

# Hazards and risks

## Health and Safety at Work Act (2015) Guidance

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### What this guidance contains

This guidance explains what hazards and risks are and provides an overview of requirements under the Health and Safety at Work Act 2015 (HSWA).

### Introduction

Under HSWA a person conducting a business or undertaking (PCBU) has a duty to address both 'hazards' and 'risks'.

- A hazard is something that might cause harm.
- A risk is a combination of the chance that the hazard will cause harm, and if it does, how bad that harm will be.

### Why manage risk?

Without controls in place, accidents happen at work and workers are exposed to noise, dust, and substances that damage their health.

Effective risk management reduces the chance (i.e. likelihood) of an accident or exposure, and how bad it will be (i.e. consequence).

Risk management works by identifying and applying controls that:

- reduce the number of accidents or things that can damage health; and
- reduce the severity of the accidents or exposures that do happen.

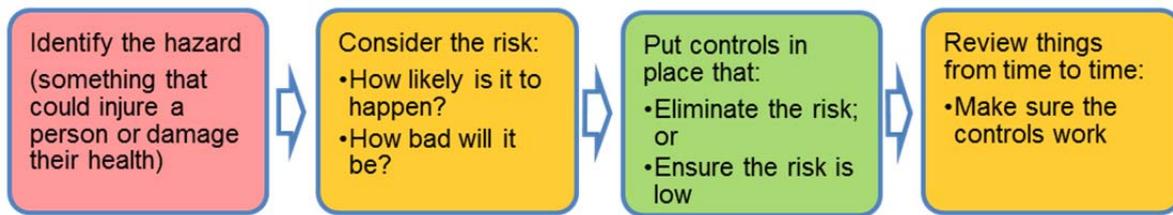
To be effective, risk management needs to be an active and on-going part of work practice.

### What is risk management?

In its simplest form risk management boils down to four steps:

1. Identify the things that can injure people or damage their health (hazards)
  2. Think about how likely the hazard is to cause harm, and if it does, how bad it will be (risk)
  3. Do things (controls) that make the risk go away (eliminate it) or make it lower (minimise it)
  4. Reassess the situation from time to time to make sure the controls are effective.
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## Hazards and risks (continued)



## Eliminate or minimise risk

Under HSWA a person with a duty is required to eliminate risks to health and safety. If the risks can't be eliminated, they must be minimised.

Eliminating and/or minimising risk must be done 'so far as is reasonably practicable'. This means considering:

- how likely the hazard or risk is to occur (likelihood)
- the level of harm that could result (consequence)
- what measures exist to control the risk
- whether ways to eliminate or minimise the risk are available or suitable.

Finally, (once these steps are considered), the PCBU should assess whether the cost of controlling the risk is grossly disproportionate to the risk.

## Aim for the highest level of protection

Workers should be given the highest level of protection that can be achieved reasonably practicably. The purpose of HSWA is to protect workers against harm to their health, safety and welfare from hazards and risks at work.

The best possible control should be found and used. The 'hierarchy of controls' below describes the types of controls available, and lists them in the order of how effective they are at controlling hazards and risks. A combination of controls may be the most effective approach.

### Hierarchy of controls

Control	Effectiveness	Description
Elimination		Eliminate the hazard or risk
Substitution		Replace with something similar with less risk
Isolation / engineering		For example - install guards on machine, redesign the task
Administration / training		Implement policies, procedures and training
Personal protective equipment (PPE)		Provide gloves, aprons, ear protection, self-inflating lifejackets, personal locator beacons and so on
	Least effective	

### Use accepted controls to manage commonly recognised risks

It is not necessary to do a formal risk assessment for every hazard or risk. If a hazard or risk is generally recognised in the sector and a best practice control exists that is sufficient to address it, there is no need to 'reinvent the wheel'.

Maritime NZ, WorkSafe New Zealand, Standards New Zealand, or industry best practice guidance are examples of credible sources of information about suitable controls.

Example of a recognised hazard:	Example of a recognised control:
<ul style="list-style-type: none"><li>• Cutting, crushing, trapping</li><li>• Falling</li><li>• Dust, contaminated air</li></ul>	<ul style="list-style-type: none"><li>• Machine guards</li><li>• Barriers, handrails</li><li>• Ventilation and extraction systems</li></ul>
<ul style="list-style-type: none"><li>• Tripping hazards, mess</li></ul>	<ul style="list-style-type: none"><li>• Safe paths, non-slip surfaces</li></ul>
<ul style="list-style-type: none"><li>• Hazardous chemicals</li></ul>	<ul style="list-style-type: none"><li>• Protective equipment, handling procedures</li></ul>

### Review how you do things

Practices can become outdated, which is why it's important to review procedures regularly. HSWA is about ensuring the highest level of protection that is reasonably practicable for workers. If you use a common industry practice, remember to consider whether it still meets that standard.

### The 'risk matrix' approach

A risk matrix is a tool for thinking about risk.

With a risk matrix the chance of an event happening (likelihood) and the result of the event (consequence) are considered separately and then combined.

The weightings are based on the Standard AS/NZS 31000 and the handbook to the Standard - SA/SNZ HB 436:2013.

## Estimating likelihood and consequence

Estimates of likelihood and consequence must be realistic, and based on what is known about what happens across the sector.

Personal experience is misleading. Individual workers have different experiences at work so personal experience doesn't predict the future. Statistics tell us what happens across the whole group of people in the sector doing the same thing.

For example, surveys show that people working in the fishing sector feel safe, but the data shows that commercial fishing has a high accident and injury rate.

### 'Bill' and 'Ben'

It's normal for people to base their opinions about the world on their own experience.

Statistics predict what will happen for a group of people, but don't predict what will happen to an individual because there is always variation within a group.

Although their experience is different, statistically speaking, Bill and Ben have the same chance as anyone else of being hurt or seeing someone else get hurt.

Of course, Bill may be doing everything right, and the operation he works for may have very high safety standards.

Or Bill might be a 'statistical outlier' (like a person who is 2 metres tall (6ft 8in) when the average is 178 cm (5ft 10in)).

Bill hasn't experienced an incident yet, but that doesn't mean he won't. Tomorrow could be the day he goes to work and sees a serious accident or gets hurt himself.



#### Bill

Bill has worked on fishing boats for 20 years without incident.

He thinks the risk of being hurt is low - because that reflects his experience.

Bill is relaxed about health and safety.



#### Ben

Ben sees a nasty accident in his first week on a trawler.

He thinks fishing is risky - that reflects his experience.

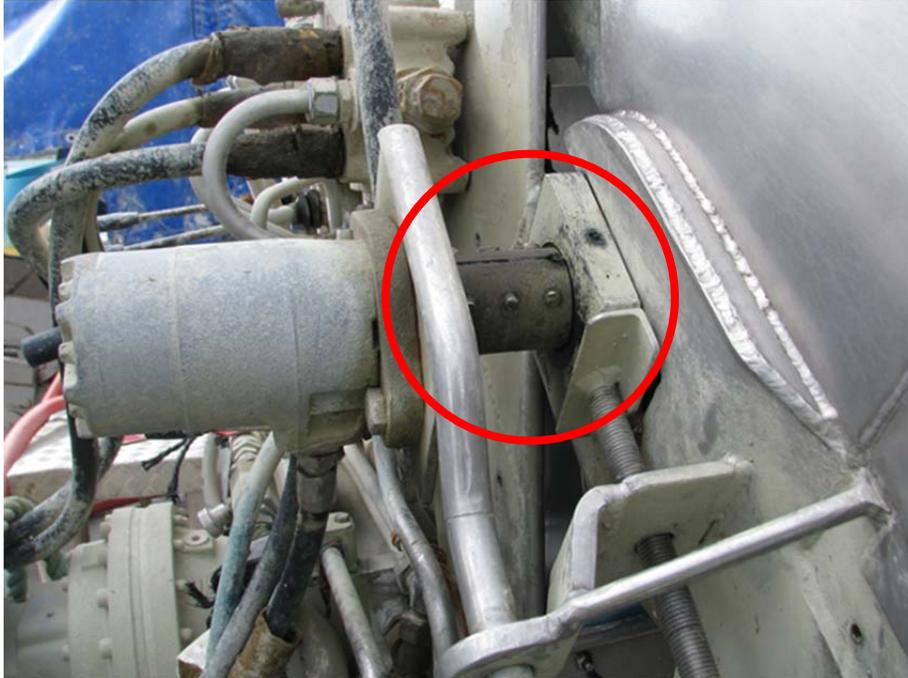
Ben takes health and safety very seriously.

## Risk management in practice – exposed drive shaft example

Here's how the risk management tools described in this guide can work in action.

### Step 1: identify the hazard

The crew notice that a conveyor belt drive is exposed. They discuss it with the skipper.



Item: Conveyor belt drive shaft

Hazard: Clothing or fingers could get caught as it spins

### Step 2: Assess the risk

The operator, skipper and crew assess the situation. They agree that a person is 'likely' to be harmed if they are caught in the spinning drive shaft.

Likelihood table

Category	Worker injury
Almost certain	Is expected to happen in this type of work. May occur reasonably often in this vessels operation
Likely	Will probably happen in this kind of work. Expected to occur occasionally in this vessel's operation.
Possible	Will probably happen at some time in this kind of work. Might happen once in the vessel's operating lifetime.
Unlikely	Could happen in this kind of work. Not likely to happen on every vessel but does occur from time to time on a vessel.
Very unlikely	So unlikely that it may only happen in exceptional circumstances.

## Hazards and risks (continued)

The operator, skipper and crew then discuss how badly someone would be hurt if they are caught in the spinning drive shaft. They decide that the consequence would be 'major' because someone could be seriously injured (for example if a worker's clothing got tangled in the shaft they could be pulled against the machine).

**Consequence table**

Category	Worker injury
Insignificant	No injury
Minor	Cuts, bruises or abrasions that can be treated with first aid
Moderate	Injury requires medical treatment and stops the person from working
<b>Major</b>	<b>Person killed or seriously injured.</b>
Severe	More than one person killed or seriously injured

The likelihood of harm and consequences are then plotted on a risk matrix. A 'likely' accident with a 'major' consequence gives a 'very high' risk rating.

The result tells the operator, skipper and crew that they must do something about the exposed belt drive shaft before they use it again.

Likelihood	Consequence				
	Insignificant	Minor	Moderate	<b>Major</b>	Severe
Almost certain	Medium	High	High	Very High	Very High
<b>Likely</b>	Medium	Medium	High	<b>Very High</b>	Very High
Possible	Low	Medium	High	Very High	Very High
Unlikely	Low	Low	Medium	High	Very High
Very unlikely	Low	Low	Medium	Medium	High

### Step 3: Control the risk

The operator, skipper, some crew and the company engineer talk about the best way to prevent the belt drive shaft from harming someone (control the risk).

A crew member tells of another vessel he worked on where the operator had installed a guard on a similar belt drive. The guard had made things safe and didn't affect the use of the machine.

The company engineer says that it would take him an hour or so to install something similar at little or no cost, using some leftover stainless steel. The operator instructs the engineer to go ahead and make it.

Everyone agrees the guard looks really good. However:

- The guard only covers the top of the belt drive shaft.

Note: Hazards like this should be guarded on all sides

- It's still possible to poke a finger through one of the holes and they can't be sure that this won't happen.

Note: A guard with holes should be well clear of the hazard so that no-one can make contact with the moving part.



The engineer has another go at fabricating the guard.

This time the guard is made from stainless steel sheet and is fitted right around the whole belt drive shaft.

The operator, skipper, and crew know from Maritime NZ magazines that accidents can happen when workers remove machine guards. They discuss the risks and develop a **safe operating procedure** setting out how they will make sure the machine is safely shut off if or when the guard is removed.

Everyone agrees that the hazard should now be effectively controlled.



## Hazards and risks (continued)

### Step 3 (part 2): Reassess the risk

#### Likelihood

With the guard installed and effective procedures and training, the skipper and crew now assess the likelihood of an accident as 'unlikely'.

Category	Worker injury
Almost certain	Is expected to happen in this type of work. May occur reasonably often in this vessels operation
Likely	Will probably happen in this kind of work. Expected to occur occasionally in this vessel's operation.
Possible	Will probably happen at some time in this kind of work. Might happen once in the vessel's operating lifetime.
Unlikely	Could happen in this kind of work. Not likely to happen on every vessel but does occur from time to time on a vessel.
Very unlikely	So unlikely that it may only happen in exceptional circumstances.

#### Consequence

The probable consequence of touching the new guard is reassessed. They decide that it would be 'insignificant' because no injury can occur.

Category	Worker injury
Insignificant	No injury
Minor	Cuts, bruises or abrasions that can be treated with first aid.
Moderate	Injury requires medical treatment and stops person from working
Major	Person killed or seriously injured
Severe	More than one person killed or seriously injured

#### Risk

Likelihood and consequence are plotted on the risk matrix again. The result is now 'low' – the guard (along with the safe operating procedures) is effectively controlling the risk.

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Very High	Very High
Likely	Medium	Medium	High	Very High	Very High
Possible	Low	Medium	High	Very High	Very High
Unlikely	Low	Low	Medium	High	Very High
Very unlikely	Low	Low	Medium	Medium	High

### Step 4: On-going review

Although the guard is controlling the risk, the operator, skipper and crew need to monitor the risk as part of their on-going work practice. This means for example:

- Noticing whether the guard is working as it should.
- If someone takes the guard off and leaves it off, asking 'Why?' For example, was the guard getting in the way of a work activity? Is there a better way to control the risk?

The operator should apply the lessons learned on this vessel to their whole operation, and make sure the risks from other moving machinery in the operation are also effectively controlled.