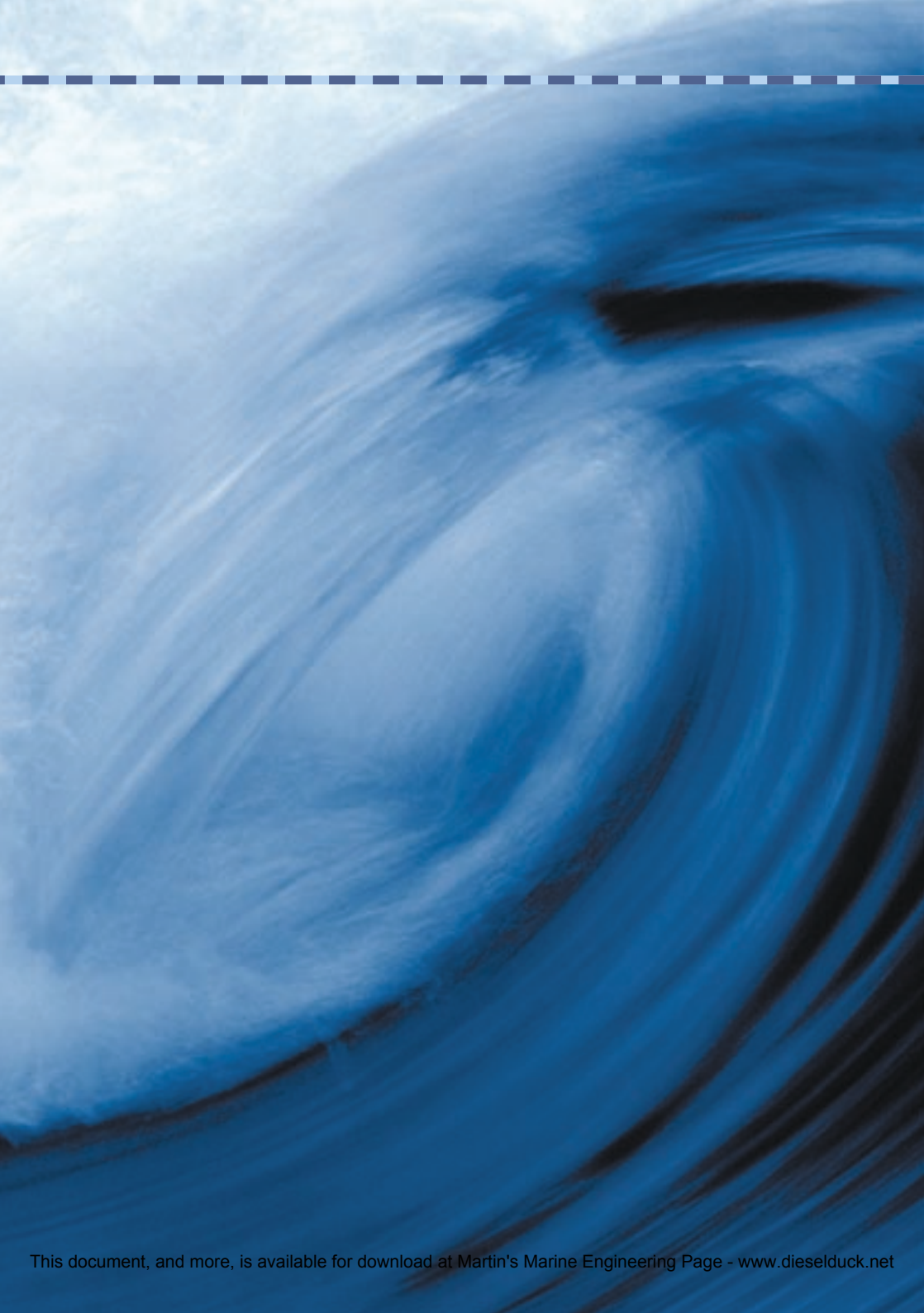
Sjøfartsdirektoratet
Norwegian Maritime Directorate

Risk assessment

- your ticket to safety on board



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– your ticket to safety on board

To prevent unwanted events on board it is important to assess situations which may cause accidents or damage to health. By systematically mapping different work operations, effective measures may be implemented and serious consequences may be avoided.

Who is responsible for what?

The shipowner and master are responsible for planning, organising and the carrying out of risk assessments on board. To ensure smooth implementation, the shipping company needs a risk assessment system at a strategic level. The Norwegian Maritime Directorate recommends that shipowners implement such systems even for their vessels for which such systems are not required. The protection supervisor and the protection and environment committee on board

should be involved, to represent the interests of employees and make sure the shipping company follows up its responsibilities.

The main objective of this pamphlet is to provide guidance on how to get started with risk assessment and is primarily aimed at shipping companies, seafarers and fishers – at all levels of the organisation.

The pamphlet does not provide any ready made answers. In addition to explanatory text we have however chosen to provide some simple illustrations which may be used in establishing risk assessment systems.

Everyone is responsible

To ensure the best possible working environment at sea, all hands have to pull together.

- *Safety costs, accidents cost more*
- *A safe workplace is an effective workplace*
- *More safety – less accidents*

What is risk assessment?

Risk assessment is a detailed and systematic evaluation of all real and potential sources of danger, and must be carried out regularly. The purpose is to identify all reasonably foreseeable risks connected to the work on board, and to determine whether the risk is acceptable, or if preventive[1] or corrective[2] measures are called for. Risk assessments should lead to appropriate procedures, identify needs of protective equipment and safety measures to reduce the risk of personal injury, and require preparatory and supplementary work.

The requirement for risk assessment of work operations is part of the Regulation of 4 August 2000 No. 808 concerning the working environment, health and safety of workers on board ship.

The Regulation must be incorporated in the safety management system as required by the ISM Code. Where there is no requirement for a safety management system, the Regulation should be part of a strategic plan. An example is the "Safety Manual for Fishing Vessels", which is based on the principles of the ISM Code.

When must risk assessment be carried out?

Risk assessment should uncover dangers that employees may be exposed to on board. This entails that all work operations have to be analysed. Risk assessments as part of the company's accident prevention program should be carried out regularly. It is on board the individual ship that the frequency of risk assessment has to be determined. In addition, risk assessment should be carried out when:

- new equipment and new technologies are introduced.
- changes in organisational structure or work planning have consequences for the safety and health of employees.

[1] Prevent an unwanted event from occurring

[2] Prevent an unwanted event from reoccurring

If an unwanted event or accident occurs on board, risk assessment has to be carried out with the aim of preventing the event from reoccurring.

Requirements for documentation

Risk assessments must be documented. Our inspections have revealed that often no documentation exists to show that risk assessments have been carried out. Documentation is also important for the transfer of knowledge and experience.
The documentation should:

- illustrate hazards related to particular work operations.
- be in written form and updated on a regular basis.
- be easily accessible to all employees on board.

"Safe Job Analysis"

Many shipping companies have established systems where "safe job analysis" is an entrenched tool the use of which yields good results. "Safe Job Analysis" contains many of the same elements and has the same purpose as the requirement contained in the Regulation, and is therefore a good basis for the implementation of the requirement. In many instances "Safe Job Analysis" is almost identical to the Regulation so that few adjustments are necessary.

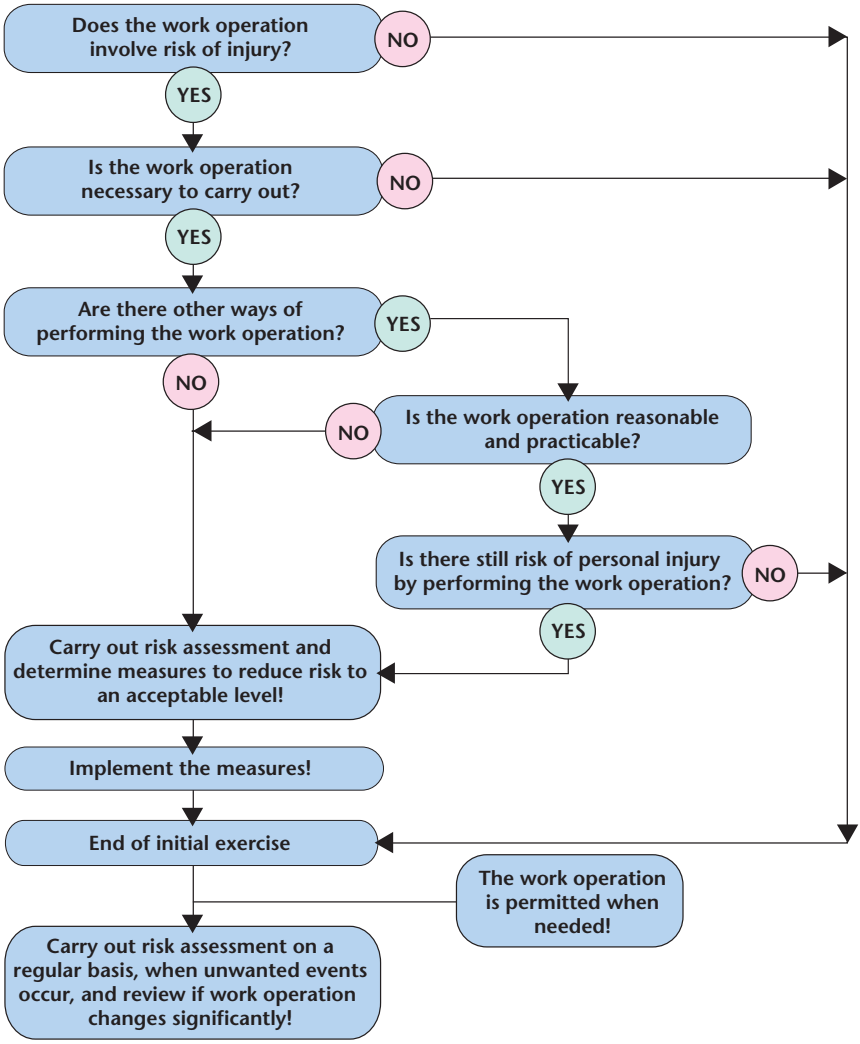
How to go about it

In risk assessment, it may be difficult to know where to begin. The example below illustrates different work operations on the ship and may help in analysing the different types of hazards that may be encountered. The form may be adapted to suit different types of ship and work.

Hazard **Work operation**	Fall to a lower level	Struck by falling object	Expo-sure to chemi-cals	Inhala-tion of gases	Fire	Explo-sion	Hit by object	Burn	Crush-ing injuri-es	Etc
Mooring		x						x	x	
Loading/unloading	x	x							x	
Painting			x	x						
Welding					x	x	x			
High pressure washing							x			
Rigging gangway	x	x							x	
Sand-blasting		x								
Lifeboat drill	x	x						x	x	
Etc.										

A model that provides an overview:

The model below can be used to give the necessary "overview" of the situation, before the specific risk assessment of the work operation starts.



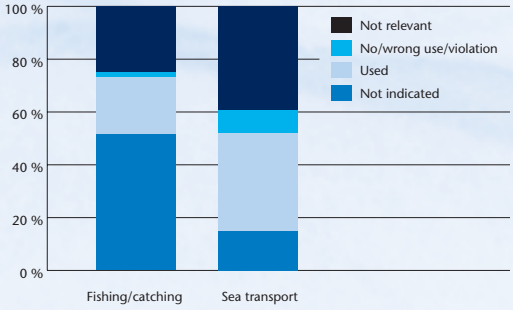
Other ways and means

Risk assessment should be as realistic as possible. Do not forget that employees may have useful and important experiences to contribute. These include personal experiences and knowledge of personal injury reports that relate to one's own shipboard experience, knowledge of situations that should have been dealt with, or general knowledge about the conditions on board a ship.

Statistics is another useful tool in discovering unwanted events. The Norwegian Maritime Directorate's personal injury statistics may be of help in determining where measures should be implemented.

"Personal protective equipment/preventive measure not relevant to the injury? "

It must be indicated in the personal injury report forms whether or not protective equipment or preventive measures were used when the accident happened, or if they are not considered to have been relevant in preventing the injury. Half of all reports on personal injuries from 1995 to 2002 on fishing vessels do not indicate whether protective equipment was used or preventive measures were implemented. In the category maritime transport the corresponding percentage is 14.88. A full 39.2% of the personal injury reports for maritime transport and 24.7% of fishing and catching indicate that protective equipment or preventive measures were not relevant as to whether the accident happened or not.



It is likely that this is because the necessary risk assessment has not been carried out, and the reasons are probably that:

- the crew considers that there is no need for risk assessment.
- the need for risk assessment of parts of particular work operations has been neglected.
- there is a lack of procedures for risk assessments.

Some examples of measures which are not considered to be relevant but often are

Cleaning is not considered to be one of the most risky work operations on a ship. However, personal injury reports received by the Norwegian Maritime Directorate indicate that injuries occurring when sweeping, washing or cleaning, are quite common.

- In more than 25% of all reported injuries in the period 1995-2002, involving cleaning operations on fishing and catching vessels, preventive measures were not considered relevant to the injury.
- For vessels engaged in maritime transport in the period 1995 to 2002, injuries during cleaning operations constitute 6.55% of all personal injuries. In 40% of these cases, protective equipment/preventive measures were not considered relevant to the injury.

The cause of many of these injuries is contact with dangerous substances. In many cases protective equipment and/or preventive measures should have been used.

Injuries in connection with maintenance – in the engine room and other maintenance – make up 26% of all injuries in the category maritime transport. In almost one case out of every four it is stated that there was no preventive measure that could have been used. Keeping in mind the potential risk elements connected to work in engine rooms, maintenance of the engine room is an area where preventive measures at all levels need to be implemented.

Risk assessment in practice

Below are provided several practical examples of risk assessment of work operations. The examples are not exhaustive, but illustrate the elements that should be included.

Maintenance	Risk assessment no. XX	Audit no. X
Concerns:	Deck crew	
Work operation:	**Painting over the side of the ship**	
Hazard:	Fall into water and possible drowning	
Preventive measures:	• Check that ropes are free from damage. • Check that rope ladder is free from damage. • Check that fastening of ropes and ladder is in order • Inflatable lifejacket must be used. • Line with lifebuoy attached rigged where the lifebuoy floats in the water.	

Provisioning	Risk assessment no. XX	Audit no. X
Concerns:	Deck crew	
Work operation:	**Provisioning over gangway/ramp**	
Hazard:	Fall from the gangway/ramp and end up between ship's side and the dockside	
Preventive measures:	• Ensure that gangway/ramp is fastened securely on board and on the dock. • Ensure that handrails and safety nets have been rigged. • Line with lifebuoy has been rigged where the lifebuoy floats in the water underneath the gangway. • Inflatable life-jacket should be used.	

Hazardous work place	Risk assessment no. XX Audit no. X
Concerns:	Engine room personnel
Work operation:	**Work in the engine room**
Hazard:	The engine room is a high risk working area where the probability of injury is great, no matter what the work operation: • Objects may fall down onto the platform level. • Oil spilled on to the deck may make it slippery. • Oil pipes or steam pipes may crack and one may be sprayed with inflammable / hazardous liquid. • One may hit one's head on hard objects.
Preventive measures:	When in the engine room, personal protective equipment should always be used: hardhat, hearing protection, gloves, boiler suit, protective boots.

Use of chemicals

Certain work operations require a more thorough examination than others, of which the use of chemicals is an example. Below are listed certain points that highlight potential hazards in using chemicals. The datasheets that are to be included with the chemicals and kept on board contain vital information.

That chemicals are dangerous could mean that they:

- are hazardous to health (and may cause reactions).
- are inflammable.
- are explosive.
- have either very high or very low temperatures.
- displace the oxygen in the air.
- may lead to dangerous reactions.

You may be exposed to risk if you:

- inhale polluted air.
- inhale oxygen-deficient air.
- get chemicals directly on your skin – either by touch or because of spray.
- swallow some of the chemical.
- get close to a fire or an explosion.

Before starting work involving chemicals

1. What does the work entail?
- Which chemicals are to be used?
- How are they to be handled?

2. Which dangerous attributes does the product have?
- If inhaled?
- If skin contact?
- Is it inflammable/explosive?

3. Where and when in the work may there be danger?
- Accumulation of gas?
- Skin contact?
- Are there any incendiaries in the vicinity that can cause sparks or flames?

4. What can happen if something goes wrong, as for example a power cut or a leakage?
- Fire/risk of explosion?
- Unconsciousness?

5. Are preventive measures needed?
- Is the exposure as low as possible (including an evaluation if a different and less dangerous chemical can be used)?
- Have steps been taken to avoid a fire/an explosion?
- What measures are to be taken if there is an accident?
- Is protective equipment available?

6. How is the work to be carried out?
- Select work method, equipment, place and preventive measures.
- Have instructions, emergency preparedness and information been prepared?

Risk assessment on a fishing vessel

Work on board a fishing vessel presents many elements of risk because of the movements of the vessel and the desire to complete the work effectively and speedily. It is therefore of the utmost importance that those responsible for safety on board fishing vessels assess the risks involved. An example of the elements that should be included is provided below.

Fishing and catching operations	Risk assessment no. XX Audit no. X
Concerns:	Employees on fishing vessels incl. trawlers
Work operation:	**Hauling the trawl / getting the catch on board** • Skipper directs haul-speed taking factors such as depth and current into consideration, as well as manoeuvring the vessel into correct position for the trawl gear. • Winch operator on deck/bridge.
Hazard:	• Because of the great loads on wires, blocks and block brackets, wires may break or block bracket may fail, with the result that persons in the vicinity may be fatally struck. • During handling of heavy equipment injuries may occur. • Because of excessive noise from winches with fittings during hauling of gear, noise related injuries may occur.

Preventive measures:

- The trawl deck must be clear and loose objects secured.
- No persons on deck and in the vicinity of the trawl gallows during hauling of the trawl.
- Hard hat, life-jacket, protective footwear, hearing protection and gloves must be worn.
- Nobody must get close to the doors before these are in place.
- After disconnecting the doors no one must move out into the trawl lane before the equipment is in place.
- Continuous monitoring must be carried out to check that mantel wire and strops are undamaged before and during hauling of the cod-end or bag.
- The trawl door must be closed as soon as the cod-end or bag are on board.
- Caution must be shown on deck when the fish haul hatches are open and the cod-end or bag are opened and emptied.
- All crew members involved in the hauling process should be made aware of the location and correct operation of all safety related equipment on board the vessel, including the use of emergency stop.
- All observed damage to the equipment is to be reported immediately to the net man.

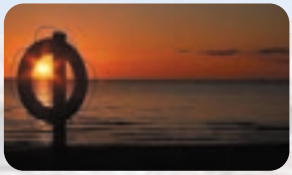
Everyone has a responsibility

The work supervisor will, particularly on a larger vessel, go through what is to be done before work starts, and provide advice about any potential hazards and use of protective equipment. However, everyone has a responsibility to ensure that the workplace is as safe as possible at all times, and that work operations are performed in accordance with stated plans and procedures.

As an employee you should in any case, before a job begins, ask yourself these questions:

- How is the job to be carried out?
- What can go wrong?
- Which measures have to be taken to avoid danger?
- Who is to be informed?

Everyone who works on board has both a right and a duty to stop work that risks life and limb.



Useful information

Rules and regulations

- Seamen's Act of 30 May 1975 No. 18
- Regulation of 4 August 2000 No. 808 concerning the working environment, health and safety of workers on board ship
- Regulation of 11 January 2001 No. 21 concerning protection of employees from exposure to chemicals
- Regulation of 15 June 1987 No. 507 concerning safety measures etc. on passenger ships, cargo ships and lighters
- The ISM Code

Publications

- Factsheets (only in Norwegian)
  - Risk assessment in preventive OSH work
  - Inspection of seafarers' working and living conditions
  - Statistics on personal injuries at sea
  - Personal injuries – injuries during lifeboat drills
  - Handling and storage of chemicals
- Personal safety messages from the Norwegian Maritime Directorate
- Safety brochures for fishermen
- "Safety manual for fishing vessels"
- The Norwegian Maritime Directorate's personal injury statistics
- Navigare

Safety videos/films

- "Everyone has a responsibility" ("Alle har et ansvar")
- "The ISM Code in practice" ("ISM-koden i praksis)
- Occupational Safety and Health video for fishermen (to be released end 2003)

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Sjøfartsdirektoratet
Norwegian Maritime Directorate

Postal address
P.O. Box 8123 Dep
N-0032 Oslo

Visiting address
Stensberggt. 27
Oslo

Phone (+47) 22 45 45 00
Fax (+47) 22 45 45 01
Ordering fax (+47) 22 45 45 45

E-mail postmottak@sjofartsdir.dep.no
Website www.sjofartsdir.no

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