Incident

What can we learn from the Costa Concordia?

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Summary

The aim of this paper is to illustrate that human and organisation factors associated with major accidents are not industry-specific and that a lot can be learnt from accidents even if the full facts are not yet known. It makes the point that people are more receptive to learning if they have clear images of the accident to relate to whilst the delay in waiting for formal investigation reports to be published can mean that useful safety messages can lose their impact.

Keywords: Accident investigation, causal tree, human factors, organisational factors

Introduction

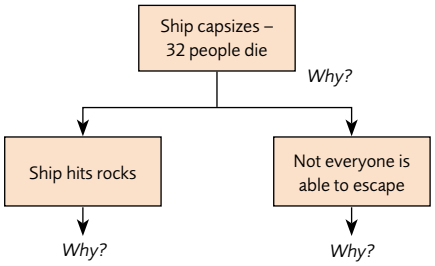
Most *lpb* readers do not operate cruise ships and may think that the causes of the Costa Concordia accident, which capsized on 13 January 2012 with the loss of 32 lives, are not very relevant to them. This is probably a reasonable assumption if only the technical aspects of the accident are considered. However, studies of human and organisational factors have shown that there are many consistent themes that feature in major accidents across all industries. Therefore, every accident should be viewed with regard to what can be learnt about safety.

People may feel that it is too soon to learn from the Costa Concordia accident. Certainly, the facts of why this specific accident occurred will not be known until a formal investigation has been completed. However, this will take time, during which the images associated with the accident will have faded in peoples' memory and the messages that can be used to remind people about safety may lose their impact.

This paper uses the Costa Concordia accident as an example of the types of human and organisational failures that can result in major accidents. It is based on information obtained from press reports with supposition and opinion. It is not intended to be a factual account of the accident and illustration of what any organisation dealing with hazardous operations need to consider and manage.

Accident overview

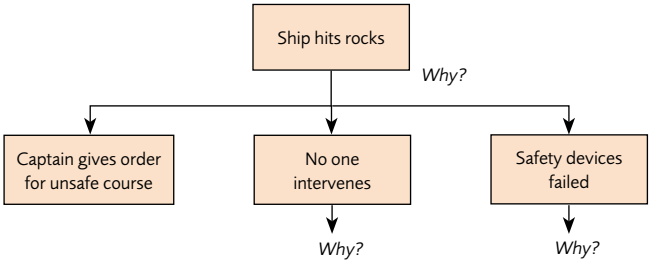
The aim of this paper is to learn as much from the Costa Concordia accident as possible, as early as possible. This can be achieved by defining the accident at a very high level and drilling down in the areas of most interest. Causal trees are developed by simply asking 'why' an accident occurred in order to map out events and conditions until root causes are identified. They are a simple and effective method of understanding an accident. The diagram below gives a simple representation of the Costa Concordia accident.



The causal tree gives us two fundamental questions. Answering them will give us an insight into how this accident may have occurred, even when the full facts are not known.

Why did the ship hit rocks?

The obvious answer to the first question (at least according to the press) is that the Captain gave the order to deviate from the normal course. We can only surmise why he did that, and so at this time we will probably not learn much by speculating. However, the Captain was not operating the ship alone and so it seems reasonable to ask why someone else did not intervene when the order was given to set an unauthorised route? Also, even without knowledge of modern ships it seems fair to assume that there would have technical systems on board that should have protected against this event.



Why didn't anyone query the Captain's order?

There are at least three situations that could explain why members of the Costa Concordia's crew did not intervene when the Captain issued an unsafe order. It does not really matter which is the 'correct' explanation in this case as they are all plausible and can occur in any organisation. They include:

1. If a culture exists where senior members of staff expect their orders to be followed without question, other people will be reluctant to voice any concerns they may have. There will be a delay whilst either the person issuing the original order

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Costa Concordia cruise ship a few months before sinking close to the Italian coastline on 13 January 2012

realises their mistake or someone else summons up the courage to say something. By this time the error cannot be recovered.

2. If one person takes all key decisions and/or carries out critical activities with minimal input from others the situation can arise where no one else has the opportunity to develop and maintain full competence. When that person makes an error (it is not only novices who get things wrong) it is possible that no one else has the skill or knowledge to recognise it until it is too late.
3. If a group of people work closely together for a long time they can start to focus on a common goal. The people who could oversee the activity can become too involved and unable to maintain an objective view of what is happening. The group becomes very effective at getting things done but start to develop rationales for why breaking a rule is justifiable. When an error occurs no one is in the position to detect or correct it.

It is entirely possible that none of these are an accurate account of the culture on board the Costa Concordia. However, they are all plausible and highlight that any organisation will be vulnerable if senior members stifle comment, if key competencies are held by only a small number of people or groups of people work together with no effective independent overview.

Why did safety devices fail?

Assuming there were devices on board the Costa Concordia to warn about a possible collision with an undersea object it must be concluded that they either did not work or that the crew did not respond correctly when they were activated. Again, there are a number of plausible explanations about how the use of warning devices could have contributed to the accident including:

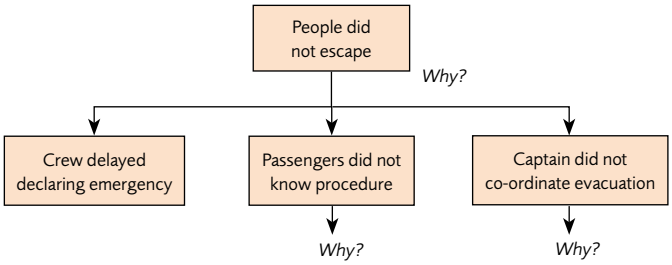
- There was not a clear indication of the warning device's status. People assumed the absence of a warning indicated safety when in fact it was because the device had failed.
- People had become over-reliant on warning devices and had lost the ability to accurately assess a situation when they failed.
- People had an unreasonable view of the effectiveness of warning devices and did not take account of inherent limitations. They assumed that if the device did not activate that everything was safe, even if other information was available that may have indicated a risk.
- The warning device was prone to spurious activation. People assumed a warning was a 'false alarm' and that there was no need to respond.

As an overall learning point, it is easy to assume that warning devices will always increase safety and so more devices must always result in reduced risks. In fact there are many potentially negative downsides of inappropriate or over use of warning devices. These need to be considered during design and managed through the training and assessment of personnel who operate the systems.

Why were some people unable to escape?

Whilst we can look for more reasons to explain why the ship hit the rocks; the second question remains regarding why people died in the accident. An immediate observation that can be made is that once control of a hazardous undertaking is lost there is always a degree of luck that determines whether the outcome is positive or negative.

It has been reported in the press that there was a lack of organisation when the Costa Concordia first hit the rocks and later when it started to list at a severe angle. This meant that people may not have been properly prepared and it took longer to evacuate than it should have. Some of the reasons are illustrated in the causal tree below.



These are pretty standard reactions to emergencies that have been observed in many accidents. People generally underestimate the scale of a problem and reassure themselves that everything is under control. People assume accidents will never happen to them and so do not pay much attention to emergency procedures. And no one knows how they will act in an emergency and just because someone has a senior role does not mean that they will not panic or make significant errors of judgement.

The Costa Concordia is a useful reminder that emergencies are complex situations and it is impossible to predict how they will develop. Unfortunately, people tend to have an unrealistic view of their ability to deal with them. This means organisations have to work particularly hard to make sure the arrangements in place are robust enough to deal with any situation. The fact that normal activities can be handled effectively and efficiently is not a reliable indication of how emergencies will be managed when they occur.

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