain, with equipment that doesn't work as expected and rules and procedures that are ambiguous. A vital part of investigating human factors is about getting as close as possible to how work actually happens.

Do	Don't
• Consider all reasonable possibilities and use evidence to support including or excluding them.	• Don't focus on the last person to touch the equipment. The underlying conditions that led to the incident may have existed for some time.
• Focus efforts on preventing anyone else getting into the same situation by adapting the systems and conditions they work with.	• Don't give "human error" as the root cause. Human error is not the end-point, you need to understand the context of why the error occurred.
• Always complete the analysis. By forcing yourself to 'test' each of the other possibilities, you can reduce or prevent 'confirmation bias,' which is the tendency to search for and interpret information in a way that confirms a pre-existing belief.	• Don't hide behind jargon – e.g., "cognitive bias", "lack of risk awareness". Try to be concise and explicit in your explanations. If you can't easily explain what it means, find an easier way to write it.
• Use natural language to explain what you've found	
• Keep an open mind	
• Seek to understand how your organisation systems and procedures contributed	
• Compare how work "should" have been done, how it was typically done, and how it was done on the day of the incident	
• Prepare for giving honest and direct feedback on management contribution	

2.3   The role of the client

The role of the client is to enable the investigation to happen, to provide resources, access, and authority. They also receive the investigation report, may quality assure the findings of the report, and take action on the findings. All these can be done in a manner which is constructive or harmful to the uncovering of human factors

In particular, clients need to be careful not to give any impression that could deter those involved from speaking truthfully about what really happened, and the issues that led to it. Openness and cooperation of interviewees is an essential aspect of uncovering HF in investigations.

Do	Don't
• Set Terms of Reference that ask for the human and organisational factors to be explored	• Don't talk about 'blame', 'holding people to account', 'finding out who is responsible'
• Prepare to reflect on your own contribution to the events, and don't let your involvement influence the course of the investigation	• Don't use discipline as a threat in connection with the investigation
• Help ensure the independence of the investigation team.	• Don't ask investigators to recommend discipline
• Encourage the open and honest reporting of problems that could have contributed to an incident	• Don't add layers of procedures or practice as a response to recommendations, look for more reliable means
• Challenge investigators to dig deeper if they have not established the causes of behaviour, actions or decisions	• Don't demand use of specialist human factor language, terms or tools
• Challenge investigators to explain how leaders, supervisors or your own behaviours and messages created the conditions for the incident	• Don't push your personal hypothesis onto the investigation team
• Seek to take sustainable action to prevent others getting the same situation	
• Look for evidenced explanations of behaviour in natural language, even if specific "human factors" are not called out	

You have the ability to promote good investigation, through what you ask to be investigated, pushing for an understanding of your own contribution, and pushing for systems and factors underlying behaviour. You also create the environment for people to be open, by keeping a separation between investigation and discipline, avoiding blame, and keeping in mind that the purpose of the investigation is to learn. This will help you and your company avoid recurrences of incidents.

2.4   Maintaining independence

While it is ideal for someone who is completely independent of the site to lead the investigation, this may be hard to achieve in real life. These guidelines may help:

- The investigation leader should always be independent from the event being investigated
- The investigation leader does not necessarily have to be independent of the site or the company, but you may want to consider this for the most serious incidents, where findings on system, organisational, and leadership causes may be more difficult to deliver to an investigator's own line managers.

Clients can assist with independence by

- Keeping senior leaders briefed and fielding questions and challenges which could unduly influence the direction of the investigation team
- Asking for another person to set the terms of reference/receive the investigation report if they believe there may be a conflict of interest because of their contribution
- Get help from a coach or colleague to keep them on track with supporting the investigation's independence.

2.5   When you might need more help

The key message from this document is that you can go a long way to making a good job of identifying and addressing human factors in investigations without any specialist help.

It is possible, however, that the particulars of an incident may call for specialist help.

This does not necessarily mean that you need a human factors "expert" – it is only in the most complex of cases that you are likely to need this. However, if you decide you want a specialist view on (say) the design of a control room panel, to see how an individual could misread it, then you may call on someone who designs control panels and understands the human aspects of the design process. Just as a metallurgist might help to examine how a piece of steel failed, the specialist is there to help you, as the investigator, get the full context of the incident.

3. HF in each stage of an investigation

Overview of stages

In this section we look at the investigation, the collection of the facts that allow us to reach the underlying causes.

This document does not recommend any particular type of investigation technique. You should be able to use the advice given here with any tool used by your organisation. For a discussion of techniques along with strengths and limitations, reference 2 is helpful.

For the purpose of this document we've described 5 main components of a typical investigation process:

Preparation	→	Evidence gathering	→	Analysis	→	Findings and recommendations	→	Reporting
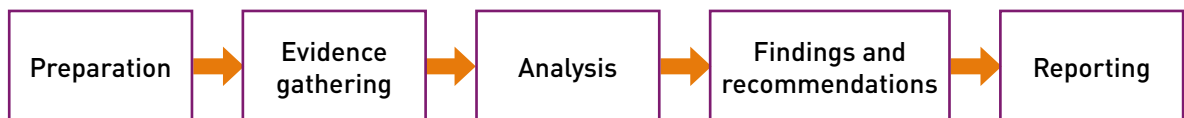
1) **Preparation**: in which the client and investigator are working to agree what is being investigated, the make-up of the team, and the logistics of mobilising to the site.

2) **Evidence gathering**: in which investigators start understanding the story of the incident and gather diverse and often fragile or fleeting human factor evidence

3) **Analysis**: in which investigators systematically search for explanations of what happened and pair them with evidence

4) **Findings and recommendations**: In which investigators are describing their conclusions and working with the client to agree to recommendations that will have a sustainable effect

5) **Reporting**: in which the final story, evidence, and recommendations are written down to be used to take action

The following sections describe how each phase contributes to understanding the human factors of an incident, and how to maximise the likelihood of you being able to gather HF evidence and draw conclusions in each stage.

3.1   Preparation stage

| Preparation | → | Evidence gathering | → | Analysis | → | Findings and recommendations | → | Reporting |
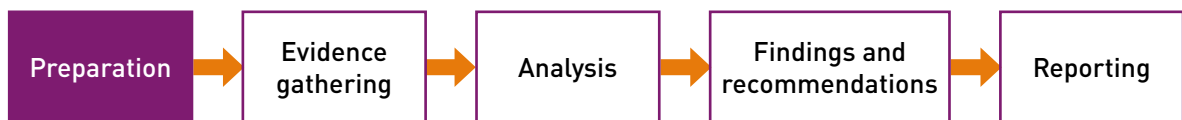
In this stage

In the preparation stage the client and investigator will:

- Understand the scope of what is being investigated
- Decide the make-up of the investigation team
- Arrange logistics of mobilising the team to the site
- Preserve the evidence, including interviewing people who witnessed the event

Investigator's to-do list

- Agree Terms of Reference (TOR) that allow for exploration of the physical, organisational and leadership factors that could underpin human causes.
- Many types of evidence will be helpful to the human factors part of your investigation. Ask the site to preserve all evidence as well as they can. This may mean preserving documentation and digital evidence, leaving physical evidence in place or photographing, videoing or mapping if this can't be achieved. Some evidence might be considered private in some countries (emails for instance) so seek legal advice if necessary.
- Ask for the witnesses to be made available to the investigation team, or for contact details to be made available. This may be challenging where contractors or shift workers are involved, but asking increases your chance of interviewing important witnesses.
- Some of the best information is obtained while the incident is fresh in people's minds, and the best way to gather that is through early interview. The logistics of the oil-and-gas industry sometimes make this difficult. Witness statements can serve a purpose when an early interview is not possible, but shouldn't be considered a substitute for a well-structured interview which will help interviewees recall many more useful memories than a witness statement alone.

- Beware of affecting people's memories of the incident. Discussing the incident with others, answering leading questions and even crafting a written statement can all lead to **false memories**.
- Your team selection will depend on the type of incident. You are looking for a combination of skills that can help you examine the human side of the incident. This does not necessarily mean that you need a human factors "expert" – it is only in the most complex of cases that you are likely to need this. However, you will benefit from having independent people who understand how this type of work is really carried out, how the equipment or tasks are designed, and what the potential difficulties are for people involved.
- Resist pressure to include the consideration of discipline or Just Culture in your TOR. Becoming associated with the discipline process can lead to interviewees mistrusting you.
- Where you are working with a lawyer, get to know them and explain that the purpose of the investigation is to learn. Explain you will be looking for system causes that could prevent a range of different incidents, and that your enquiry doesn't stop at human error.

Client's to-do list

- Provide Terms of Reference that allow for the **human and organisational factors** to be explored and reported
- Make arrangements to preserve the scene, along with physical, documentary and digital evidence
- Make the names, roles and contact details of those involved available to the investigator
- Remain impartial, don't offer your opinion, and avoid your own biases. Avoid speculation and try to discourage teams from debating the causes, as these can all affect how people remember what happened
- Don't ask for recommendations on discipline or Just Culture in the TOR
- Avoid talking about discipline or blame, as this can make people reluctant to be open about what happened

False memories: Although our memories seem to be faithful records of what we've seen, they are constantly being reconstructed and renewed as new information come to light. Answering leading questions, talking to someone who has a different recollection of events or simply replaying events in our heads to make sense of them, can all lead us to unintentionally reconstruct memories. For these reasons investigators prefer first-hand verbal accounts soon after the incident, avoid leading witnesses and try to minimise discussion and speculation by witnesses and others in the organisation, including leaders. Extremely similar witness statements can be a sign that a team has collectively arrived at an explanation, so you may have to work harder in interviews to retrieve first-hand recollections.

Human and Organisational Factors: A term which emphasises the joint contribution of individuals, company systems and social structures on incidents. For investigators this means not stopping at "the person who pressed the button".

Getting ready

The investigator and the client agree a terms of reference. The client is keen to understand how he and his team may have influenced the event and has asked for human factors to be explored.

The valve had to be isolated and the spill cleared up but everything else is as it was left. All the paperwork has been gathered in a pack for the investigator.

This shift team is due to be off shift in 2 days, but the client has worked with the people involved to make sure they will be available to talk to. The client's boss has asked for a list of people to be disciplined, but the client has emphasised to everybody on the site that the investigation is to understand how it happened and learn from it.

3.2   Evidence gathering

Preparation → **Evidence gathering** → Analysis → Findings and recommendations → Reporting
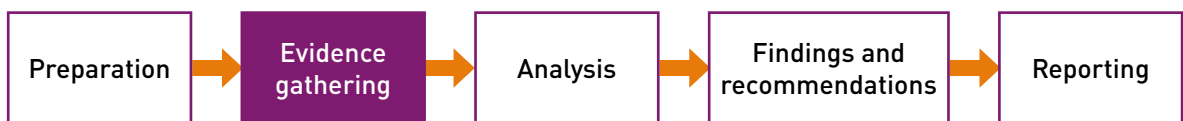
In this stage

In this section investigators will:

- Start to build a timeline of events
- Visit the accident location (if practical)
- Gather fact-based evidence, including physical and documentary evidence
- Conduct interviews with witnesses, and those familiar with the operations, including specialists and subject matter experts

Sources of evidence

Hopefully, evidence has been successfully preserved in the preparation phase. In gathering evidence in this section take care not to destroy it. For instance, when gathering physical parts, make sure you have mapped their location in case that is relevant. When gathering digital data, consult with a specialist so that you do not accidentally erase valuable records.

Interview evidence is an essential component of understanding the human aspects of an incident, and is dealt with in detail later. However, many other types of evidence may be useful in helping to explain systemic factors that influenced the actions or decisions of people. As you continue to analyse and gather further evidence, the table below may help in thinking about the range of evidence available:

When considering...	...what sources of evidence might you look for?		
	People	**Paper**	**Physical**
Whether the individual was acting on the instruction or influence of an authority figure?	• Interview with individual about their understanding of the instruction • Interview with the authority figure to understand how instruction/influence was given, and how it was intended to be interpreted. • Interviews with peers of authority figure exploring what is normally expected • Interviews with peers on what is normally expected	• Work instructions in permits/emails/etc	
Clarity or practicality of expectations?	• Interviews with individual, peers and supervisors exploring any misunderstandings or conflicts in meeting expectation • Walk through the task looking for practicalities/ challenges of the task with those usually involved • Work with those that do the task to identify where procedures may not reflect reality	• Review clarity, availability, up-to-date or practicality of any written expectation, including procedures	• Review physical layout/ ergonomics of equipment to allow the task to be carried out as expected, or as written in a procedure

When considering...	...what sources of evidence might you look for?		
	People	**Paper**	**Physical**
Capability or resources?	• Interview individual on understanding of what was required, own experience and capability, and practicality of doing it. • Interview individual and peers on time, people or other resources to do what was required	• Competence systems, training and assessment records • Permits, work instructions or procedures citing competence requirements • Previous incidents involving the same individual in different tasks • Previous incidents involving other persons on the same task or in the same circumstances • Records of individual's physical fitness/ capability for the task	• Physical layout/ ergonomics of equipment to allow the action be to carried out
Error?	• Interview evidence that individual recognises they made an error • Interview evidence that individual can't explain reason for their actions • Evidence of individual being tired/ preoccupied/ distracted • Peer interview evidence that task has known error traps, or others have made, or nearly made similar errors in the same situation.	• Previous incidents involving the same individual in different tasks • Previous incidents involving other persons on the same task or in the same circumstances • CCTV footage	• Physical layout/ ergonomics of equipment to allow the action be to carried out • Review adequacy of controls/interfaces/ indicators • Review environmental conditions. Temperature/ light, noise, etc.

When considering...	...what sources of evidence might you look for?		
	People	**Paper**	**Physical**
Custom-and-practice developed amongst a team?	• Interview evidence with individual and peers on why this was preferred approach and how widespread it is • Interview evidence with supervision on level of knowledge and endorsement of custom and practice	• Risk assessments relating to custom-and-practice • Informally documented practices (black-books) • Efforts to formalise the custom and practice physical layout/ ergonomics of equipment to allow the action be to carried out • Review adequacy of controls/interfaces/ indicators • CCTV footage	• Tools/equipment that are specifically designed, improvised or home-made to support the custom-and-practice (e.g., use of a scaffold tube to increase leverage on a pipe wrench) • Physical layout/ ergonomics of equipment to allow the action be to carried out • Review adequacy of controls/interfaces/ indicators
Whether the individual was in a difficult situation?	• Interview evidence with individual on what made it difficult to meet expectations in this case • Interviews with peers/ other person with same knowledge, skill, and experience on their approach to the situation • Understand what people needed to know to make a decision, and what information they actually had access to.	• Previous incidents involving the same individual in different tasks • Previous incidents involving other persons on the same task or in the same circumstances • Review suitability of procedures/work instructions for dealing with the circumstances encountered • CCTV footage	• Physical layout/ ergonomics of equipment to allow the action to be carried out • Review adequacy of controls/interfaces/ indicators

When considering...	...what sources of evidence might you look for?		
	People	**Paper**	**Physical**
Whether the individual was acting to benefit themselves or in the belief that they are acting in the interest of the company?	• Interview individuals involved on what they perceived benefits to be/ why they perceived them as beneficial at the time, and what the perceived consequences were of not acting as they did • Interview peers and supervisors on level of knowledge/ endorsement/ extent of this condition • Interview supervision/ leadership on how priorities have been messaged/how resources were made available	• Plans/schedules of work • Schedule of leaves and time to start and finish work • Leadership messaging • Rosters/work patterns • Records of previously reported efficiency/ continuous improvement opportunities	• Physical layout/ ergonomics of equipment that make the task inefficient or make alternative actions more attractive
Whether there was intended harm, damage, or loss?	• This is highly unusual in normal operation and is outside the scope of this document		

Interviewing

- Interviewing is a skill, which can be improved by specific training and regular practice.
- Plan for your interview. Talk with your team about what you are looking for, what key information the person may have, what you have been told by others or seen in other evidence that you would like to corroborate.
- Think about the order in which you interview people. The closest-involved are your highest value witnesses. However, information that comes from those less-involved may be crucial in planning your interview with the closely-involved. Some investigations may benefit from an "outside in" approach, where you start with witnesses more distant from the scene, to maximise the value from those more closely-involved later.
- Interview one person at a time.
- Many companies use two interviewers. One person leads the interview and asks the majority of questions. The second interviewer can take notes, and supplement further questions when asked by the lead interviewer. Avoid overloading with interviewers – any more than two and the interviewee is likely to feel like they are being grilled by a panel.

- In some organisational or national/regional cultures, there may be great deference shown to senior people which can limit an interviewee's openness. Senior management figures should not be tasked with interviewing junior staff; similarly, avoid having line managers interview their own staff.

- Be open-minded about what the interviewee will tell you. You may have theories, but often new and important information will come from an interviewee that you did not anticipate.

- Set the interviewee at ease. Greet the interviewee. Remember they may be nervous, or even have witnessed upsetting scenes. A calm, at ease interviewee is more likely to be able to remember helpful detail

- Introduce yourselves and describe how you'll go about the interviewing process. Be clear that you are there to help them remember as much as possible, to stop things like this happening.

- Avoid any mention of discipline or blame or accountability, even if you are trying to reassure. There may be a time for this after the investigation, but your task is to maintain an open and collaborative relationship with the interviewee – they have the information you need to do your job. If pushed on the question of whether there will be discipline at a later stage, emphasise that the purpose is only to understand the circumstances of the incident, to prevent anyone else getting into the same situation.

- Get them to tell you about themselves, and their experience

- Where possible use a method of interviewing that helps interviewees to recall as much detail as possible on the circumstances, environment, and events leading up to the incident, even if you think that detail may not be immediately useful. With HF this sort of detail could be very useful. For instance, an operator might mention a weak signal, or poor sleep the night before.

- Use an open question at the beginning, to help interviewees give an account in their own words, before exploring further. For example:
    - Tell us about everything you remember from the time you woke up to the incident.
    - Tell us about your role in the job from when you first got involved with it

- Avoid guiding the interviewee to answers which match your expectations (for instance, based on what you might know from other interviews or evidence). Keep questions open, don't complete their sentences, and don't offer your own opinion of what happened.

Cognitive interview: a structured method of interviewing eyewitnesses about what they remember from an incident. The primary focus of the cognitive interview is to help witnesses recall as much detail as possible. It achieves this by allowing them to tell the story in their own words and then retell smaller sections of the story in greater detail, no matter how irrelevant the detail. Cognitive interviews reliably enhance the process of memory retrieval and have been found to reduce errors in recall.

Key points: Interviewing

Some investigators use the "PEACE" mnemonic to remind them of key stages for an interview

- **Plan**: prepare your approach to the interview and the key information you want to get from an interviewee
- **Explain**: receive your interviewee in a friendly manner, and explain the purpose of the interview and how it will run.
- **Account**: Allow the interviewee to give their version of events without interruption. Take them back to sections of their account and ask them to explain each section again in more detail, to aid recall. Finish with any specific questions you had planned for.
- **Closure**: End the interview in a positive tone. Say that you may come back to them for more information, and that they can contact you if they think of anything else
- **Evaluate**: In your investigation team, evaluate the interview so that the team gains a common understanding of the information that has been obtained.

- You may prepare a list of specific questions that you are interested in, but remember that these can actually change what the interviewee remembers about the situation. Try and use them only after the interviewee has given their account and response to open questions.
- Thank your interviewee and tell them you may come back with more questions, and if they remember anything more they can contact you.
- The use of recording devices needs careful thought. They can provide a highly accurate record of an interview. However, they can also make people feel uncomfortable and limit their openness, defeating the purpose of the interview. Simple notes may be enough.
- When taking notes, tell the interviewee what you're doing and offer them a chance to review the notes. This all helps to place the interviewee at ease which will aid their recall.
- Where possible, avoid having interviews with multiple companies in the room. When multiple companies are involved:
  - Agree who will be conducting the interviews, who will assist with note-taking, and how the resulting information will be shared amongst companies
  - Where multiple company representatives are required to be in the interview, keep them to the back of the room, introduce them to the interviewee, and ask observers to save their questions until the interviewer turns to them to ask for their input.

- Multiple language interviews may be challenging. If you have to rely on a translator to ask your questions and interpret answers, spend some time with your translator to explain what you are trying to do in investigating the event. Ask them to translate the detail of questions and answers as closely as possible, even if a witness's response seems to have unnecessary detail, or things which don't make sense. Encourage them to ask for clarification from you if a question is not clear or open to a different understanding in the other language. Ask them to advise on any concepts which do not translate well, or have a different cultural meaning in the other language.

- Your goal is to help interviewees recall events as accurately as possible. You are not trying to set them up for failure or get them to admit guilt. The vast majority of interviewees are honest and will help you explain the incident. On rare occasions that you suspect somebody is not being truthful, don't be confrontational. Instead, take that person's account and cross-check with other accounts and evidence. If you have convincing evidence, approach the interviewees and ask them for help to explain the difference. They may offer a convincing explanation that you had not considered, or they may change their account. Either way confrontation is best avoided, as it can lead to interviewees "clamming up", which may impede your efforts to learn valuable details about an incident.

Clients also play a role in successful interviewing

- Make interviewees available, and help investigators to talk to those who may have gone off shift, or moved on to other jobs

- Help to set interviewees at ease by avoiding talk of blame, discipline, just culture or accountability

Interview – the operator's supervisor

The supervisor tells you that this is a regular operation, happening twice a shift. The operators are very used to it and have done it a thousand times before. Operators are told not to go off and do other jobs, but it is a very busy time. There was an engineer looking at providing an automatic drain but the supervisor doesn't know what happened to the design change.

The supervisor says that, this particular operator hasn't been thinking straight since his new baby came along. He always seems to be tired and irritable. The supervisor knows that fatigue is something that can increase mistakes so he wouldn't be surprised if that's what happened.

Q: Do you know enough about the incident to explain what happened?

That was a pretty useful interview. You've got some useful information and you might think that you have enough to be able to explain what happened here.

The supervisor has a theory which might be correct but your job is to take all of these theories and find the evidence which proves that those causes and contributing factors did indeed set up the situation. You may well conclude that Bob made a simple mistake because he was tired, but consider the following questions:

- What were the systematic ways of avoiding tired operators carrying out critical tasks?
- What happened to the design change that the engineer looking at?
- Is this the only operator that did other jobs while waiting for the line to drain?
- What other explanations might there be for this mistake?

Early interviews will provide you with some useful lines of enquiry but be careful not to draw conclusions until you have gathered all your evidence, including interview accounts.
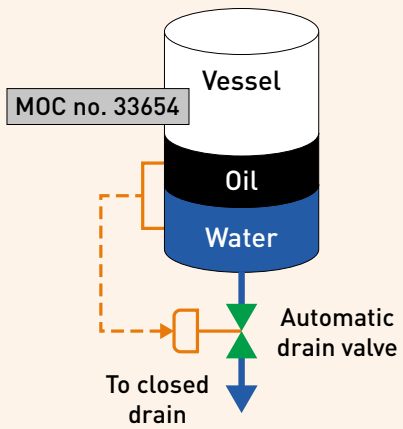
What was the engineer looking at?

You interview the engineer, whose first involvement with this vessel was two years before the incident. The engineer tells you that she was concerned about relying solely on an operator's action for hazardous operations. The Engineer had raised an MOC (management of change) request to fit a level transmitter and automatic valve, routed to closed drain system. The proposal had a lot of support at the time, but the MOC system is in a bit of a mess and it never really progressed.

She feels bad because she knows the operator involved. He is a good, reliable, competent guy with a young family. She hopes you're not going to get him fired.

You tell the engineer that you are just interested in finding out what happened and preventing anybody else getting into the same situation.

MOC no. 33654

Vessel

Oil

Water

Automatic drain valve

To closed drain

The management of change had potential to eliminate this critical task and so avoid the risk of a simple error causing this leak. Furthermore, there may be other important modifications stuck in the system that could lead to other incidents if not addressed.

Focusing on the individual involved is only the starting point, and is unlikely to yield solutions which will sustainably reduce risk. By focusing on the systems and conditions that led to the operator being in this position, there is a greater likelihood of discovering systematic problems that could prevent a number of serious incidents.

3.3   Analysis

| Preparation | → | Evidence gathering | → | **Analysis** | → | Findings and recommendations | → | Reporting |

In this stage

In this stage you will

- Continue to develop the timeline, or "story", of what happened, based on the facts and evidence gathered
- Pursue promising lines of inquiry
- Make sense of your evidence
- Identify the causal or contributing factors that led to the incident based on facts and evidence
- Continue gathering evidence, including re-interviewing, where there are gaps or theories that are yet to be proven or disproven
- Identify which safeguards did or didn't work, or may have worked had they been in place based on the evidence.
- Consult other disciplines (e.g., engineering, operations, HF) if there is an area you do not fully understand

Key points: Analysis

Don't stop at a mistake, action, or decision by a person. You are not trying to explain why an individual did what they did. You are trying to identify the context, systems, and conditions that made their actions likely to happen, so that your recommendations can prevent anyone from falling into the same trap.

What was there in the environment, equipment, task design, or culture that created the conditions for the mistake, action or decision? Or, in cause-and-effect language, what were the factors that were causal or contributory to the person's own contribution?

You may not get conclusive evidence. You may be forced to explain what "probably" happened, so that you can recommend a range of precautionary measures that would prevent that in the future.

Analysis techniques

HF analysis relies on the same cause-and-effect logic that sits at the heart of most investigation techniques. It is most effective when conducted as part of the investigation, rather than being treated as an add-on, or something to be done after the investigation is complete.

In the vast majority of situations, almost any investigation analysis technique can be used to gain a reasonable understanding of human factors. This means that the investigation analysis technique your company uses can be used to good effect.

Some key points for a variety of techniques are listed in the table (based on reference 2). However, there are some common aspects which will help in all circumstances

- Even if your analysis technique has not taken you to a level that explains why the human action or decision occurred, keep going. Don't let the method restrict your enquiry.
- Make good use of your timeline of events. Don't be afraid to go way back in time, and forward past the incident. The conditions for many human factor issues are laid down years before and lie dormant as **latent conditions**. Information from after the event will help you understand how practical it was for people to detect the problem and recover.
- Identify gaps and go back to ask more questions
- Allow yourself "soak time" to understand what your analysis is telling you. Invite someone in with fresh eyes to hear the story and suggest new lines of enquiry.
- Fundamental to all techniques is to NOT stop at the point where you identify a mistake, action or decision by an individual, but to keep asking 'why'/' how' and 'how else'. You are trying to understand the systems and conditions that led that person into a situation, and could lead others into the same situation
- Support theories or hypotheses with evidence.
- Keep an open mind
- Always look for the next level of explanation when you see a human cause. It may itself have another human cause (such as they were told to do it) or physical, organisational or management system cause
- You may come across an area that you want to understand better, but don't feel you have the technical knowledge. If that happens you may call on a specialist (e.g., engineering, operations) to help you get the full context of the incident.
- Analysis is an iterative process. You will gather some evidence, look at the timeline and your causal analysis and it will often show that you have gaps or raise even more questions. Be prepared to go round again.

Latent Conditions: conditions which set up the accident to happen, but might sit unrecognised for a long period of time. This might include a design error, or an instrument overridden and undiscovered for months.

| Type of technique	Is this yours?	HF element....
Logic based	• Techniques which aim to understand how causes led to effects. Includes 5-why, logic-tree	• Don't stop at a mistake, action or decision by a person, even if you run out of 5 whys, or if it seems to go out of your original scope • Keep asking why until you have established the human, physical, organisation and leadership causes that resulted in the person's actions
Barrier based	• Techniques that identify which barriers or defences were effective, failed or were missing	• Where your organisation considers a human task to be a barrier, do not stop at your finding about the barrier. Continue to ask what caused the human action. • Where an engineered/mechanical barrier has failed, seek to understand the human contribution, and the systems and conditions that led to the human action.
Checklist based	• Using predefined lists or trees.	• If your techniques have specific checklists that cover the factors that influence they should help you to look below any human component. • Be careful not to jump to checklists too soon. Build up your timeline of events that explain the story of "what" happened before using the checklists to ask why. • Some checklists can unintentionally narrow down the focus of your investigation. Step back and consider "what else" might have contributed to the situation
System theory techniques	• Less common, but a technique that looks at how various "actors" interact. These actors may include individuals, processes,, regulators and even governments	• These techniques are usually used by experienced researchers.
Specialist Human factor techniques	• Several techniques that take psychology and organisational research to produce tools that can identify the type of mechanism involved (e.g., Human error analysis, ABC analysis, Fatigue tools.	• These techniques can be valuable, especially when an investigation is struggling to explain the role of people. • However, it is perfectly possible to gain a good understanding of human actions and decisions by using some of the more basic techniques above. These specialist tools may be used to augment the basic analysis technique but should not replace it. • Take care that you do not assume that one technique can deal with all situations.

Your analysis

Looking at the evidence it seems clear that this was a simple mistake. Why?

The task was straightforward but the operator was tired, and he had a lot of other tasks to do, so he was multitasking. All those things could lead to him to forget to return to the drain. But it was critical to get this task right. Was that recognised? Why not? Even if the operator was present, is it easy to tell when oil starts to flow out of the line? What were the perceived benefits of doing it the way it was done? What other tasks might there be where a simple mistake could lead to an incident?

Knowing which the critical tasks are could lead to extra instruction, checking or controls. There was none of that, and that was a factor here.

But there was also that MOC. There was an opportunity to eliminate this incident forever if that modification had been applied. You wonder why it didn't get done.

MOC no. 33654

Vessel

Oil

Water

z z Z

Automatic drain valve

To closed drain
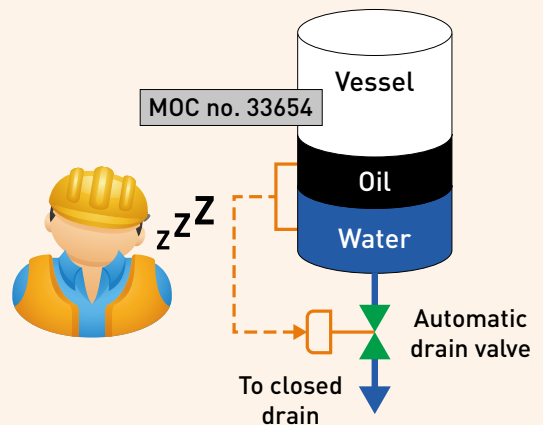
This might be the point when you think you want to ask more questions to understand why the modification hadn't been completed. Why was the MOC system not functioning properly? What other issues could be sitting dormant in the process waiting to become an incident?
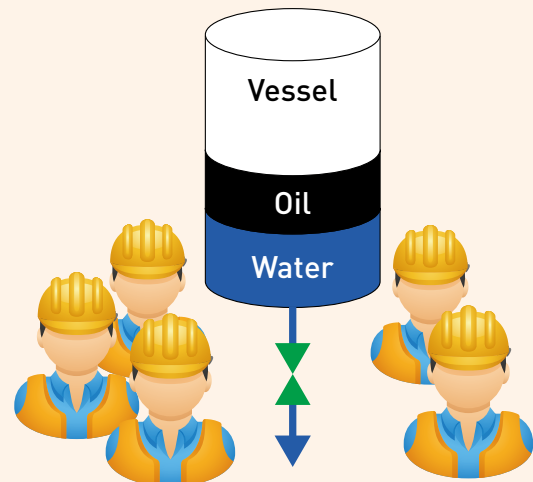
Asking more questions

You interview the colleagues of the operator. You find that it's common practice to leave the drain flowing because there is a lot to do, and standing waiting by the drain seems like a waste of valuable time. The task is tricky anyway because it's hard to tell when traces of oil appear in the rapidly flowing drain, especially at night. Sometimes you miss the change and you get more oil than you are expecting.

All tasks are viewed the same way, and there are no extra controls or oversight for tasks that are more likely to lead to an incident.

"Yes, everybody leaves the drain running. We have stuff to do."

There is no real understanding of fatigue by supervisors, who do not think about how it might affect critical tasks.

Many people know about the suggested modification but nobody is hopeful that it will happen. People say there is "no money for that sort of thing" and so they just make the best of what they have.

You look at the management of change (MOC system) and discover a backlog of modifications. There is no prioritisation of safety-related changes. Interviews with leaders show that that they are unaware of the backlog and prioritisation issues, and are surprised as there is a lot of money being spent on modifications.

The problem with the MOC system is causing real difficulty, and there could be several other incidents which could stem from this. Managers are unaware and the workforce is getting the impression that the company is cutting cost. The evidence seems to show that considerable funds are available but are not being prioritised on the important stuff

Having done your first phase of analysis and gathered more evidence to fill the gaps, you are now getting to some real system issues with the potential to have prevented this incident, but also many more incidents.

Don't be surprised if you have to iterate around the evidence/analysis loop until any gaps have been closed and the systemic issues that could help prevent incidents have been identified.

3.4   Findings and recommendations

| Preparation | → | Evidence gathering | → | Analysis | → | Findings and recommendations | → | Reporting |
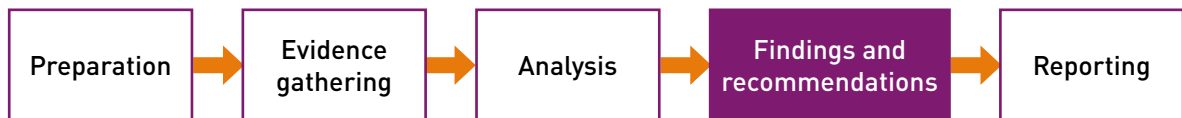
In this stage

At this stage an investigator will:

- Describe the findings, in particular what you believe the factors are that caused or contributed to the incident
- Develop recommendations to correct causal factors or system root causes that contributed to the event
- Discuss the findings and recommendations with clients/operational leaders and legal to secure agreement

Findings

The style of your findings will probably vary according to your company method but here are some things to remember

- Taken together, your findings should tell the story of how the incident occurred, both at immediate and more systematic cause level
- Where a person's action or decision caused or contributed to the incident, explain both what they did and why they did it
- Avoid language that might be judged as blaming individuals
- Take the position of an independent observer
- Use simple language, and avoid human factor or psychology jargon

Recommendations

- A combination of corrective actions is a typical result as most often there is more than root cause.

- Try to recommend the most reliable, sustainable actions that you can. Apply the **hierarchy of controls** to assess effectiveness of recommendations. Recommendations which eliminate an error-prone task, or provide an engineering alternative, are more reliable and sustainable than those which rely on procedures or human controls.

- Look for opportunities to identify those tasks which could have serious consequences if there is a mistake or human error. Look for ways to prevent, detect and recover from error.

- Recommendations tackling the deeper system causes are more likely to have an impact on reducing multiple incidents, than those that merely tackle the situation that occurred on this incident with the individuals involved.

- Consider both short and long term measures. Sustainable engineered recommendations will take time to implement. Consider short term measures that will reliably address the immediate risk, even if you know that they are not sustainable in the long run.

- Don't make recommendations for discipline or just culture, as these are not the objective of the investigation team, and have potential to undermine trust in future investigations. Simply present the facts of what happened and how widespread issues might be. It may be appropriate to make recommendations to reinforce expectations or standards that weren't met during the incident, but decisions on discipline are for the line management of those involved to decide.

Hierarchy of controls: An industry concept that sets out an ideal order in which to consider controls that reduce risk. These are considered in order of the most reliable and sustainable, to the least. It is particularly relevant to human factors, where the most reliable approach is to eliminate a hazardous or error-prone task, rather than rely on more human controls.

- Elimination (of hazard or task)
- Substitution (with less hazardous material or process)
- Engineering controls
- Administrative controls (such as control of work procedures, signs etc.)
- Personal protective clothes and equipment
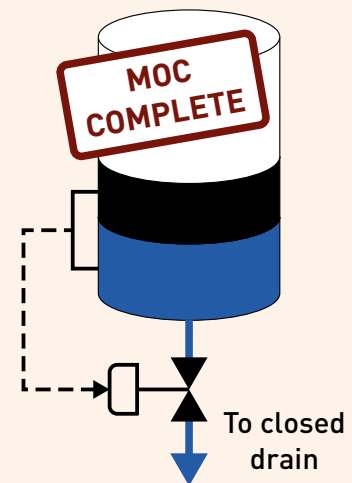
Your findings and recommendations

You've found that the incident happened when the drain valve was left open by mistake. It was common-practice to leave the drain unattended because of the high workload. The operator's fatigue may have contributed to his forgetting to return to the drain, but there are other scenarios in which anyone could have made that mistake by, for instance, being distracted or engrossed in another task.

Although this was an important task to get right, the task had not been well designed. As well as the possibility of forgetting to close the valve it is hard to detect the traces of oil in the water flow.

The opportunity to address this systematically using the hierarchy of controls was missed because the MOC system was not prioritising safety modifications, in part due to a lack of management focus.
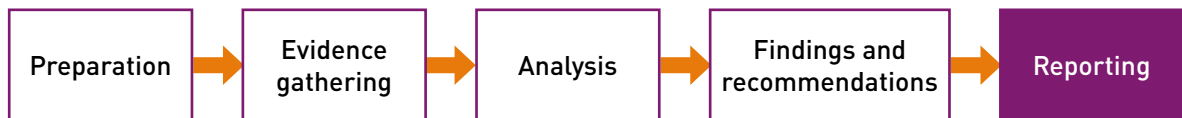
The investigation team found at least 4 other examples of safety critical modifications that are stuck in the system.

The team makes recommendations to

- Complete the modification as planned, as an engineered sustainable solution

- Identify important tasks and improve the design of those tasks by uncovering the difficulties that people experience when they carry them out

- Apply increased controls for the most important tasks, making sure individuals executing them are rested and that there is adequate oversight and cross-checking built into task execution

- Review the workload of operators to ensure that the opportunity and resources are available to perform important tasks

- Improve the management team's focus on the MOC system, and prioritisation of safety related modifications

MOC COMPLETE

To closed drain

3.5   Reporting

| Preparation | → | Evidence gathering | → | Analysis | → | Findings and recommendations | → | Reporting |

In this stage

At this time the investigator will:

- Clearly and simply explain the work of the investigation team including the findings and how they link to recommendations, the context of how the event occurred, the evidence collected and the analysis carried out
- Agree the report between investigator and client
- Work with legal to agree wording that is clear, accurate, evidenced, and enables the learning to transfer beyond this incident

Priorities for effective HF investigation

- Your aim is to explain the behaviour in context of systems and conditions that apply to many people, not make a judgement on the individual's actions or decisions.
- When explaining the role of individuals, be clear to describe it in the context of the factors that contributed to that behaviour, including what made sense to them at the time.
- Use plain language that your audience can easily understand.
- Use non-inflammatory language. Some terms have a technical meaning, but which may have a different meaning in normal usage. "Violation" is a term that is used in some analysis systems to mean an intended action, even if the outcome wasn't as intended. To the average person the term is interpreted as something done maliciously, which is rarely the case. Use of this type of language can therefore distract readers, and divert them from more systemic issues.

Working with legal

The Energy Institute provides some useful advice on how to work with legal to encourage learning from incidents (reference 2). A handful of points relevant to HF is listed here:

- Establish a productive relationship with the legal department
- Write as if information will be made public
- Be prepared to challenge legal advice and/or opinion constructively

Helpful behaviours

What investigators can do

- Use language that is simple, clear and widely understood. Resist the temptation to use human factor or psychology jargon
- Tell the story as an impartial observer, without judgement of those involved and avoid language that could be misinterpreted as denoting blame

What clients can do

- Read the report. It can be tempting to rely on a summary or verbal account, but there will be detail in the report that will really help you to understand the systemic issues, especially when it comes to human factors. You may also miss something that you need to act on.
- Where an action or decision causes or contributes to an incident, look for explanations of why people did what they did. Don't be satisfied with a report that simply points to an individual's failure.
- Do not demand that technical Human Factor/Psychology language is used in the report. It is better for everyone's understanding if the investigators have used simple language that is accessible to everyone, as part of the story of the incident.
- Work with your lawyers to make sure that investigation findings that point to system and organisational issues are used for learning in the company.
- Ask for clarification on terms that are ambiguous or jargon. Challenge investigators to use simple clear language.
- Encourage sharing of human factor findings amongst leadership and management peers to aid learning.

Your report

You are going through the draft report with the client and a lawyer and they question the statement "the operator deliberately left the drain unattended".

The lawyer asks if this means it was a one-off case of an individual acting maliciously. In that case she wonders why there is not a recommendation to discipline the operator as this wording seems to mean that there was some malice on the part of the operator.

You explain that although the expectation was to stay with the drain, it was common practice to go and do other tasks. The operator made a simple mistake by not coming back, made likely by a number of factors including the way the task was designed, workload, and fatigue. You also explain that your investigation does not make recommendations on discipline, as this undermines trust in the process.

Your client agrees that recommending discipline is not in the scope of the investigation. He does not think that it is appropriate in this situation anyway as there are system problems that underpinned this accident (such as the missed opportunity to provide an automatic drain) and they are his responsibility to tackle them.

Your laywer suggests the more factual "the operator walked away from the valve to do another job. They forgot to return in time to close the valve, possibly because they were concentrating on the other task, or due to tiredness from personal issues".

Together with the lawyer and the client, you work through the findings, and agree wording which clearly explains the situation, doesn't apportion blame and puts the individual's actions in context of the systems and conditions they were working in.

Investigation Report

Vessel

Oil

Water

Draft for Legal Review
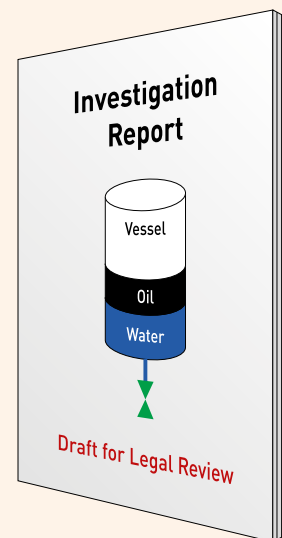
4. Implementation

What can you do to maximise the success of HF Investigations in your organisation? This section gives some suggestions.

Build capability of investigators and clients

To achieve quality investigations, be thoughtful about the candidates you select to lead investigations, and how they are prepared and developed. Characteristics may include:

- Enquiring, open-minded attitude
- Prepared to consider multiple explanations
- Desire to pursue explanations rather than apportion blame
- Systematic approach to collecting and analysing evidence
- Able to facilitate a team and engage with those involved in an incident
- Able to deal with clients
- Willing to take an independent view on what happened
- Able to listen and empathise with those involved
- Able to brief the team on the intended outcome

The competence structure may include:

- Selection of candidates
- Building basic understanding of need to understand causes of behaviours, not stopping at human error
- Building understanding and skills of analysis approaches and appropriate evidence
- Interview skills
- Practicing skills regularly
- Having experts in your organisation who can train, coach and grow the skills of everyone involved
- Internal or external courses

Choose an investigation analysis technique

Ensure the team has an analysis technique that allows exploration of the causes and contributing factors to individual behaviour. There are off-the-shelf tools and techniques designed to do this, or the organisation may develop an internal tool. For a full consideration of different techniques, see reference 2.

Creating the environment for successful HF investigation

Openness is a key part of successful HF investigation. The workforce needs to be assured that understanding HF helps their interests rather than threatens them.

Engage leadership in behaviours that aid learning from incidents, including:
- Reading investigation reports to understand the full context of human actions (not just summaries, which can give a false impression)
- Seeking explanations for individual behaviours that would help others in the same situation
- Encouraging sharing of own weaknesses as an act of leadership
- Encouraging investigation teams to assess leadership contributions
- Expecting recommendations that provide systematic, preventive measures

Also coach leaders to avoid behaviours that discourage understanding of human and organisational factors
- Avoid blame or use of discipline in a way that reduces reporting
- Avoid oversensitivity to protecting own reputation
- Don't assume the job is done when a hazard has been communicated
- Avoid asking for information to be over-simplified so that weak signals are masked
- Don't set investigation scope so that leadership is excluded and there is undue attention on blame and discipline

It is also helpful to engage the other communities that you work with, to help them understand this document and what you are trying to do by using it
- Those who provide your HF expertise or training
- The contractor or sub-contractor companies you work with
- Your regulators or industry bodies
- Unions and worker's organisations to explain how this document helps learning and worker safety

Engage your legal department.
- Lawyers are adept at asking probing questions that can really test the quality of your investigation, and may help you get to root causes.
- Engage with your lawyer at regular intervals through investigations, so that the final report will be easier to draft.

Connections to other processes

Although outside the scope of this document it is understood that the success of your investigation depends on a number of other processes being effective:

These include, before the investigation
- Deciding what to investigate, and taking advantage of learning from both serious incidents and incidents with significant learnings
- Applying sufficient resources to investigation

And after the investigation
- Managing actions to completion
- Verifying that the actions are meeting the intent of actions
- Taking learning from incidents that can benefit the company or industry

For a fuller discussion of these issues, see IOGP Report 552 - *Components of Organisational Learning from Events* (reference 1).

Appendix

Examples of performance shaping factors

This is an example list of Performance Shaping Factors (also known as Performance Influencing Factors) but is not exhaustive. This list is drawn from the UK Health & Safety Executive website (reference 3)

Job factors

- Clarity of signs, signals, instructions and other information
- System/equipment interface (labelling, alarms, error avoidance/tolerance)
- Difficulty/complexity of task
- Routine or unusual
- Divided attention
- Procedures inadequate or inappropriate
- Preparation for task (e.g., permits, risk assessments, checking)
- Time available/required
- Tools appropriate for task
- Communication, with colleagues, supervision, contractor, other
- Working environment (noise, heat, space, lighting, ventilation)

Person factors

- Physical capability and condition
- Fatigue (acute from temporary situation, or chronic)
- Stress/morale
- Work overload/underload
- Competence to deal with circumstances
- Motivation vs. other priorities

Organisation factors

- Work pressures, e.g., production vs. safety
- Level and nature of supervision/leadership
- Communication
- Manning levels
- Peer pressure
- Clarity of roles and responsibilities
- Consequences of failure to follow rules/procedures
- Effectiveness of organisational learning (learning from experiences)
- Organisational or safety culture, e.g., everyone breaks the rules

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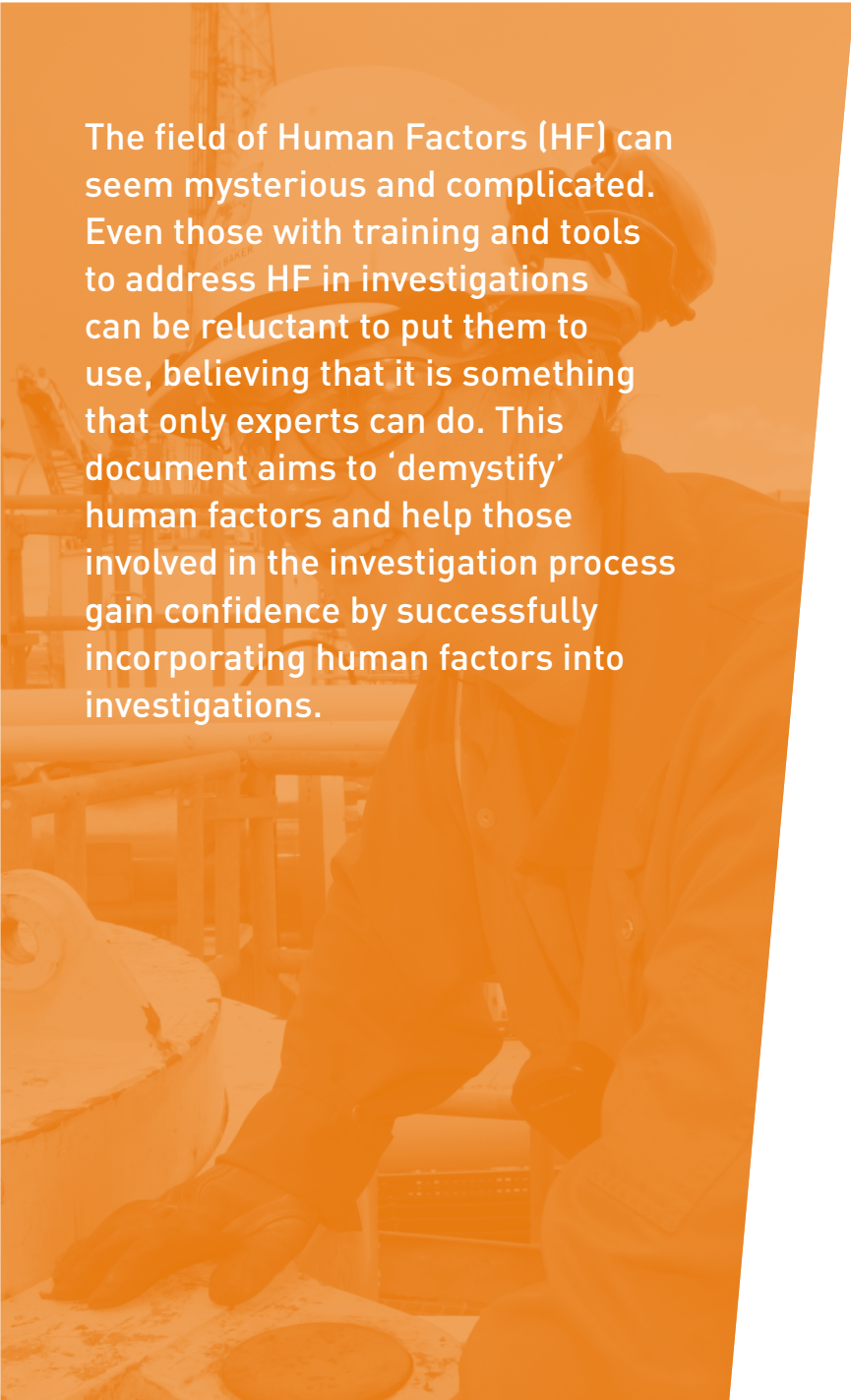
www.iogp.org

The field of Human Factors (HF) can seem mysterious and complicated. Even those with training and tools to address HF in investigations can be reluctant to put them to use, believing that it is something that only experts can do. This document aims to 'demystify' human factors and help those involved in the investigation process gain confidence by successfully incorporating human factors into investigations.