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First Edition

This booklet is designed to assist the Learning Study facilitator, together with the investigation leader and team, in delivering a high quality output. It is intended for use by those who have done an investigation facilitators course and supports the conversations that were held in that forum.

Most of this booklet is taken from one of my published books: *Essentials of Safety: Maintaining the Balance*. CRC Press, 2021

## The Purpose of Investigations

From the start, let's ditch the term 'investigation'. Even calling it an 'investigation' is fraught with debate about 'root' cause, who is accountable, and the danger of losing the idea that this is all about learning. Various authors and safety thinkers, especially Todd Conklin, talk about 'learning teams' as a surrogate for the word 'investigation' which works well in the way he describes and practices it. I will use the term 'learning study' for what I am describing here as it has some elements of making sure we understand how the real world works and what we can learn from it, and also reminds us that we have to do a study. We have to do some exploration and thinking work here, and that the process does need some leadership, just like any study does. A learning study can range in complexity from a simple study looking at Work-As-Normal when doing a Learning From Normal Work review to highly complex and fluid incidents which may seem really hard to get our heads around.

There is one guarantee in the workplace and that is that people will do things we do not expect them to. In this example we explore, using the framework of the *Essentials of Safety*, a method for undertaking workplace incident learning studies. Not surprisingly perhaps, it pulls heavily on my books *Simplicity in Safety Investigations* and *Essentials of Safety* inasmuch as it talks to the imperative in any investigation method to understand how the work was done (Work-As-Done), how it was normally done (Work-As-Normal), in addition to how we think it is done (Work-As-Written). We use the *Essentials of Safety* elements to explore the fundamental question in a learning study: 'What played a part in creating the incident and what can we learn from it?'

A word on our mindset before undertaking a learning study after a workplace safety incident. What we look for, we find. If we are truly curious as to what happened and what we can learn from it, then we will think, talk and behave in alignment with that mindset. This is where our minds need to be as we form the team to explore what did not go quite as we anticipated it would.

Also, before launching into the details of the learning study process we need to understand the learning study basic steps:

1. A decision to undertake a learning study is made.
2. A preliminary information-gathering step is undertaken.
3. A learning study team is formed.
4. The team goes through the draft Work-As-Done timeline.
5. More comprehensive information-gathering is undertaken by the team, including a PEEPO.
6. The timeline is completed and 'Elements of Interest' identified. These are the gaps between Work-As-Done and Work-As-Normal and/or the gaps identified between Work-As-Normal and Work-As-Written.
7. The contributors are listed for each Element of Interest.
8. For each sentence, word, or statement created within the contributors, the team explores what we can learn and how we may embed those lessons, and
9. Capture the time line, gaps, exploration and learning into a simple report.

Let's have a look in detail, each of these steps:

### 1. A decision to undertake a learning study is made

A learning study can be undertaken on just about anything. It could range from a safety, health, occupational hygiene, or environmental incident, a production or financial loss, or a failure in a health system. The incident could also be a non-incident. By this, I mean that we can undertake a learning study when things are going well in addition to when they are not going so well. We call this a Learning from Normal Work (LNW) review.

A decision as to whether to undertake a learning study needs to be made based on the actual and potential severity of the incident, whether the incident or one similar to it has occurred in the past and whether there appears to be lessons to be learnt by the organisation. About the worst thing you can do for the quality of learning studies is to run them based on a number derived from key performance indices (KPI's). I have seen businesses that require x investigations to be undertaken per month. This is not a good behaviour in my opinion and devalues the investigation processes. There will most likely be some local legislative requirement that requires you to carry out an investigation after a workplace incident. The legislation will rarely specify what sort of investigation to do, only that one needs to be undertaken. A good approach is for the leader of the area to pause, talk with peers and advisors and to think about what happened. They need to contemplate whether there are things that we might learn from the incident and what level of resources we need to spend on it. A simple example I saw in a webinar recently was in relation to two incidents. One involved a truck operator falling about 1.5m off a truck access ladder when a handrail broke. The other was about a guy tripping over his own feet on a flat surface. Both resulted in medical treatment and a legislated need to investigate. The question to consider is how much effort you are going to put into the truck incident learning study and how much effort will you put into the 'tripped over his own feet' incident. Without knowing any more specifics it appears that there could be more to learn from the truck incident and so it should command a higher level, broader, more powerful examination than the 'tripped over his own feet' incident. You can also use a reflection of the 'thinking' elements of *Essentials of Safety* to inform your decision to seek to learn from the incident. For example, a difference between Work-As-Done and Work-As-Written may be triggered because of people's cognitive limits being overwhelmed and you want to see what we can learn from this.

### 2. A preliminary information-gathering step is undertaken

The focus of the preliminary information-gathering step is on what occurred (Work-As-Done). There is usually also a smattering of what the Work-As-Written was, and some Work-As-Normal where its need is obvious – it is always a good idea to talk with others who do the same work as that involved in the incident about Work-As-Normal as early data and information is collected.

This initial information-gathering activity is undertaken by the local area as soon as possible after the incident and would typically involve a balance between post incident conversations (interviews) and some document and system digging. The output of this step usually consists of a preliminary, or draft, time line (Work-As-Done only) and an armful of interview notes,

procedures, task based risk assessments, training records and other related documents and notes. It is important to ensure that some early information gathering is done, especially concerning interviews and conversations as the human memory is fallible and erodes very quickly over time.

### 3. A learning team study team is formed

The size and level of horsepower of the team will depend on the incident. The more complex or complicated the incident appears to be and the more there may be to learn from the incident, the larger and more highly powered the team should be.

There are a couple of mandated positions within any learning study team that you should never be without these:

- An independent learning study team leader. The level of this leader should be equivalent to the owner of the incident and in alignment with the depth of the study. For example, if the incident was a significant, life-changing injury which could easily have been a fatality, the independent leader should be no less than a manager (or their equivalent). If the incident was a simple rolled ankle and there were a few things to be learnt for the business, a superintendent or equivalent may be perfect for the task. The reason we need an appropriately senior person in the team leader role is that they generally have a good understanding of how an organisation is designed and functions at a strategic level and this is important when understanding the organisational component of the incident.
- A learning study process facilitator. Make sure they know how to run a learning study and clearly display the skill of herding cats. A learning study, like any other investigation process can easily go off track if not facilitated well.
- One or more subject matter experts (SME) – people who know the ins and outs of the systems and technical process that lie behind the task that was being undertaken at the time of the incident. This could be the technical engineering type people who know the process back to front and inside out, or the specialist nurse or medical practitioner who has been around long enough to know what is going on and is recognised as such by managers and peers.
- A number of ‘real people’. These are people who do the job that was being done at the time of the incident. They can include peers from other shifts or other parts of the business. Pick people who will happily share how things really are out there with the team. I believe that there needs to be two real people as team members. These are the source of most of the Work-As-Normal information that is essential to understanding in the learning study, and
- An alternative thinker. This is an important role, especially for complex, technically specific incidents. This team member brings the challenging questions and the upsetting of the status quo of the SMEs and should ideally not know too much about the technical components of the task related to the incident. Another way to view this role is as the black hat of DeBono’s *Six Thinking Hats* fame.

The total number of people making up a learning study team will depend not only on the complicatedness or complexity of the incident, but also on the skill of the facilitator. Facilitating any process with 15 or so highly motivated and sometimes boisterous people with strong opinions in one room at one time is not a task for the faint hearted – I know this

from personal experience, I have found that the most effective and efficient number of team members is in the range seven to nine.

#### **4. The team goes through the draft Work-As-Done timeline**

Prior to this step, it is useful to give an overview of the incident and of the learning study process. Considering that only a preliminary set of information has been collected at this point in time, the time line that is given to the team will most likely not contain all the Work-As-Done details that the team will need for the learning study. Nor will it contain any of the Work-As-Normal and Work-As-Written detail required. The purpose of this step is to give the team a bit more information concerning the incident and to prime their minds for the next step.

#### **5. A more comprehensive information-gathering activity is undertaken by the team**

To work out what additional information may be required for the Work-As-Done, Work-As-Normal, and Work-As-Written parts of the timeline and also for the exploration of any gaps we carry out a more formal PEEPO. PEEPO is simply an acronym for People, Environment, Equipment, Procedures, and Organisation. It is a simple process that enables the team to think about and record the data and information they want collected to enable them to understand the incident.

Carrying out a PEEPO is one of the simplest tasks of the facilitator. You need a white board and some small sticky notes (3M brand A7 sized PostIt® notes are the best).

Disperse the sticky notes amongst the team and ask them to write down anything they would like to see in the way of data under any of the PEEPO (People, Environment, Equipment, Procedures, Organisation) categories. A great way to encourage them is to ask questions such as: 'Okay Jim, you are a Safety Rep (or electrician, or whatever). What is it that you would like to see that would help you understand exactly what happened here?' Get them to write down the data they would like to see collected and then stick the note up on the white board under PEEP or O.

Additional matter for consideration as the PEEPO is undertaken relates to the *Essentials of Safety* discussed in the main section of this chapter above.

Once the PEEPO is completed (this normally takes 45 minutes or so), distribute the sticky notes to the team (except the facilitator) and instruct the team that they are accountable for collecting the data and bringing it back with them when the team reconvenes. Set a time with the learning study team leader for the next session based on the complexity and time constraints for the collection of the information from the PEEPO.

The time it will take for the data to be collected will vary enormously. Before the team gets back together after collecting their information, ring around and make sure all of the information has been collected. If not, postpone the next section of the learning study and offer assistance in the gathering of the information. It is not a good idea to finalise the timeline development and the rest of the learning study with only a portion of the PEEPO data collected. In fact, generally, from my experience, it is a terrible idea.

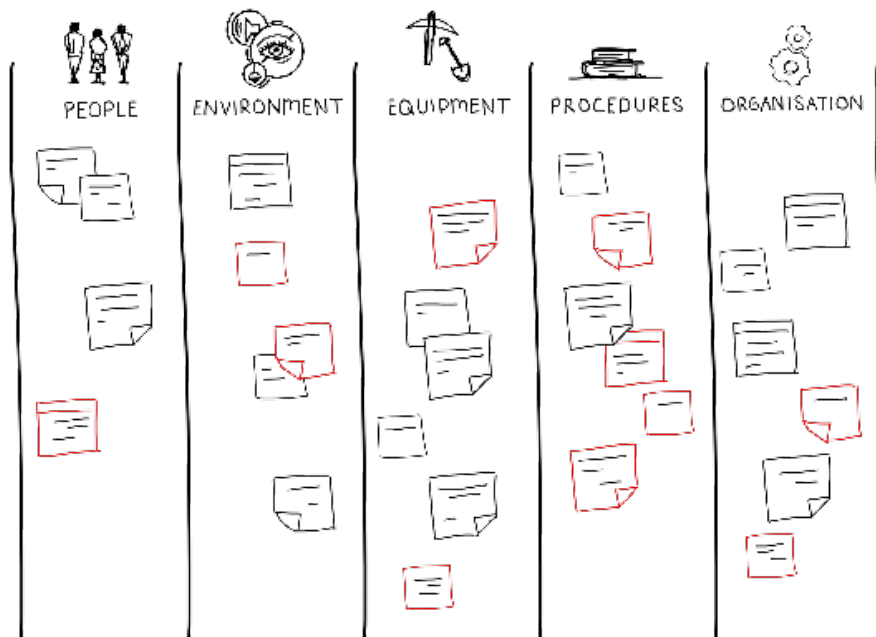


Figure 1 – A completed PEEPO

## 6. The timeline is completed and 'Elements of Interest' identified

The timeline is the mechanism for aligning the learning study team on 'what' happened during the event, what happens normally and what 'should' have happened. It is built on the concepts of Work-As-Done, Work-As-Normal and Work-As-Written. The purpose of this step is also to spend some time, as a team, getting the team members' heads around the incident and identifying which (few) Work-As-Done bits could be potential Elements of Interest.

Don't forget that Work-As-Done, Work-As-Normal and Work-As-Written do not have to be behaviours. They could represent system issues, instrumentation variances, financial, process and production flows, maintenance activities et cetera.

To finalise the timeline the learning study team focuses on converting the draft Work-As-Done timeline into the final version after collecting further information during the PEEPO in step 5. It is most effective if the facilitator spends some time prior to this step in making sure the draft Work-As-Done timeline is transferred to individual PostIt® notes and is put up on the wall. It is a good idea to cover a section of wall with paper first as the sticky notes often fall off painted and often dusty walls. The Work-As-Done timeline can then be easily built upon by getting the team members to write elements of the timeline on the sticky notes and stick them up on the wall in and amongst the existing draft timeline. The facilitator will be

kept busy ensuring the sticky note language is clear and the sticky notes are in the correct chronological order.

Particular care needs to be taken with the wording of the Work-As-Done notes in order to facilitate the creation of Work-As-Normal and Work-As-Written. For example, you will need to couch negatives into an element of the Work-As-Done so that it sticks out as something worth exploring. For example;

Insufficient information	Better clarity of the issue
The supervisor gave an instruction to swing valve 24.	The supervisor gave an instruction to swing valve 24 without discussing the associated hazards and controls.
The scaffolder climbed off the scaffold at height.	The scaffolder climbed off the scaffold at height without wearing a harness and lanyard
The carpenter used a hammer.	The carpenter used a hammer to insert a screw into the table top.

As you can see the descriptions in the ‘Better clarity of the issue’ column lend themselves to the building of Work-As-Normal and Work-As-Written more easily than those in the ‘Insufficient information’ column.

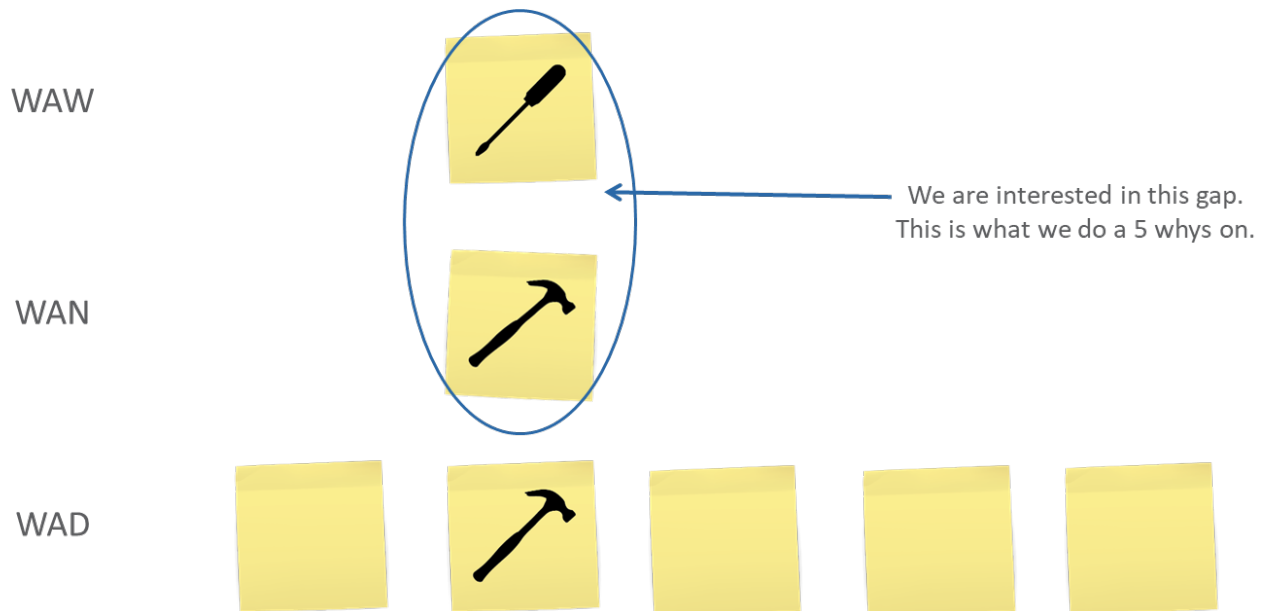
Once the Work-As-Done portion of the timeline is complete and all team members are happy with it as a description of what happened, then they need to decide which Work-As-Done elements need to be completed into an ‘Element of Interest’ by the addition of Work-As-Normal and Work-As-Written. I often use a simple voting system to decide which elements of the Work-As-Done timeline are going to be built into elements of interest. Giving each team member three to five ticks each usually works as a voting method. Once the team has identified a (small) number of Work-As-Done elements that they want to build on, the team adds a sticky note above the relevant Work-As-Done describing the Work-As-Written associated with it. Then they add the associated Work-As-Normal. The topics must be clearly the same. The team will need to pull strongly from the data collected by them in for this. For example:

Element	Poor element of interest	Better element of interest
WAW	Supervisors should discuss hazards with operators	Procedure 24 – Task Assignment – requires that the hazards and controls associated with a task are discussed between the person assigning the task and the person doing the task during task assignment.
WAN	Supervisors often give instructions to swing valves over the radio	Supervisors often assign tasks without discussing the associated hazards and controls for the task.
WAD	The supervisor gave an instruction to swing valve 24 to the operator	The supervisor gave an instruction to swing valve 24 without discussing the associated hazards and controls.



Element	Poor element of interest	Better element of interest
WAW	Carpenters must use screwdriver to put screws in.	Work instruction 24 – Screw Insertion – requires carpenters to use a screwdriver to put screws into tabletops.
WAN	It is reasonable to expect carpenters to use screwdrivers.	It is common practice for carpenters to use hammers to insert screw in tabletops.
WAD	The carpenter used a hammer.	The carpenter used a hammer to insert a screw into the tabletop.

The facilitator then circles the gaps. In both of the above examples the gap lies between Work-As-Normal and Work-As-Written. You should aim to have no more than four or five Elements of Interest. Any more than that and you are probably looking at elements that are not in the causal pathway of the event and may need to be captured in a parking lot instead.



At this of time, we have a completed timeline with the identified Elements of Interest.

Figure 2 – A complete timeline with gaps identified

**7. For each of the gaps identified between Work-As-Done and Work-As-Normal and for each of the gaps identified between Work-As-Normal and Work-As-Written (Elements of Interest), capture the contributors from the information collected.**

Before getting into the activities of this step, it is important for the team to have sufficient soak time so that the team can establish a common mental model of the incident, where the gaps are, what the Elements of Interest are and an overview of the information that has been collected by the team. The time needed for this can vary a lot. Take the time needed so that the majority of team members and happy to move onto this step.

Identifying the contributors is a white board / brainstorm activity with the whole team and covers each Element of Interest and sometimes the incident itself. The first part of this is the secret to a good process outcome. We need to ask the right question to start with. Each question is a translation of one of the Element of Interest gaps into a 'Why' question. Following on from this, the team pulls from the data it has collected and builds a set of statements, words, and sentences that describe the contributors. These are then captured on a whiteboard.

A useful prompt to help the study team can be things like:

- What information have we collected during our PEEPO that relates to this Element of Interest question?
- What Essentials of Safety element or part of the total system let us down here?
  - Have we gone deep enough to understand this as yet?
  - Do we need to ask another question to go deeper here?
- What else?

Here are a couple of examples from a scenario loosely based on the *Herald of Free Enterprise* incident. I say loosely based as I have taken the original report, books et cetera and tweaked them so that the incident and its details are more useful as a learning tool for when I run learning study training sessions. I encourage you to read the full report if you want to get a better picture of the actualities of the incident. In a nutshell, the *Herald of Free Enterprise* incident is described as:

*On the 6th March 1987 the Roll on/Roll off passenger and freight ferry Herald Of Free Enterprise under the command of Captain David Lewry sailed from Number 12 berth in the inner harbour at Zeebrugge at 18.05 G.M.T. The bow doors were left open after loading vehicles and passengers. The Herald was manned by a crew of 80 hands all told and was laden with 81 cars, 47 freight vehicles and three other vehicles. Approximately 459 passengers had embarked for the voyage to Dover, which they expected to be completed without incident in the prevailing good weather. There was a light easterly breeze and very little sea or swell.*

*The Herald passed the outer mole (harbour marker) at 18.24. Massive volumes of water entered through the open bow doors and the Herald capsized about four minutes later. During the final moments the Herald turned rapidly to starboard and was prevented from sinking totally by reason only that her port side took the ground in shallow water. The Herald came to rest with her starboard side above the surface. Water rapidly filled the ship below the surface level with the result that not less than 150 passengers and 38 members of the crew lost their lives. Many others were injured.*

The first gap identified was between Work-As-Normal and Work-As-Written. The Element of Interest looked like this:

**WAW** – *General Instruction (1984) requires that the loading officer ensures the bow doors were 'secured when leaving port'.*

**WAN** – *It is routine for the loading officers across the Free Enterprise vessels to leave for their harbour stations without ensuring the bow doors are ‘secured when leaving port’.*

**WAD** – *The loading officer (Chief Officer) left the bow door area without ensuring the bow doors were ‘secured when leaving port’.*

The Gap question therefore is between Work-As-Normal and Work-As-Written. The question becomes, therefore:

*‘Why is it common for loading officers across the Free Enterprise vessels to leave for their harbour stations without ensuring the bow doors are ‘secured when leaving port’?’*

An example list of contributors for this Element of Interest could look like this:

- The Masters of Free Enterprise vessels rely on a negative reporting process, which relies on people telling him or her when something is NOT right.
- There are conflicting and ambiguous TCF Limited standing orders and procedures, especially related to required activities prior to leaving port.
- There are fewer officers on the Dover – Zeebrugge run than other TCF runs.
- The loading officers were routinely not queried by the Master about the open or shut status of bow doors.
- The closing of the bow doors was not deemed as a ‘critical’ step in the process of leaving port.
- There was no business-wide learning from five previous TCF ‘sailing with bow doors open’ incidents, and
- There was pressure to sail without verification of critical pre-sailing steps (e.g. shutting the bow doors).

After the first Element of Interest’s contributors are captured on the whiteboard, write them up on a large butcher’s paper and stick it up on a wall. Repeat the process until you have explored all of the Elements of Interest identified.

Another example of a gap identified was also between Work-As-Normal and Work-As-Written. The Element of Interest looked like this:

**WAW** – *Section 68(2) of the Act requires the Master to know the draught of their vessels prior to putting to sea.*

**WAN** – *It is routine for Free Enterprise vessels to sail down at the head without checking the draught of the vessel.*

**WAD** – *Herald of Free Enterprise backed out of berth 12 at Zeebrugge down at the head by an unknown amount in draught. (The draught was not checked).*

The gap identified was between Work-As-Normal and Work-As-Written. The gap question therefore is:

*Why is it routine for Free Enterprise vessels to leave Zeebrugge port trimmed by the head?*

The white board gap contribution brainstorm revealed the following thoughts:

- There was no instrument available to measure the draught of the vessel.
- The TCF senior leaders did not listen to questions and concerns raised by Masters.
- The ballast 14 pump was not sufficient to timeously empty tanks whilst at port.

- There was limited to no awareness of trim characteristics of Free Enterprise vessels by Master or TCF management.
- There was no level of chronic unease with respect to sailing trimmed by the head. (No what if?).
- The trim of vessel not considered as a critical control, and
- TCF knew it was not possible to comply with draught measuring legislation and did nothing about helping the Masters comply.

The output of this step is 2 or 3 sheets of paper containing the contributors to 2 or 3 Elements of Interest.

### 8. For each sentence, word, or statement, explore what we can learn and how we may embed those lessons.

For each of the Elements of Interests, we potentially now have a piece of butcher's paper full of statements, words, and sentences that describe the contributors to each Element of Interest and therefore to the incident. These need to be sorted and converted into lessons that the business can learn from.

There will be a number of lists and that may describe too many contributors to effectively manage the lessons for. In order to make the lists more manageable, they can be consolidated into categories if needed.

The categories should make sense for the specific incident and your business. A couple of examples of category lists are:

- Systems.
- Risk Control, and
- Leadership.

Or maybe:

- Plant.
- Process.
- People, and
- Organisation.

Under each of these topics, we place the contributors that fit into that classification regardless of which Element of Interest they came from. We then need to ask:

- What can we learn as an organisation, and as individuals, from this incident?
- How can we embed that learning into our systems, behaviours, beliefs, routines and ways of being in our business?

There could be a number of lessons from each category. Whilst this appears to be duplication of work as we move items from the first 'Element of Interest' focussed list to the category list, it is a very helpful activity and actually makes the process flow more effectively. We need to identify the lesson itself and what the action is to promote the sustainability of the learning from the lesson.

By way of example, again from the mock-up of the *Herald of Free Enterprise* study used in the training, the 'Risk Control' list was as follows:

#### Risk Control:

- There is a lack of aligned understanding of speed characteristics of Free Enterprise vessels.
- There was no level of chronic unease with respect to sailing trimmed by the head. (No 'what if?' was ever asked)
- There is limited to no awareness of trim characteristics of Free Enterprise vessels by Masters of Free Enterprise vessels or TCF management.
- The ballast 14 pump is not sufficient to timeously empty tanks whilst at port.
- There was no instrument available to measure the draught of the vessel.
- There is no alarm or instrument existed on the bridge that could alert officers of the open or closed status of the bow doors, and
- The loading officers were never queried by the Master about the bow doors being shut prior to leaving port.

Derived from this list is the first lesson, from the category 'Risk Control'.

Lesson 1: 'Operators of complex equipment such as ferries, need to be familiar with the operational characteristics and limitations of the equipment they operate in order to be able to manage and operate within those characteristics.'

We then explore what action or actions we might take in order to sustain the learning from lesson 1 and embed it into the systems, behaviours, beliefs, routines and ways of being in our business: A sustaining action for this lesson could look like: 'Include in the training and competency assessment systems for operators (Masters, Chief Officers, senior engineers and senior decision-makers) a requirement that they study and deeply understand the equipment they are expected to manage and operate. Especially where those characteristics relate to the safe operation of that equipment.'

By way of another example, again from the mock-up of the Herald of Free Enterprise study used in the training, but this time from the 'Systems' list:

#### Systems:

- There is no system for consideration and management of 'critical' tasks.
- The trim of vessel was not considered as 'critical'.
- The closing of the bow doors was not deemed as a 'critical' step within the 'leaving port' process.
- There was no learning from five previous 'sailing with bow doors open' incidents.
- There are conflicting and ambiguous TCF limited standing orders and procedures, and
- There is a Masters' negative reporting process, which relies on people telling him when something is NOT right.

The second lesson is then derived from the contributors in the category 'Systems' as outlined above. It could look like this for example: Lesson 2 – 'Processes must be in place to ensure that lessons from incidents are shared in a way that results in changes in the way people believe, behave and the way they control risks.'

A possible action to sustain the learning from lesson 2 could be along the lines of: 'Implement an incident learning management approach that ensures that learning from incidents are shared in a way that results in changes in the way people behave and control risks. This must not be limited to leadership verification processes, training, procedures, standing orders, reporting processes, or critical controls'. In both examples, other lessons could also be captured. I have chosen the ones I did purely as examples.

### **9. Capture the time line, gaps, exploration and learning into a simple report.**

The secret to a good quality workplace incident report is to keep it simple. It should contain as a maximum:

- Title of the incident.
- Executive summary.
- Photos.
- Learning Study team members.
- Timeline, including the Elements of Interest highlighted or circled.
- Contributors by topic list (e.g. 'Systems') or by Element of Interest.
- Lessons to be learned, and
- Actions to sustain the learning from the lesson