



Boatbreakers Boat Dismantling Training

Unit 1

Risk Assessment for Recreational Craft Dismantlers

Aim of Unit 1

By the end of this unit you will:

- Identify the hazards in the boat dismantling tasks
- Learn why it is essential to conduct a risk assessment
- Learn how to conduct a risk assessment

Hazard

Source, situation or act with a **potential for damage**, harm or adverse effect in terms of **human injury** or **health** problems (CCOHS 2009).





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Hazard



- Going into **confined space** without taking any precautions is **hazard**.
- **Slip/trip** due to wet surfaces is a **hazard** or **moving equipment** can also be counted as **hazard**.
- Mechanical hand tools are source of **hazard**.
- Basically, a **hazard** is anything that has the **potential of causing harm** to people, facility or environment.





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Hazard

Occupational hazard examples in a dismantling yard

Activity	Potential hazard
Electrical hand tools	Electric shock, electrocution
Work on height	Fall from height
Hand tools	Cuts
Hot works	Fire, explosions, toxic gases
Operations with cranes	Hit by an object
Asbestos	Asbestosis
Paint removal	Toxic gases

Types of Hazards

- **Physical hazards** (Noise, vibration, hit by an object, slip, trip, fall)
- **Ergonomic Hazards** (Wrong body posture)
- **Environmental hazards** (Hot, Cold, and Odour etc.)
- **Psycho-Social hazards** (Stress, fatigue, mobbing)
- **Chemical Hazards** (Oil, gasses, spills)
- **Biological Hazards** (Bacteria, viruses, blood or other body fluids)

Physical hazards

Physical hazard can be explained as an element within an environment (workplace, home, etc.) which **can cause harmful effects to a person** without necessarily touching him/her (COMCARE 2014).

- Noise
- Vibration
- Machinery
- Electrical Hazard
- Fire
- Slipping / Tripping
- Penetration by sharp object
- Impact with flying object



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Noise

Noise is one of the most common physical hazards.

- **Deafness or hearing loss** caused by high noise is **irreversible**. Noise levels should be reduced to acceptable level, as a last resort hearing protection must be used. On a typical task, if the noise is exceeding 80 decibels (dB), measures must be taken
- Loss of hearing may also show itself with a constant ringing or buzzing.
- If you are suspecting loss of hearing, go to a doctor as soon as possible!





Noise

Napo in Stop that Noise

<http://www.napofilm.net/en/napos-films/multimedia-film-episodes-listing-view?filmid=napo-006-stop-that-noise>



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Noise

Napo out in the cold

<http://www.napofilm.net/en/napos-films/multimedia-film-episodes-listing-view?filmid=napo-006-stop-that-noise>



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Vibration

- Vibration is also a type of physical hazard. **Vibration is produced by equipment used in a task** such as chain saws, drills, jackhammer and etc.
- **Vibration-induced white finger** is the most **common** condition among the operators of hand-held vibrating tools.
- **Vibration** can cause changes in tendons, muscles, bones and joints, and can affect the nervous system. Collectively, these effects are known as Hand-Arm Vibration Syndrome (CCOHS).
- **In order to prevent** vibration, choosing **tools with lower vibration** level is the most effective measure. Furthermore maintenance of the equipment should be done properly and regularly.





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Vibration

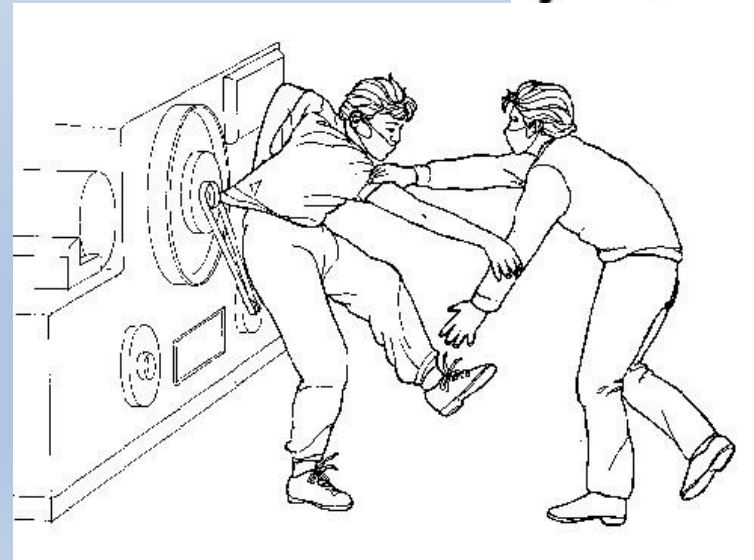
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Machinery

- **Other important physical hazard is related to machinery.**
- Being caught or hit by machinery is very common accident type.
- Machine should not be intervened without turning off and guards for moving part should always be in use.



Electrical Hazard

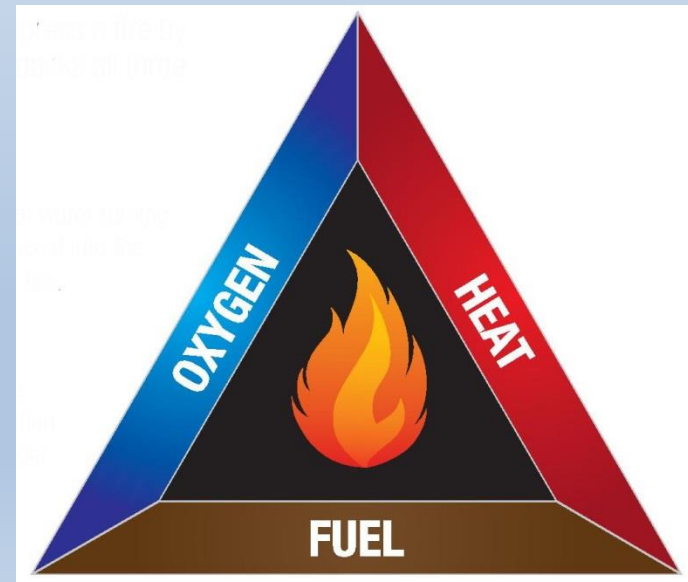
- **Electrical hazards** are also type of physical hazard.
- Frayed cords, improper wiring or intervene with electrical tools without training may end up with severe health risks.
- Electrically powered equipment, such as saws, drills vacuum pumps and etc. are used in boat dismantling.
- When mishandled or not maintained, these devices may cause a significant hazard to workers. Many electrical devices, which have high voltage or high power requirements, carry even higher risk.



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Fire

- Fires and explosions are hazards with fatal consequences.
- In order to prevent a fire, heat triangle should be understood correctly. In order to burn something, start a fire or something to catch a fire, there must be 3 main elements at the same time; Heat-Oxygen and Fuel.
- If one corner of this triangle is removed, fire can be prevented. For example, if the heat source is removed from the danger area, fuel oxygen would be left. Since there is no energy source to heat the fuel and oxygen, there will be no danger from the fire.





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- Daily hazards such as slipping on a wet surface and tripping are physical hazards.
- Consequences for these hazards can also be significantly severe. Assessment of these hazards and identification according to the work place should be made carefully



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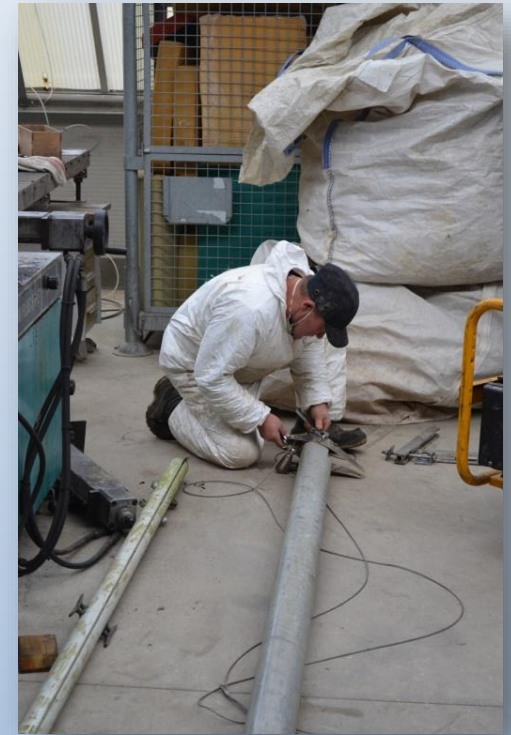
- **Penetration by sharp objects** is also very common accident. Sharp objects are used in many tasks but they can be hazardous and cause injuries like **cuts**, **punctures** or **amputations**. Also there is always a risk of **infection** of a cut.
- **Impact with a flying object** is also can be dangerous. Object falling from a height has energy and during the fall this energy is converted to speed.
- Also, **chains**, **ropes** and **wires** under strain are also **extremely dangerous hazard** source. If a rope under strain snaps, that strain is transferred to the snapped rope as energy. Due to the energy, backlash can cause fatal consequences.



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Ergonomic Hazards

Ergonomic hazards are the hazards that caused because of **discomfort of the job**. Incorrectly designed/used desks, chairs or workstations, wrong body postures or lack of training during manual handling procedures can be given as an example. Consequences are not fatal and they are not seen in a short-term but in a long term ergonomic hazards can cause serious damage.





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Environmental hazards

- Extremes of temperature can cause serious health problems. For example heat stroke can cause malfunctioning of the metabolism and may even lead to death. Also extreme colds can also cause health problems in a work place such as infections, flu, cold etc. Extreme temperatures can also cause problems such as tiredness, vulnerability to infections or reduced capacity to work.



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Psycho-Social hazards

- This may include fatigue, family problems, stress, shift work, harassment from workers and mobbing from a superior.
- **Distracted** worker can act **reckless** and he/she put him/herself into **dangerous** situations. This may include fatigue, family problems, stress, shift work, harassment from workers and mobbing from a superior.



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Chemical hazards

- Chemicals, which can be a very simple product such as glue or a very complex and hazardous one such as an acid, can affect the skin by contact or the body either through the digestive system or through the lungs, if air is contaminated with chemicals, vapour, mist or dust.
- Effects can be immediate or medium to long term depending on the chemical.



Biological Hazards

- Biological hazards may also be counted as an occupational hazard. Contagious diseases amongst workers may cause great danger regarding worker health.
- Insects, bacteria, fungi, animals within the facility or temporary workplace can also be included.
- For example,
 - A boat which is exposed to heavy rain and water for a long time may contain mould and because of this mould, employee can be exposed to bacteria or viruses. In this case hazard should be identified and removed before working on the boat.
 - Other example is that take a boat that was used by birds as nest. This is also serious health risk because droppings of birds can cause histoplasmosis. Furthermore feathers may also create allergic reaction which can also be counted as biological hazard.

Hazardous Materials

Hazardous materials that can be found on boats

The aim of this section is to give brief information about hazardous materials and potential hazards associated with different boat dismantling tasks.

Hazardous materials that can be found on boats

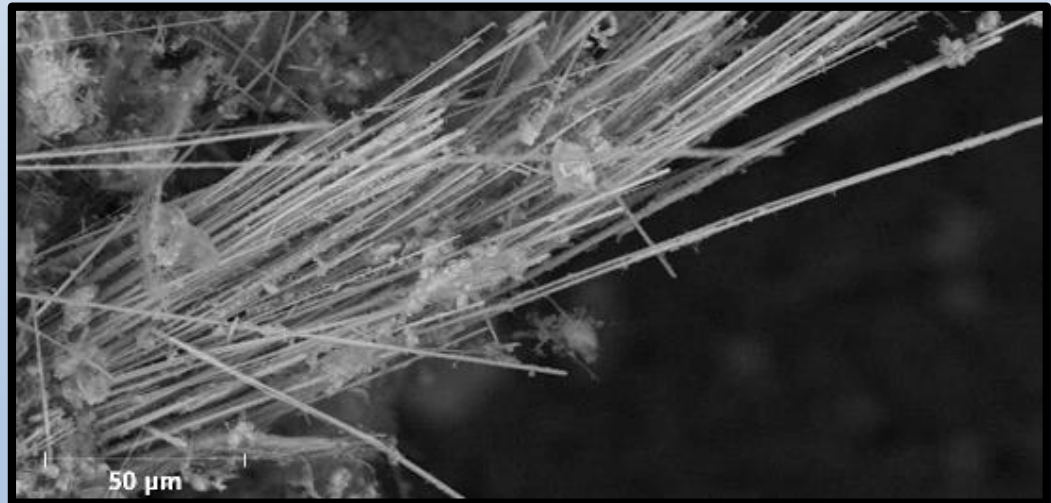
- Asbestos
- Heavy Metals
- Mineral Oil
- Polychlorinated biphenyls, PCB
- Tributyltin (TBT)

Hazardous Materials

Asbestos

Asbestos is very **dangerous** fibrous material. It was used in all kinds of industry due to its properties. But now usage and extraction of asbestos is banned by EU. Asbestos can commonly be found in

- Pipe insulation
- Insulation
- Floor tiles
- Glues
- Hull coating
- Sealing (pipe, door and etc.)
- Fire blankets
- Interior fire doors
- Thermal pipe insulation
- HVAC flexible duct connectors
- Glass wool
- Ropes
- Wallboards
- Panels



Hazardous Materials

Asbestos

Inhaling these particles causes serious illnesses;

- Mesothelioma - a form of cancer mainly affecting the lining of the lungs
- Asbestos related lung cancer
- Asbestosis - a non-malignant scarring of the lung tissue
- Non-malignant pleural disease (diffuse pleural thickening and pleural plaques)(HSE)



Hazardous Materials

Heavy Metals

- Heavy metals can be found in many products in a boat. **Lead, Mercury, Cadmium, Zinc** etc. are used in many products such as thermometers, batteries, electrical switches, paints and insulation.
- Being exposed to **Iron, Manganese, Copper, Chromium** and **Zinc** at these high levels can cause serious health risks; such as pneumoconiosis, psychical and neurological disorders, irritation of the upper respiratory tract, gastric disturbances, metal fever, ulceration of the skin (Steel 1968).
- **Lead** exposure has severe toxic effects on multiple organs and systems; anaemia, kidney failure, reduced heart rate variability, loss of appetite and stomach cramps, etc. (NIWL 2005).



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Hazardous Materials

Heavy Metals

Heavy metals can be found in a lot of materials on a boat;

- Thermometers
- Barometers
- Electrical Switches
- Lamps
- Thermostats
- Batteries
- Paints
- Blood Pressure Gauges
- Light fittings



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Hazardous Materials

Polychlorinated biphenyls, PCB

Polychlorinated Biphenyls or shortly **PCB's** are by product of coal tar.

Due to its great properties as an electrical resistance, PCBs were used as coolants and insulators. It was used in electrical equipment, such as transformers, switchgear, capacitors and the starter of fluorescent lights.

Exposure for PCB can cause

- cancer
- kidney failure
- failure of immune system
- fatigue
- headaches
- cough
- neurological problems.



Hazardous Materials

Tributyltin (TBT)

TBT is an organic compound which was first used in the early 1960s as an antifouling agent.

It is extremely effective on marine organisms like barnacles, mussels etc. But, it is aggressive biocide which interferes with hormones and has adverse effects on marine biology.

TBT is hazardous for human skin. Exposure for hours may cause skin irritation, as well as irritation on eyes.

It can cause **breathing difficulties, headaches, tremors.**

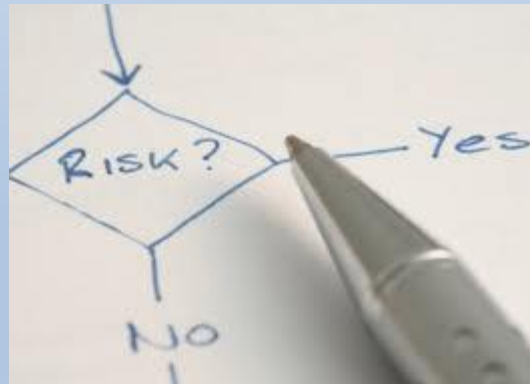
TBT may be exposed to during grinding and cutting procedures.



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Risk

- **Risk** is the **likelihood of an occurrence, chance or probability of a hazardous event**, exposure or that a person will be harmed combined with consequences.
- This definition is also applicable to situations with facility, property or equipment lost.



Hazard vs Risk

- **Hazard** is anything that can cause harm to people property and the environment.
- **Risk** is the chance or probability of that **hazard** causing harm or damage to people, property and environment.
- For example, **Confined space** and suffering from hypoxia is a **hazard**, but probability and consequences of occurrence is **risk**. The risk on this case is very high, because it is very common as a frequency and consequences are severe. On this case, hazard should be eliminated with mitigation methods, such as ventilation. As a last resort, breathing masks can be used.

Risk Assessment

What is Risk Assessment?

- **Risk assessment** is the process that **enables** to **identify hazards**, **evaluate the risk** related to hazard and eventually **eliminate or control the hazard**.
- **The main aim** of risk assessment **is to remove the occupational risks**, but this may not be applicable all the time.
- If elimination of a hazard is not possible, the risks should be reduced to acceptable level.
- **Risk assessment is a thorough look** at the workplace **to identify things, situations, processes, etc.** that **may cause harm**, to workers, to facility or the environment.

Risk Assessment

Who should do it?

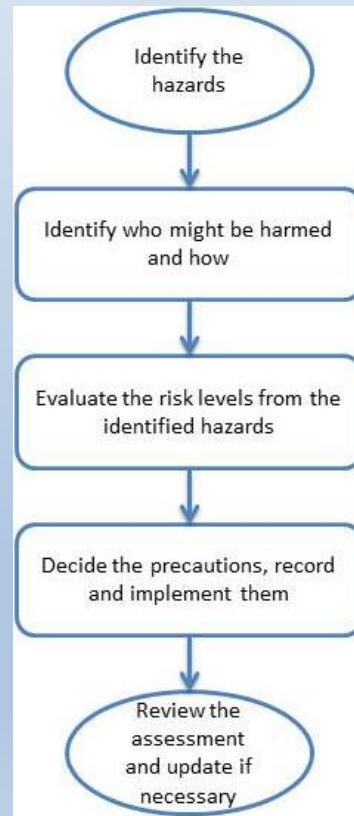
- **Assessments should be done** in a competent way **by managers, workers and safety delegates** who have a good knowledge about the workplace need to participate and work all together.
- **Workers** should be involved because they **are the most familiar with the tasks**. Experience of each part contributes more accurate risk assessment which leads to much safer working environment.
- If employer does not have the opportunity to involve workers and managers, **external services** which are qualified on this area can be used.



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Risk Assessment

Steps on risk assessment



Risk Assessment

Steps of the risk assessment

1. Identify the hazards

- **Identifying the hazards** is the **most important step** of the risk assessment.
- **Go** through the **tools, equipment, materials** and **methods** that are **used** on a task.
- **All aspects of the work should be looked**, accident, incident records must be taken into account

Risk Assessment

Steps of the risk assessment

1. Identify the hazards

- **Best way to identify the hazards is breaking the work process into steps.** Each step should be investigated as a different task and hazards for each component should be identified.
- Other important point is to **check manufacturers' instructions** or **data sheets** for equipment as they can be very helpful in identifying the hazards.
- Another helpful thing that should be done on risk assessment is **walking around to observe.** Watch workers doing their jobs to identify potential hazards that may lead to an injury, paying attention to the amount of time the worker is exposed to the hazard.



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Risk Assessment

Steps of the risk assessment

2. Identify who might be harmed and how

- For each hazard **decide who might be harmed.**
- This may be a **single worker conducting the task**, it may be **groups of people** or it may even be **passers-by.**
- For this analyse special requirements for workers should be taken into account, for example **unexperienced workers, people with disabilities, contractors, interns** etc.

Risk Assessment

Steps of the risk assessment

3. Evaluate the risk levels from the identified hazards

- **Assess** and **decide** if measures are adequate or more control measures needed.
- **Identified hazards should be ranked.** Most dangerous hazard to control first can be found this way. Hazards can be ranked by taking into account the percentage of the workers that are exposed, frequency of exposure, consequences of and probability of exposure.
- These are not precise predictions of when or how severe an injury may be, they are only estimates. The method can help to decide which is more important, an infrequent job that has the potential to kill a worker, or a frequent job that causes less severe injuries.

Risk Assessment

Steps of the risk assessment

3. Evaluate the risk levels from the identified hazards

Degree of Risk

- Degree of risk depends on different factors, such as exposure time to hazard, type of exposure and the consequences of exposure to that hazard. In order to calculate and assess the risk, below formula is used

$$\text{Risk} = \text{Probability} \times \text{Consequence}$$



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Risk Assessment

Steps of the risk assessment

3. Evaluate the risk levels from the identified hazards

Risk Matrix

- A low risk was identified by a likelihood rating of zero, and a severity rating of zero while a high risk was identified with ratings of three. The higher the number, the higher the risk and this led to prioritised action plans.

		Severity					
		0	1	2	3	4	5
Risk	Rating						
	High risk	2	3	3	3	3	3
	Medium risk	2	2	3	3	3	3
	Low risk	1	2	3	3	3	3
	Low risk	1	1	2	3	3	3
	Negligible Risk	0	1	2	2	3	3

		Severity					
		0	1	2	3	4	5
Probability	5	0	0	1	1	2	3
	4	0	1	2	2	3	3
	3	1	2	3	3	3	3
	2	1	1	2	3	3	3
	1	0	1	2	2	3	3
	0	0	0	1	1	2	3

Risk Assessment

Steps of the risk assessment

4. Decide the measures, record and implement them

- After assessment, the control measures and precautions should be analysed and hazard should be got rid of if possible.
- If not, risks must be controlled. A less risky option can be tried, access to hazards can be prevented, work can be re-organised to reduce exposure, and protective equipment can be used.



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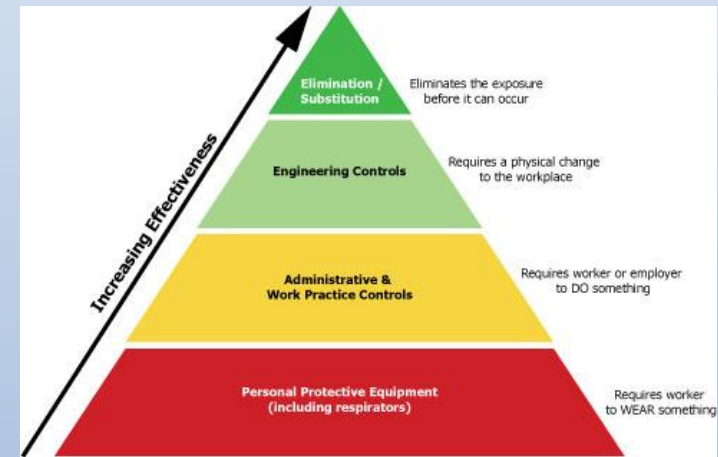
Risk Assessment

Steps of the risk assessment

4. Decide the measures, record and implement them

After evaluating the risk, control methods should be evaluated if they are adequate to prevent the hazard or not.

If measures are adequate, they should be implemented and workers should be informed about the risks. If not, ways to eliminate or control the hazards must be identified.



Risk Assessment

Steps of the risk assessment

5. Review the assessment and update if necessary

- You should always **keep in mind that why the risk assessment is done.**
- **Risk assessment can prevent** work related **death, injuries** or **illnesses** by eliminating or controlling identified hazards.
- **Situations** or **conditions** in the work place **may change**, if anything changes in the work place, risk assessment should be repeated.
- Another essential thing in a risk assessment is **keeping a record of the hazards identified, steps to taken, all the accidents** and even all **near misses** to make more accurate risk assessment.



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THANK YOU!