

Marine Accident Investigation

Core Skills Course - Supporting Notes

Mod.10 Safety Recommendations

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Safety recommendations

1. Safety Recommendations

A safety recommendation is a proposal from an investigation body, based on the information derived from an investigation, made with the intention of preventing future accidents or incidents. Safety recommendations should be addressed to the individual(s) or organisation(s) best placed to take remedial action. Their formulation may be achieved in cooperation and consultation with the relevant stakeholders since they are often well-placed to identify and implement appropriate safety actions. However, the final decision on the content and addressee of safety recommendations should rest with the lead investigation body.

Safety actions and safety recommendations should flow directly from the analysis. They should address safety issues and safety deficiencies identified in the investigation report and should be directed at those organisations or individuals best placed to take remedial action. Where an identified safety issue is considered so serious that it should be addressed urgently, an interim safety recommendation should be issued, even though the investigation is still ongoing and the report has not yet been drafted.

1.1 DEVELOPMENT OF SAFETY RECOMMENDATIONS

To develop effective recommendations it is vital that the 'What?', 'How?' and 'Why?' of an accident or incident is understood so that the investigator can consider what can be done to stop it happening again.

Safety recommendations should be developed from the safety issues and safety deficiencies that have been identified during the analysis of the evidence. The safety deficiencies will, in turn, have been derived from shortcomings discovered in the risk controls (both preventative and recovery) and from discovering how organisations including regulators, the shipping company, equipment manufacturers and others, influenced the events leading up to the accident (shore management and organisational factors).

Usually, failings in a number of risk controls (those controls that, had they been in place and effective, would have prevented the accident or lessened the consequences) are identified and consequently safety deficiencies are derived from several areas of the analysis. However, because of this structured approach to the derivation of recommendations, the link between the recommendation and the events that were significant in the chain of events that led to the casualty (accident events) will be obvious; and can easily be portrayed on a diagram such as an Event and Contributing Factors Chart.

Recommendations must:

- Be stated clearly and concisely;
- Be based on facts/evidence and the derived safety deficiencies;
- Be a basis for safety action that will help to avoid, or limit the consequences of, future accidents;
- Be addressed to the individual or organisation that is best placed to implement the corrective action;
- Represent a balanced response to identified deficiency.

Recommendations must not only be well written, concise and clearly result from the investigation analysis in the investigation report, but also be supported by a convincing argument for taking action. The facts and the analysis in the report must lead logically to the recommendations presented. The recommendations should be specific enough to avoid any misunderstanding or opportunity for misinterpretation. They should not simply state: 'company X to improve their safety'.

Recommendations should concisely identify the specific risk to be addressed. However, investigators should be cautious about recommending specific solutions and the precise nature of the safety action that should be taken. It should be sufficient that the operator or

authority, having been alerted to a specific risk, be permitted to determine the most cost-effective solution. In fact, they may find the risks preferable to the control measures. Often the recipients of recommendations have specific expertise that would enable them to arrive at alternative solutions. Investigation bodies must remember that recommendations are just that; they are not mandatory and therefore, the recipients must take full responsibility for the corrective measures and actions they take.

Investigators must not be deterred from addressing recommendations to government administrations recommending amendments or improvements to legislative provisions.

For any recommendation stemming from a maritime safety investigation to be accepted and implemented by its recipient, it needs also to be:

- Necessary
- Likely to be effective
- Practicable
- Relevant
- Targeted

The recipient of any recommendation needs to be persuaded that the recommendation satisfies all the above. This persuasion is most effectively done by making the investigation and analysis thorough, rigorous and being able to demonstrate that this is so. It is very important to involve and interact with likely recipients of recommendations to ensure:

- The recommendation does not come as a surprise;
- To assist in ensuring the recommendation is practical;
- Is targeted at the right recipient;
- That recipients gain 'ownership' and 'buy-in' to the recommendation; and
- Allows potential action to be initiated sooner rather than later.

In some circumstances, recommendations need not be confined specifically to the contributing factors to the accident, but they should be related to matters covered in the investigation; they must be practicable; and they must be reasonable. Recommended safety actions in whatever form should clearly identify what needs to be done, who or what organisation is to implement the change and, where possible, the urgency for completion. They must be balanced. The effort and cost of a safety measure must be weighed against the severity of the risk posed.

1.2 RECOMMENDATIONS CATEGORIES

Safety recommendations can be broadly considered to fall into three categories:

1. Those that have the broadest importance, sometimes global importance, possibly leading to new or changes in legislation.
2. Those addressed to industry bodies or organisations requiring the reinforcement of best practice.
3. Those that can be targeted at an individual organisation, company or owner that is specific to their ships or company.

Unsurprisingly, the first is the hardest and most difficult one to address while the last is the easiest and simplest problem to tackle. However, it is important that not all recommendations fall into the last category, as often there can be a deeper underlying issue that must be tackled with a more global recommendation.

In some cases, a safety investigation may result in no recommendations being made, as effective action is planned or has been taken. However, any safety actions taken or planned for the near future should be included in the investigation report, to ensure the reader understands why no safety recommendations are necessary.

1.3 EARLY COMMUNICATION OF SAFETY ISSUES

Where the investigation body considers that an identified safety issue is so serious and could readily happen again unless urgent action is taken then a recommended safety action should be issued to those that can best address the issue. This may include the marine safety administration of the Flag State who in turn may notify IMO of the issues so that early and urgent international action can be considered.

1.4 SAFETY STUDIES

Safety recommendations may also result from the analysis of a series or several accidents. The data analysis can either be presented to supported one particular safety investigation's recommendations or arise from a 'Safety Study' where a particular issue or accident trend is examined.

2. Follow up

The investigation bodies should endeavour to ascertain details of action taken in response to safety recommendations.

2.1 ACTION TAKEN

One of the key purposes of accident investigation is the creation of recommendations to prevent similar accidents from reoccurring. However, recommended 'safety actions' are only recommendations, they are not legally binding instructions.

Administrations should consider passing legislation to support a recommendations follow-up system and require recipients of recommendations to respond to the investigating body. This does not mean that any operator or organization must adopt the safety recommendation, but must provide cogent reasons why they have not adopted a recommended safety action or have addressed the problem in some other way. Legislation should provide a realistic time frame for a response from those to whom the recommended safety actions are addressed. Having a recommendations 'closed loop' system will ensure an investigation body has its recommendations listen to and not simply ignored.

Administrations should consider publishing a report each year on the outcome of their recommendations. This can be included as part of an investigation body's annual accident report, or separately. It allows transparency in the recommendations made and enables those recipients who have rejected recommendations to be highlighted with their reasons for rejection published. In this manner it still allows recipients of recommendations to reject a recommendation but they also will be aware that the consequence will be that their response will be published.

3. Common methodology

Some high level principles supporting the preparation of SR in line with paragraph B.5 the Common Methodology (Commission Regulation (EU) 1286/2011) are hereinafter proposed: There should be a clear link between the SR and the analysis of the specific case, particularly with:

1. the contributing factors, if identified,
2. the safety issues and
3. the safety deficiencies.

Nevertheless, a SR could derive from abstract data analysis or researches not directly linked with the specific marine casualty or incident. In such a case, references to the sources supporting the promulgation of the SR should be made.

SR should aim at repairing a failed defence or at generating a new one. As mere examples, this could consist in a physical defence (e.g. more effective safety equipment etc...), administrative defence (e.g. improved procedures etc...), or organisational defence (e.g. provision of specific training).

The wording should be such that there is clarity regarding what action/change is required. The addressee must clearly understand which action the AIB recommends.

The wording of a recommendation should facilitate clear assessment whether the recommended measure is implemented entirely, partly or not at all.

There should be normally no prioritisation between the issued SRs. However, if necessary from the viewpoint of the AIB, the urgency of a recommended action may be highlighted.

A SR should guide the affected parties on what safety objective is to be achieved rather than give prescriptive solutions.

When promulgating a SR, the AIB should:

- For the sake of clarity, address only one issue per each SR
- Choose the recipients carefully
- Ensure that action is both fully justified and balanced in terms of costs and severity of the risk
- Ensure that action will improve safety
- Ensure that action is achievable
- Consider that action is not mandatory

When promulgating a SR, the AIB should, wherever practicable, avoid:

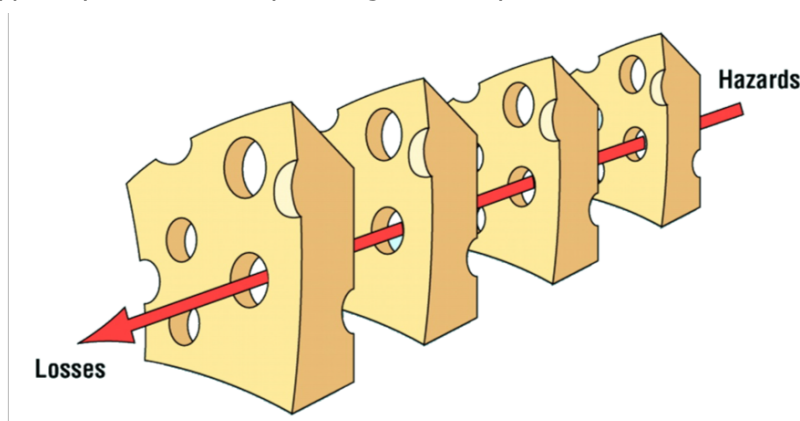
- Addressing an individual SR to multiple recipients (if necessary, better to make an individual SR to each recipient)
- Using unnecessary or ambiguous words/phrases like; *Consider, Carry out research into, Review.*

The AIB should not include multiple safety issues in a given SR (if necessary, better to make each element a separate SR)

If there is more than one recommendation in a report, it is useful to number them and group them according to the addressee (e.g. to the Company).

4. The concept of Barriers

Barriers prevent or stop events leading to an incident or they ensure that an event escalate into an actual impact. Barriers are part of 'business as usual' and should be regulated in the organisation, typically under 'Safety Management System'.



The concept of barriers can be explained with the Swiss Cheese model by Reason (1990). In the Swiss cheese model, an organisation's defenses against failure are modeled as a series of barriers, represented as slices of cheese. The holes in the slices represent weaknesses in individual parts of the system and are continually varying in size and position across the slices. The system produces failures when a hole in each slice momentarily aligns, permitting (in Reason's words) "a trajectory of accident opportunity", so that a hazard passes through holes in all of the slices, leading to a failure.

4.1 TYPE OF BARRIERS

Barriers can be of different type, such as: physical, technical, human/operational. They can be categorized using any classification system desired. A common classification system is if the functioning of the barrier is dependent on human behavior or technology. Categorizing barriers very often creates a greater understanding of how risks are managed.

Following this philosophy, a barrier system can be divided into active or passive.

Passive barriers

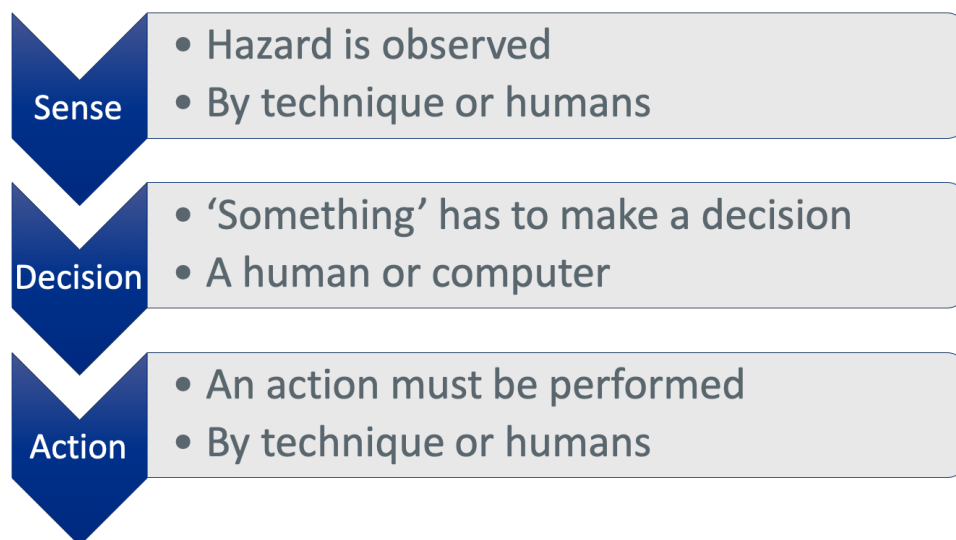
A passive barrier is for instance a fence or dyke. These barriers do not need to be activated and they may require maintenance. Often their name describe their function: guardrail, dam, fireman's suit etc.

Active barriers

Active barriers need to be activated and may consist of multiple systems or actions in order to be functional.

Sense-Decide-Act (SDA) principle

Active barriers can be further divided using the Sense-Decide-Act (DDA) principle.

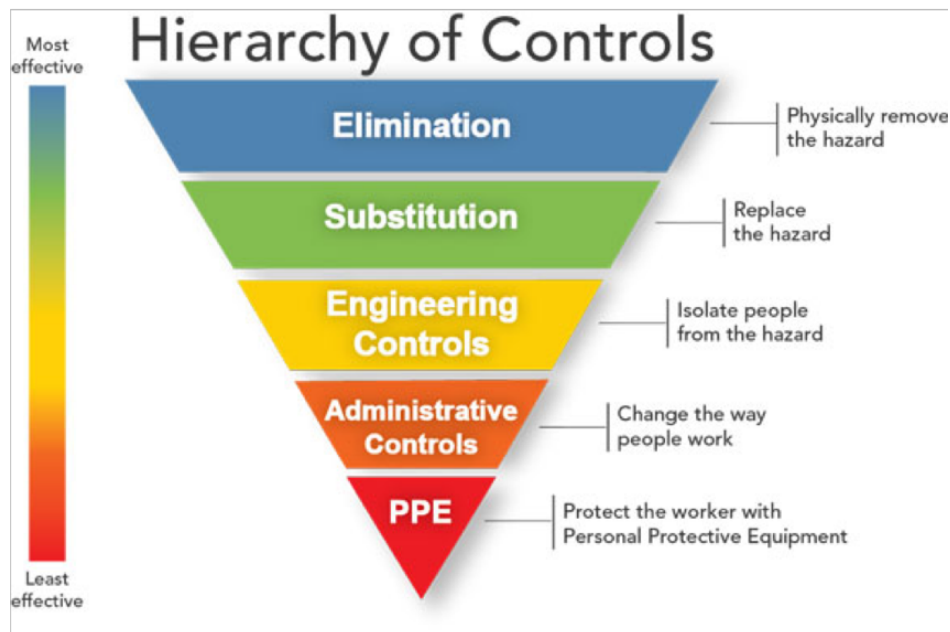


4.2 HIERARCHY OF CONTROLS

The model below shows a series of more or less effective measures to prevent injuries and accident by reducing the exposure to hazards. Following this hierarchy normally leads to the implementation of inherently safer systems, where the risk of illness or injury has been substantially reduced. You can ask yourself the following questions to help think of safety recommendations:

- Eliminating something to eliminate the risk?
- To do something different with a lower risk?

- Designing something to control current risk?
- Designing administrative procedures to deal with the risk?
- Provide PPE to protect workers or third-parties?



It is also necessary to realize that certain aspects are more difficult to change than others. A representation of this concept is given in the picture below where it is clear that the broader the system, the more difficult is something to be fixed.

