

# LOSS PREVENTION BROCHURE



A Guide To Safe Working Practice  
And Personal Injury Prevention

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## 1. Entry into Enclosed Spaces

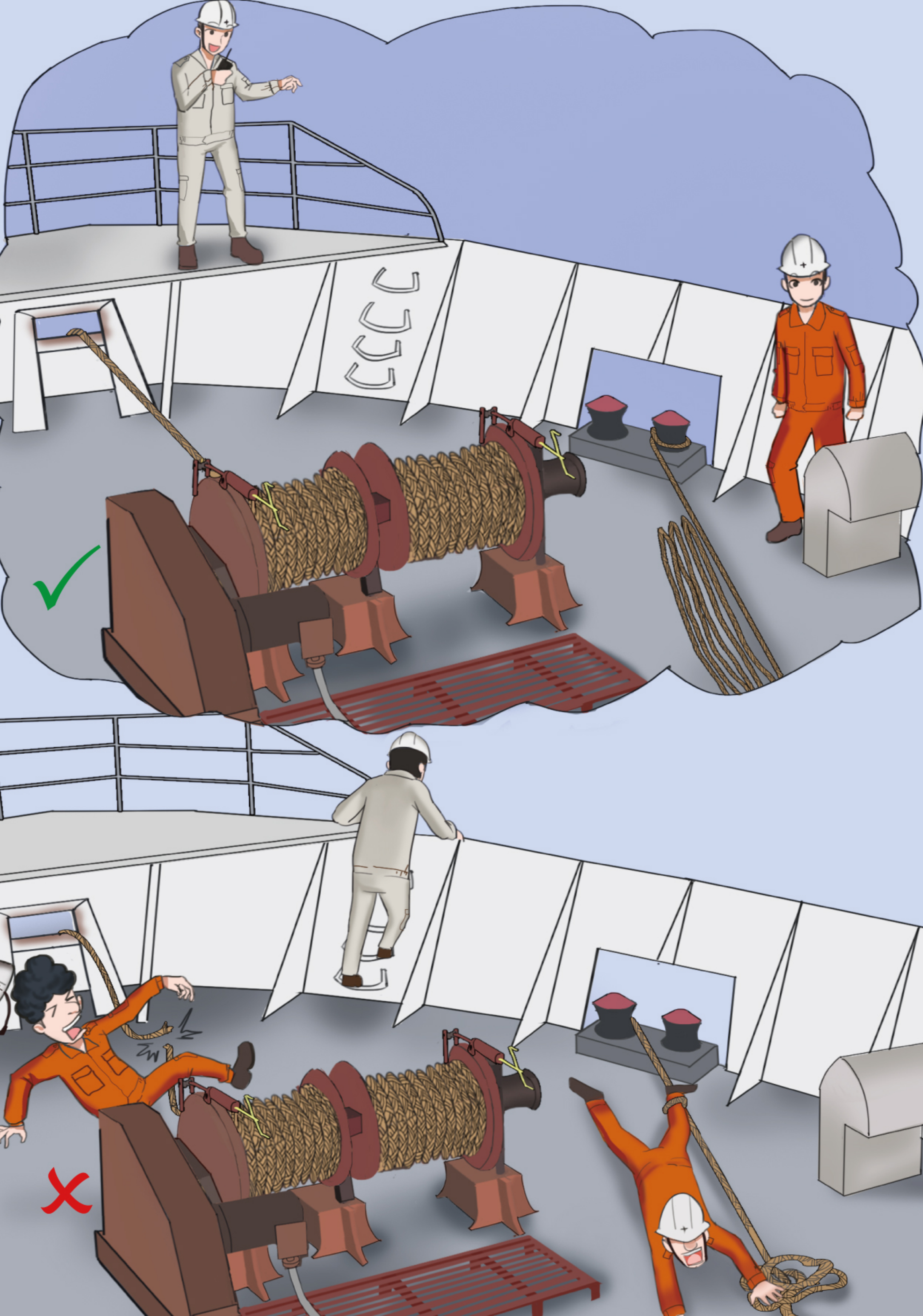
Although unremitting efforts have been made by the industry, the peril of enclosed space entry on ships can never be emphasized enough. The personnel entering enclosed spaces without safety precautions are most likely to collapse due to low oxygen level or inhalation of toxic vapours. Same things happen in a poorly executed rescue operation. More than 50% of victims died in enclosed spaces were actually attempting to rescue others. Remember, working in enclosed spaces can cost your life without you even noticing.

### Hazards associated with it mainly include:

- Hypoxia and suffocation;
- Intoxication;
- Engulfment in liquids or solids;
- Explosion triggered by high presence of flammable gases.

### Good Practice

1. Identify all the enclosed spaces onboard correctly with warning signs to prevent any accidental access of seafarers, visitors, stevedores and surveyors;
2. Be warned that a normally safe place can also be dangerous as the environment changes;
3. Carry out a risk assessment, issue a work permit and test the atmosphere prior to entry following IMO Resolution A.1050(27): Revised Recommendations for Entering Enclosed Spaces Aboard Ships;
4. Be familiar with the appropriate percentage content of the atmosphere and do not enter under unfitting circumstances:
  - Oxygen: 19.5% – 23.5%
  - Flammable gases:  $\leq 1\%$  LEL (Lower Explosive Limit)
  - Toxic gases:  $\leq 50\%$  OEL (Occupational Exposure Limit) e.g. the OEL for H<sub>2</sub>S is 10 PPM, and 50 PPM for CO;
5. Carry out atmosphere test at different locations and levels to obtain a representative sample since gases are of different specific gravity – CH<sub>4</sub> is lighter than air, CO almost the same weight as air, and H<sub>2</sub>S heavier than air;
6. Rescue operations should be performed by well-trained personnel with personal protective equipment (PPE including lifeline, SCBA and safe torch) used according to established emergency procedures;
7. Note that EEBD as an escape device is not applicable for rescuers.



## 2. Mooring Operations

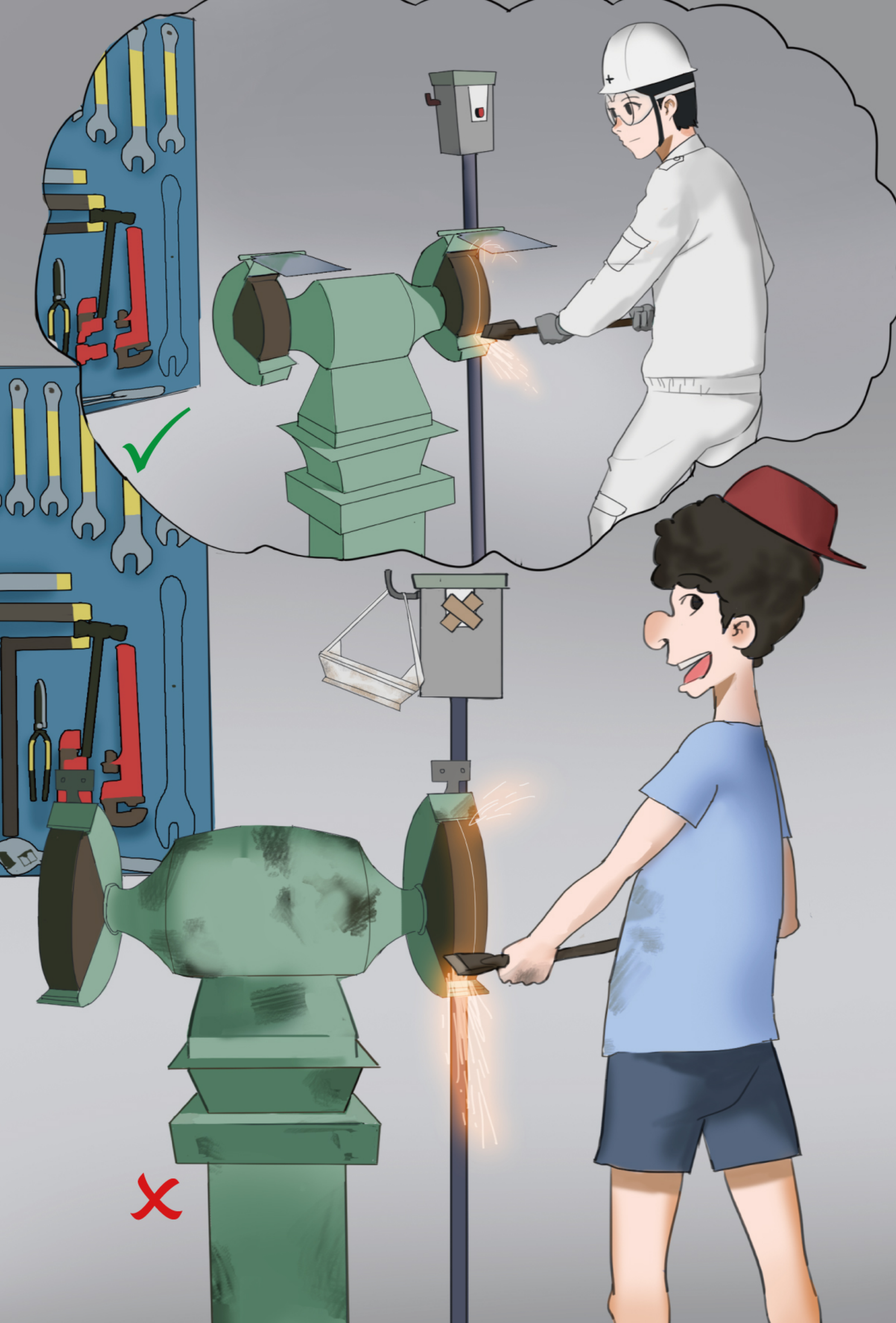
Mooring operation as a rather routine task to perform onboard can often expose seafarers to great danger. Incorrect or reckless operations have caused numerous incidents of death and injuries. Statistics suggest that of all the casualties, 53% are caused by parted ropes and 42% by ropes jumping off drum ends or bitts.

### Root cause analysis:

- Mooring equipment is not properly maintained and ropes are in poor condition;
- Crew unconsciously stand in the Snap-back Zone or the rope bight and are not warned timely;
- Junior or inexperience crew members are involved in the mooring operation;
- Officer in charge gets distracted for being involved in the operation and the command is not effectively practiced.

### Good Practice

1. Keep mooring ropes and equipment in good condition; frayed and split ropes to be replaced timely;
2. Planning and risk assessment to be conducted carefully and properly in advance;
3. Ensure anti-slip area painted and marked properly on deck;
4. Identify the Snap-back Zone correctly to warn the crew and restrict entry of irrelevant personnel;
5. Flake the ropes in an orderly layout prior to port arrival;
6. Never step in the rope bight, and extra caution should be exercised on tight ropes;
7. Avoid handling multiple ropes at the same time;
8. Officer in charge must keep monitoring the operation both onboard and ashore to provide involved crew and mooring men with timely safety reminders.



### 3. Using Tools

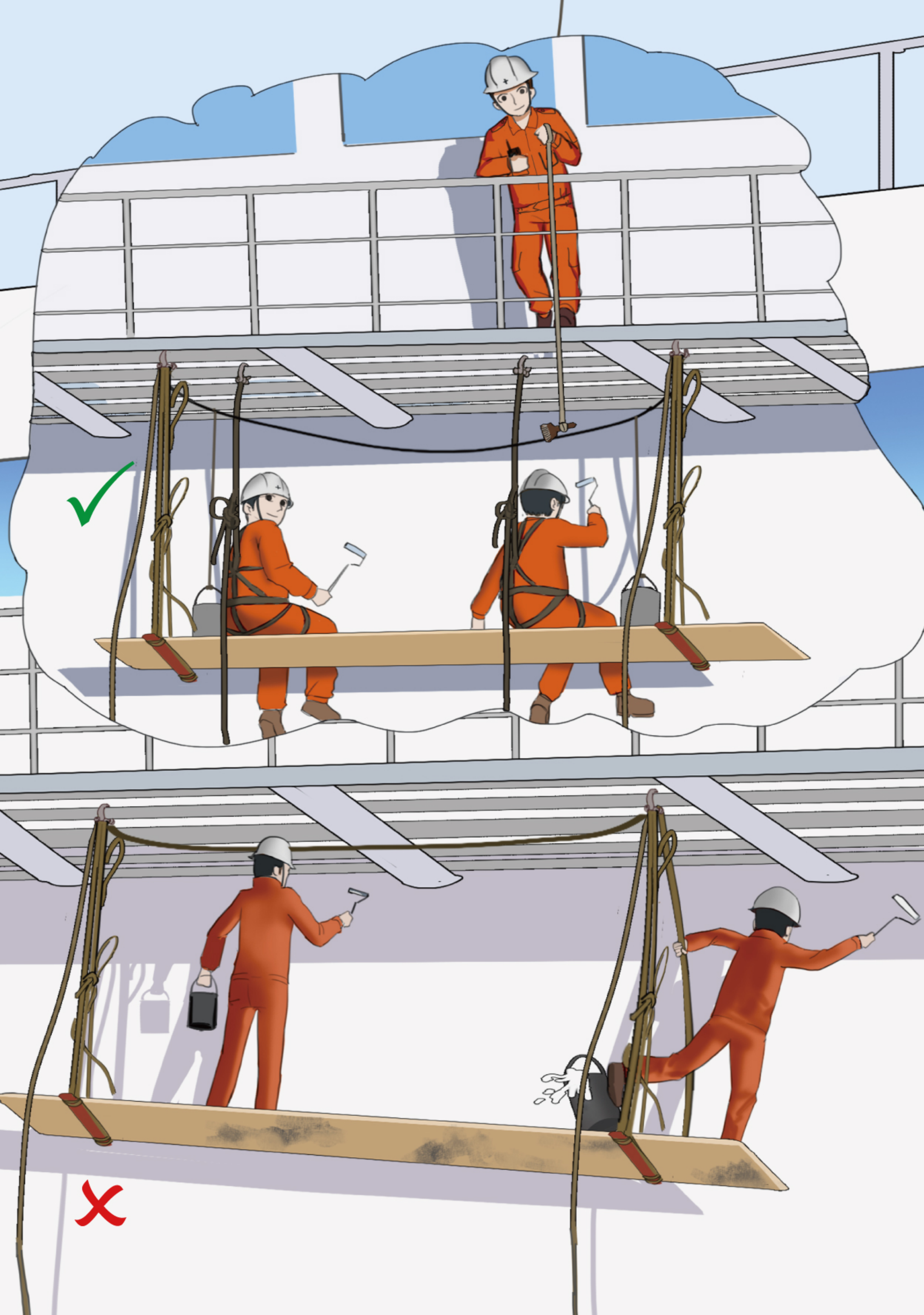
Eye, chest, and hand injuries arising from incorrect usage of power tools on ships have sometimes been fatal. Typically seen are eye injury incurred by flying objects, cutting injury and electric shock. With proper precautions taken, most of such injuries can be avoided.

**Tools used on ships include both portable tools and workshop machine tools. Reasons for potential safety hazards can be:**

- Tools are not properly operated or maintained;
- PPE such as goggles are not used;
- Failure of safety protection device;
- Malfunction of emergency stop button.

#### Good Practice

1. Maintain all the tools and machines properly; replace potentially hazardous tools if there are any;
2. Make sure good understanding of operation procedures and never start a power tool if you don't know how to stop it;
3. Never fasten the switch of portable tools with wires or clips;
4. Shut down the power before replacing drill bits and grinding wheels or attempting any repair;
5. Always wear PPE and make sure safety protection device is in place. For belt driving machines, belt guards should be installed to ensure safety;
6. Only apply fuses fitting the minimum serviceable rating of the power tools onboard;
7. Select proper illumination in workshops to prevent stroboscopic effect of fluorescent lights where rotating machines may appear to be stationary;
8. No flying hair and loose clothes while working.



## 4. Working Aloft/Outboard

Working aloft/outboard is always considered of high risks. Incidents reported over the years normally result from poor arrangement, inadequate risk assessment and weak safety awareness among the crew.

### A step wrong and you may fall, mainly because:

- Safety precautions are not properly taken;
- The crew is not familiar with the operation when working aloft;
- Gears and ropes involved are not well maintained.

### Good Practice

1. All equipment, especially wooden seats, platforms and ropes to be used for the job shall be thoroughly inspected;
2. Risk assessment to be carried out and work permit issued whenever required;
3. Inform the engine room to reduce emission of steam and smokes for work near the funnel as sudden outlet of gas and dust may cause harm to the operator;
4. Notices/placards prohibiting the operation shall be placed at all controls of ships whistle, radars, radio device as applicable;
5. The area below the workspace should be cordoned off to protect passersby from falling debris/accidental dropping of objects;
6. Proper PPE such as anti-slip shoes and safety harness shall be donned at all time; safety nets shall be in place if necessary;
7. Personnel working aloft/outboard should have adequate experience or accompanied by an experienced person, seafarers with acrophobia shall not be involved;
8. Both hands should be free for safely ascending and descending a ladder; tools/equipment should be securely housed in tool belts/bags or hoisted to the place of work in secure containers; throwing tools or carrying tools in pockets should be avoided;
9. When working on a portable ladder or a scaffold, make sure it's properly secured and assistance is provided. Do not lean away too far from the ladder, it's easy to get overbalance;
10. Do not work outboard whilst the vessel is underway; wear a life jacket and have lifesaving appliances including lifebuoys and rescue boat ready for immediate use;
11. Remove all the equipment from the site and inform concerned personnel to restore warning notices/isolated systems to normal condition once the job is done.



## 5. Slips and Falls

Slips and falls arising from both working and living onboard can be serious, especially on steel structured constructions. There are chances of injuries to head, face, shoulders, back and legs, and in worse cases, bone fractures and even loss of life. The injured may get infected and the condition may aggravate without timely treatment.

The threat lies at a number of places onboard, such as galleys, stairs, showers, chambers, decks, cargo holds, lashing platform and enclosed spaces. In addition, seafarers required to act immediately upon an urgent command or a deadline are subject to surging risks of slips, trips and falls.

### Good Practice

1. Always wear PPE and do not wear casual shoes or slippers while working; wandering on the deck or outside accommodation in slippers is strictly forbidden;
2. Take safe access on the main deck and mind every step on the stairs;
3. Ensure tidiness of the working area and clean grease and other slippery materials off the ground once the work is done;
4. Always return tools and equipment to where they belong and do not left them scattered on the ground or blocking the passageway;
5. Identify working areas that may pose the hazards of slipping and falling with warning signs;
6. A winter deck and stairs may get slippery as green water ice up. Remove ice on routine walkways in time and avoid unnecessary activities on the deck.



## 6. Hits and Crashes

Injury occurs to seafarers when they either hit something or hit by something. They may bump into pipes, ladders, cabin doors, hatches and other extended parts if they don't have a clear sight. Such incidents are most likely to happen in restricted areas, enclosed spaces and dark places, leading to minor injuries on one's head, legs and back.

However, incidents where seafarers are hit by moving objects onboard or ashore may have more serious consequences. Colliding with ship and shore cranes, hatch covers, mooring lines, lashing fittings, fire doors, watertight doors and the like can be fatal.

### Good Practice

1. Always wear PPE and hazard warning vest properly for work;
2. Identify all the extended parts and hazardous structure onboard with warning signs;
3. Ensure adequate lighting in working areas;
4. Fix all the moving parts on the vessel;
5. Designate an official in charge for critical tasks and build warning lines around defined working area;
6. Operate watertight and fire doors during calm periods in heavy weather to avoid slamming;
7. Establish a standard working procedure including the working language and standard gestures to deploy;
8. Assign sufficient men to look out for work at restricted areas.



## 7. Heavy Lifting

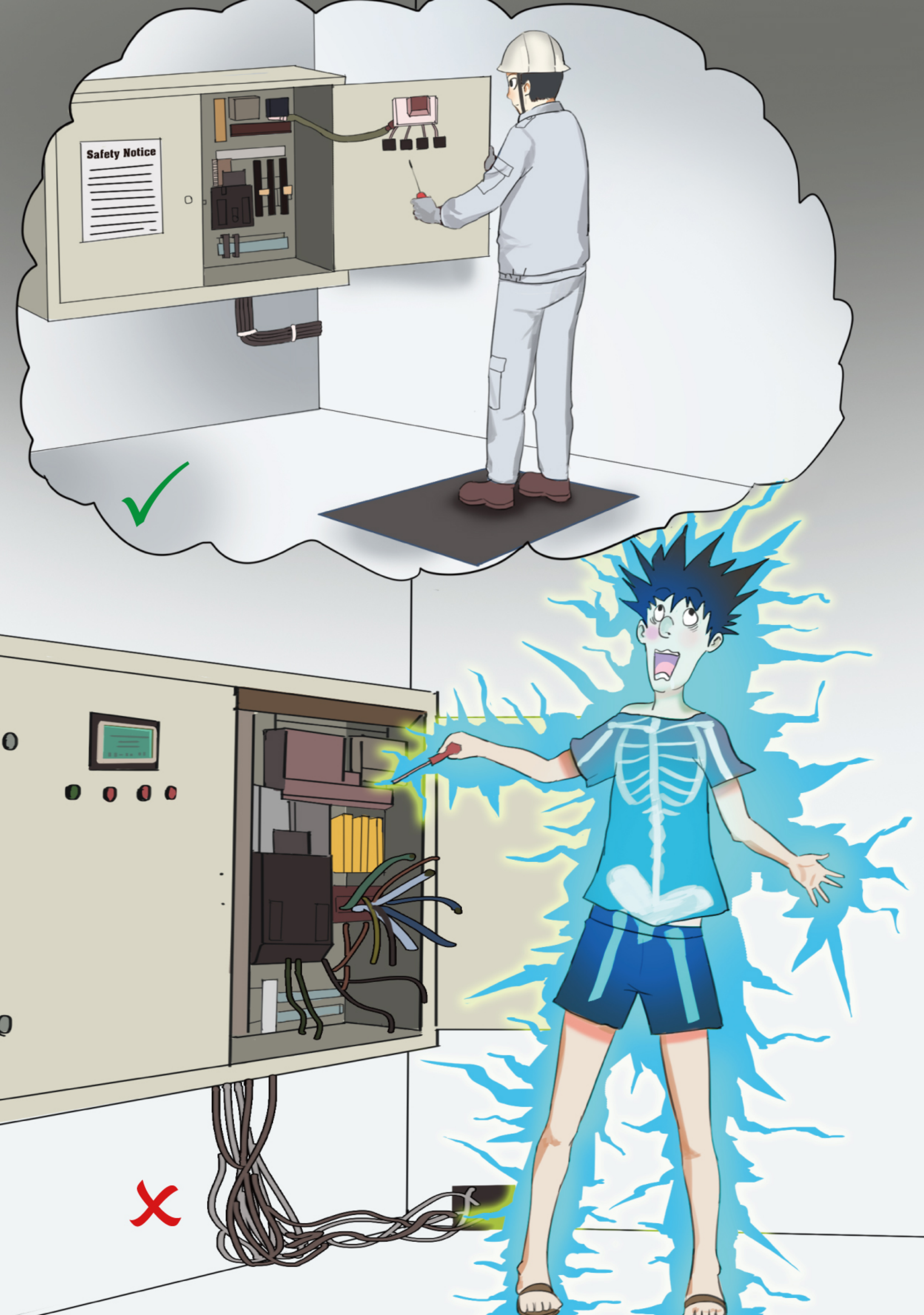
Lifting heavy loads is one of the routine tasks on board ships, often incurring damages on seafarers' back muscles, ligaments and bones. Claims on back injuries make up 25% of personal injury claims handled by P&I Clubs. Moreover, lifting loads beyond one's capability can trigger slips, trips and falls, as well as damage and loss of properties.

### Reasons for such injuries:

- Frequent work overload for seafarers;
- Seafarers holding the body posture for a long time or in high frequency;
- Complicated structures onboard restricting the working spaces;
- Slippery floor with obstacles scattered on the ground;
- Crew members are instead challenged to lift the loads while the crane and derrick are not applicable in heavy weather;
- Short of hands due to downsize of crew members.

### Good Practice

1. Use cranes or lifting aids to move heavy loads whenever possible, especially for valuables. If not, take apart the loads in smaller pieces and move for multiple times;
2. Be careful that valuables may fall into the water when carried manually through the gangway or the Jacob's ladder;
3. Make sure the way is not slippery or blocked with sufficient light provided;
4. Check around the loads for any sharp object like nails, wooden spikes or iron pieces before attempting the lift;
5. Wear properly PPE including gloves, helmets and slip resistant footwear;
6. Do not lift anything that you think is too heavy or lift above the level of your sight;
7. Avoid putting all the strains on your lower back. Get up and down slowly and steadily;
8. Designate a person to coordinate teamwork – do it at the same time and move together in order;
9. Avoid lifting loads up or down the stairs; ask for help and use straps if you have to do so.



## 8. Electrical Shock

Electric current passing through the human body may result in injuries of different levels. Electric shock in welding and injuries in contact with electric equipment are two major categories of electrical hazards on board ships.

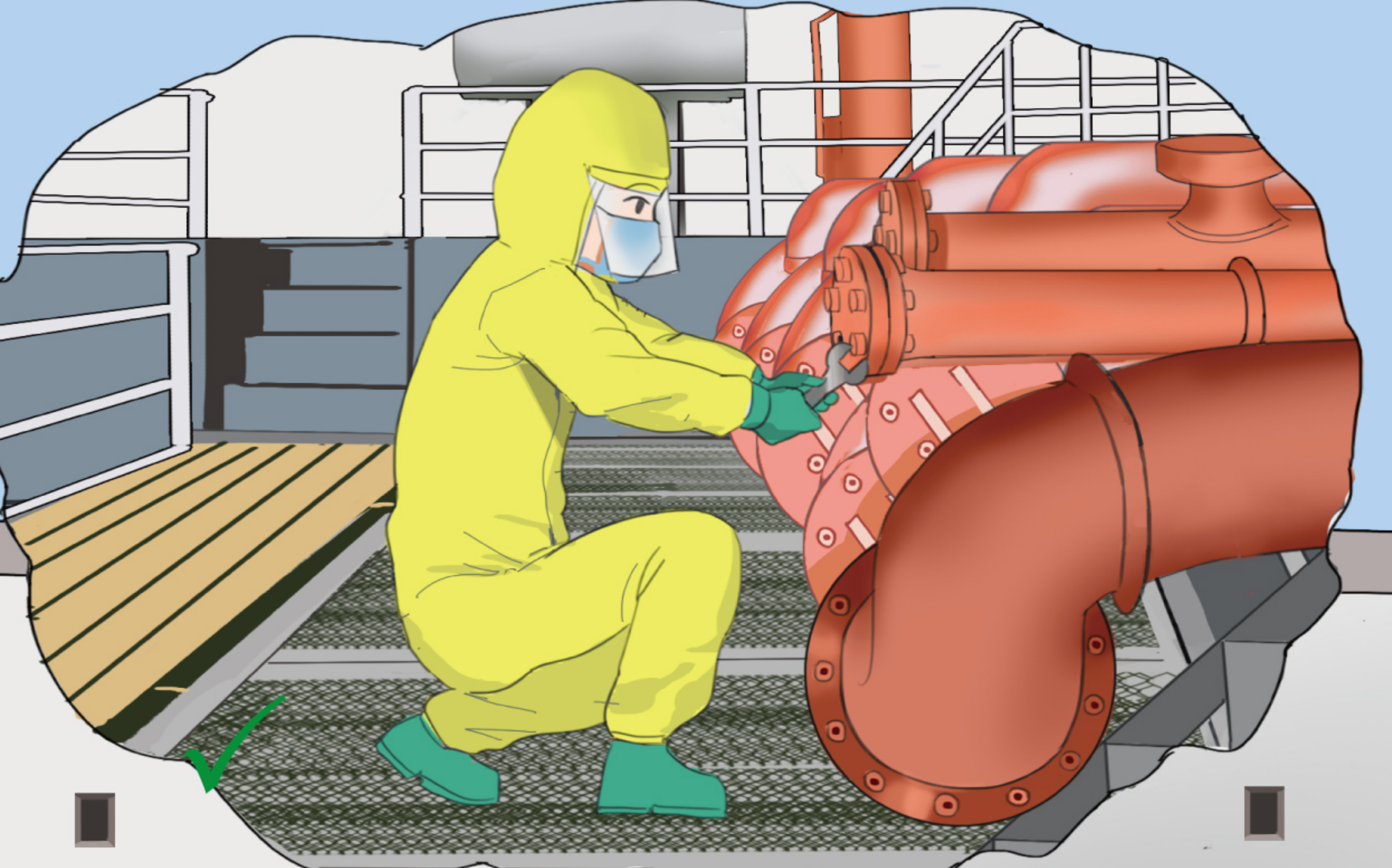
### Good Practice

#### Operating welding equipment:

1. Check the welder case for ground connection and involve electricians for the installation and removal of power supply;
2. Electrical welding equipment should only be operated by qualified technicians. Check equipment carefully before use for proper functioning of safety devices and always wear PPE;
3. Make sure insulation of cables is intact and the welding handle is firmly connected. Do not deal with a cable when it is live and pay extra attention to cables in humid weather or during rain;
4. Always wear dry or insulated gloves and use electrode holders when replacing welding rod. Never touch the welding rod by hand;
5. Adopt DC (direct current) welding onboard and install over-voltage protection if permissible;
6. Check insulation regularly to prevent primary and secondary breakdown which can cause electrification of the welder case.

#### Operating electric equipment:

1. Electric equipment shall be dismantled or repaired only by a qualified electrician and his supervisor; all warning signs shall be put up/down only by designated personnel;
2. Measure regularly insulation of all electric equipment, especially those on forecastle and outer deck, and keep them in good condition;
3. Find out how exactly the electric equipment works before inspecting or repairing it;
4. Make sure deck cable pipe is well maintained. Close the panel box to prevent short circuit as a result of water ingress;
5. Assume all electric equipment to be live and never touch them by hand. Use the back of your hand if you have to;
6. In case of any electrical equipment failure, the power shall not be switched on until the cause is ascertained and the fault is eliminated;
7. Do not plug in a new equipment without knowing how it works and how to use it.

**SAFETY + FIRST**

## 9. Handling Chemicals

Marine hazardous chemicals include explosives, compressed and liquefied gasses, flammable gases, flammable solids, self-igniting substances, substances that are flammable in contact with moisture, oxidizers and organic oxides, toxic chemicals and corrosive substances. Exposure to those chemicals may cause injuries including acute intoxication, suffocation, burns and frostbite.

### Good Practice

1. Establish standard ship-shore safe operation procedures with strengthened equipment inspection, and conduct hazard identification and risk assessment to set up reasonable risk control plans;
2. Provide crew members with training on properly handling chemicals to raise their safety awareness;
3. Wear PPE correctly as per requirements; have your eyes, nose and mouth covered to prevent exposure to chemicals like strong acid and alkali;
4. Make sure of good ventilation to avoid inhaling any chemical and solvent vapours when handling chemicals with irritating odor and toxic properties, such as H<sub>2</sub>S, NO<sub>2</sub>, Cl<sub>2</sub>, Br<sub>2</sub>, CO, SO<sub>2</sub>, SO<sub>3</sub>, HCl, HF, concentrated sulfuric acid, fuming sulfuric acid and concentrated HCl;
5. No smoking or eating on deck; non-explosion-proof lighting and portable electric are prohibited in areas where flammables and explosives exist.



## 10. Fighting Fatigue

Seafarers influenced by heavy work demands and poor living environment are prone to experience fatigue, a physical and mental disorder that persists over time and significantly affects their behavior and wellbeing. Over 80% of marine incidents are caused by human factors, among which fatigue is a major contributor. Severe accidents and pollutions may happen if the navigator's ability to concentrate on lookout, to judge and respond to emergencies is compromised.

### Main causes for fatigue onboard:

- Lack of sleep under stress and excessive workloads;
- Disturbed sleep due to noises, vibration and ship rolling/pitching;
- Seafarers feeling low.

### Good Practice

1. Ensure compliance with relevant maritime regulations including the minimum rest hours and the maximum working hours;
2. Improve living conditions onboard to ensure good meal and quality sleep for seafarers;
3. Employ scientific management practice to schedule working and rest time reasonably with full consideration to work demand and seafarers' competence;
4. Consider breaking up tedious and challenging work into less demanding tasks if possible, and try performing potentially dangerous work in the daytime;
5. Ensure shipboard conditions including heating, air conditioning, ventilation, lighting and noise levels are well maintained;
6. Encourage social life and good communication among seafarers to prevent disputes. Take appropriate entertainment and do not spend too much time on computers and cellphones or playing poker;
7. Develop crew awareness on keeping a healthy lifestyle for the good of themselves, maintain good habits including regular exercises, timely relaxation, nutritional intake, and avoid smoking and excessive drinking;
8. Keep an accurate record of crew working and rest hours so that the managers can get a full understanding of crew workloads and take targeted measures.



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This guide is intended for general guidance only. It has been translated into English from its original version in Chinese. Where the English translation contradicts with the Chinese, the Chinese version shall prevail.

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