

Risk Likelihood	Consequence Level				
	Insignificant	Minor	Moderate	Major	Disastrous
Certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme

Focus on: Risk Assessments for Vessel Operations Spill Prevention, Preparedness, and Response

Vessels visiting Washington are beginning to expand the use of risk assessments to include activities like bunkering, voyage planning, and cargo operations. When properly used, these assessments improve safety by identifying specific hazards and adding controls where needed. This focus sheet is intended to help crews understand and improve the quality of their risk assessments to prevent accidents.

Why use risk assessments?

The ISM Code requires vessel operators to assess risks to their vessels. Risk assessments can help vessel crews identify, analyze, and control new or high-risk hazards.

What is the difference between a Risk Assessment and Toolbox Meeting?

Both risk assessments and toolbox meetings play essential, complementary roles in a safety program.

Toolbox Meeting: Reviews hazards, confirms controls, and prepares the crew for safe work immediately before the task.

Risk Assessment: Identifies hazards, evaluates risks, and establishes controls.

Step 1: Identify existing hazards, risk scenarios, consequences, and controls

The first step in a risk assessment is to think about potential hazards, risk scenarios, consequences, and controls.

- **A hazard** is anything that can cause harm.
- **A risk scenario** describes how someone or something could be harmed by a hazard.
- **A consequence** is the result when the hazard causes harm.
- **A control** is an action taken to reduce the likelihood or consequence of a hazard. Examples are SMS policies, work procedures, and bridge and engine room checklists. Generally, controls are higher level efforts to reduce risk and are separate from standard personal protective equipment (PPE).

Hazard vs Risk Scenario vs Consequence vs Control			
Hazard	Risk Scenario	Consequence	Control
Wet deck	Slips, trips, falls	Minor injury	'Wet Deck' warning signs, non-skid paint, elevated walkways
Working around machinery	Crushing, entanglement, electrical shock	Injury requiring hospitalization, maiming, fatality	Guards on machinery, instructions on proper use, lock out tag out
Oil tank overflow during transfer	Oil spill/ Fire hazard / Exposure to toxic or flammable vapors	Fines, injuries requiring hospitalization, damage to the environment	Pre-load plan, fatigue management, scupper plugs, spill monitoring
Long contracts, broken sleep cycles	Mental stress, fatigue, effect on crew health	Damage to vessel, injury to crew, mental health crisis	Mental health training, shorter contracts, safety culture

Step 2: Assess how serious the consequence will be (Risk Consequence)

Risk assessments categorize consequences in different ways. The consequence may affect business, crew welfare, or the environment. Consequences can range from insignificant to disastrous.

Step 3: Assess the likelihood that the risk scenario will occur (Risk Likelihood)

To determine the likelihood of a risk scenario occurring, the crew evaluates the identified hazard, the risk scenario, and the controls in place to mitigate that hazard. This is where the crew's experience and operations specific knowledge is especially important. For example, if the vessel schedule changes to include several port calls in quick succession, the crew may identify the fatigue hazard and the need to put additional fatigue mitigation controls in place. You should take your existing controls into account when determining risk likelihood. Examples of likelihood levels are: Certain; Likely; Possible; Unlikely; Rare.

Example of Consequence Rating Matrix			
Descriptor	Business	Crew welfare	Environmental
Insignificant	No or limited disruption	Injury requiring first aid	Limited damage
Minor	Minimal disruption	Injury requiring medical treatment	Short term damage
Moderate	Significant disruption	Lost time injury	Damage to wide area
Major	Major disruption	Lasting injury	Long term damage to large area
Disastrous	Severe disruption	Death	Permanent damage to large area

Steps 4: Determine the Risk Rating (Low, Moderate, High, Extreme)

A risk rating matrix uses the determined likelihood and consequence to determine the risk rating. A risk rating reflects both how likely the scenario is and how severe the consequences are.

Example of a Risk Rating Matrix (Low, Moderate, High, Extreme)					
Risk Likelihood	Consequence Level				
	Insignificant	Minor	Moderate	Major	Disastrous
Certain	High	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

How to use the Risk Rating Matrix:

Combine risk likelihood with consequence level to determine your risk rating. A hazard with likelihood of 'Certain' and a consequence of 'Disastrous' has a risk rating of 'Extreme'. If a risk rating exceeds company thresholds, the crew should apply additional controls and repeat the risk assessment steps to determine a revised risk rating. If risks remain too high even after additional controls are added, the crew should review the operation with shoreside management or decide not to conduct it at all.

Best practices for risk assessment:

- Involve the people participating in the operation to identify hazards, likelihood ratings, and controls.
- Conduct regular training sessions on risk management procedures.
- Use a continuous monitoring system to identify operational changes.
- Ensure your risk ratings reflect reality. For example, don't classify risks such as poor visibility, strong currents, or minimal CPAs as 'Possible' or 'Unlikely', if the vessel will be transiting a river in poor weather.

Additional information

- International Maritime Organization, [Formal Safety Assessment](#)
- ABS, [Guidance Notes on Risk Assessment Applications for the Marine and Offshore Industries](#)
- Health and Safety Executive, UK, [Print Health and safety on ships - GOV.UK](#)
- Britannia P&I Club, [Risk assessment in marine transportation | Britannia P&I](#)
- International Naval Surveys Bureau Class, [Microsoft Word - 01 Guide for Risk Assessment 14052010](#)

Example Risk Assessment Template

Vessel Name	Operation/Work Activity	Approved?	Signature of Approving Authority*
		Yes / No	

Date of Assessment	Names of Assessment Team	Titles of Assessment Team

Hazard Identified	Risk Scenario	Existing Controls	Likelihood Level	Consequence Level	Risk Rating	Additional Controls	Likelihood Level	Consequence Level	Revised Risk Rating

Extreme Risk:

Task not to be undertaken

High Risk:

*Senior Officer **and** *Fleet Manager must sign off on task

Moderate Risk:

*Senior Officer **or** *Fleet Manager must sign off on task

Low Risk:

Task can be undertaken

Risk assessments should be revisited periodically to ensure the risks are addressed and to re-evaluate hazards as circumstances change. Sometimes hazards that were originally deemed acceptable can become unacceptable if circumstances change.

Date of Review	Review Team	Approved?	Signature of Approving Authority
		Yes / No	
		Yes / No	



Sara Thompson
sara.thompson@ecy.wa.gov
(360) 280.5128



To request an ADA accommodation, contact Ecology by phone at 360-407-6831 or ecyadacoordinator@ecy.wa.gov, or visit <https://ecology.wa.gov/accessibility>. For Relay Service or TTY call 711 or 877-833-6341.