Chapter one

General Workshop Safety Rules

Workshop

- **What is workplace**
  A workplace is anywhere work is done, or is to be performed by a worker, person or group of persons conducting an undertaking or business.
- **Components of workplace**
  Components of workplace refers to both the physical and environmental factors that constitute a workplace and include;
  - Physical objects/hardware (such as machinery, furniture, structures etc.), human being (operators, workers, inspectors and their team, visitors etc.)
  - Environment (operating environment).. a common denominator within the workplace is the environment.

Manufacturing is backbone for industrialized nations, workshop is small scale manufacturing process.

Basic working knowledge leads for the following understanding:

- Different engineering materials,
- Tools & equipment's,
- manufacturing processes,
- basic concepts of electromechanical controls of machine tools,
- production criteria’s,
- characteristics and uses of various testing instruments and measuring or inspecting devices for checking components or products manufactured in various manufacturing shops in an industrial environment.

It also describes and demonstrates the use of different hand tools (measuring, marking, holding and supporting tools, cutting etc.), equipment's, machinery and various methods of manufacturing that facilitate shaping or forming the different existing raw materials into **suitable and usable forms**.

Plant layout

Plant layout is such a systematic and efficient functional arrangement of various departments, machines, tools, equipment and other supports services of an industrial organization

It will facilitate and smooth processing of the proposed or undertaken product in the most effective, most efficient and most economical manner in the minimum possible time.

Definition of Safety

- **Safety** in its simplest form is a state of being at little or no risk of injury resulting from a harmful external impact, inhalation, or contact.
- It is a holistic approach to a state of wellbeing that requires people to feel they are free from being harmed in addition to actually being safe.
- It is an attitude, a form of mind of the workers, if it is good attitude it crates good working habit.

Objectives of Safety

The objectives of workshop or industrial safety are as follows:

1.Safety is needed to check all the possible chances of accidents for preventing loss of life and permanent disability of any industrial employee, any damage to machine and material as it leads to the loss to the whole establishment.

2. It is needed to eliminate accidents causing work stoppage and production loss.

3. It is needed to prevent accidents in industry by reducing any hazard to minimum.

4. It is needed to reduce workman’s compensation, insurance rate and all the cost of accidents.

5. It is required to educate all members regarding the safety principles to avoid accidents in industry.

6. It is needed to achieve better morale of the industrial employees.

7. It is required to have better human relations within the industry.

8. It is needed to increase production means to a higher standard of living.

ACCIDENTS AND THEIR TYPES

- The accidents are the mishaps leading injury to man, machines or tools and equipment and may cause injury and result either death or temporary disablement or permanent disablement of the workers.
- There are various types of common accidents needing due attention to prevent them which

are as follows:

1. Near Accident

An accident with no damage or injury is called near accident.

2. Trivial

An accident with very less damage is called trivial.

3. Minor Accident

It is an accident with damage and injury more than trivial.

4. Serious Accident

An accident with heavy damage and lot of injury is called serious accident.

5. Fatal

It is an accident with very heavy damage. There may be loss of lives also.

Effect of Accidents

(A)Effect on the owner of factory

direct and indirect cost

(B) Effect on worker

(C) Effect on society

CAUSES OF ACCIDEENTS

The accidents may take place due to **human causes**, **environmental causes and mechanical causes.** These causes are discussed below.

Human Causes

1. Accidents may occur while working on unsafe or dangerous equipment's or machineries possessing rotating, reciprocating and moving parts.
2. Accidents occur while operating machines without knowledge, without safety precautions, without authority, without safety devices.
3. Accidents generally occur while operating or working at unsafe speed.
4. Accidents may occur while working for long duration of work, shift duty etc.
5. Accidents commonly occur during use of improper tools.
6. Accidents may occur while working with mental worries, ignorance, carelessness, nervousness, dreaming etc.
7. Accidents occur because of not using personal protective devices

Environmental Causes

1. Accidents may occur during working at improper temperature and humidity causes fatigue to the workers so chances of accidents increases with workers having fatigue.
2. The presence of dust fumes and smoke in the working area may causes accidents.
3. Poor housekeeping, congestion, blocked exits, bad plant layout etc. may cause accidents.
4. Accidents occur due to inadequate illumination.
5. Improper ventilation in the plant may also leads to industrial accidents.

Mechanical Causes

1. Continued use of old, poor maintained or unsafe equipment may result in accidents.
2. Accidents commonly occur due to use of unguarded or improper guarded machines or equipment's.
3. Unsafe processes, unsafe design and unsafe construction of building structure may lead to accidents in the plant.
4. Accidents occur due to improper material handling system and improper plant layout.
5. Accidents may occur due to not using of safety devices such as helmets, goggles, gloves, masks etc.

However the other general causes of accidents in workshops are listed under:

1. Because of ignorance to work with equipment's, hand tools, cutting tools and machine tools.
2. Operating machine and equipment's without knowledge.
3. Extra curiosity to work without knowing.
4. Due to poor working conditions.
5. Because of speedy work.
6. Improper method to work.
7. Due to use of improper tools.

8. Because of lack of discipline.

9. Uninterested in work.

10. Due to carelessness.

11. Due to over confidence.

12. Bad working environment.

13. Because of excessive over times duty by industrial workers.

14. Dangerous materials with which to work.

15. Lack of cleanliness.

16. Due to poor planning.

TYPES OF SAFETY

The fo1lowing general types of safety are considered in the workshop

1. Safety of self.
2. Safety of job.
3. Safety of machines tools.

General Safety Precautions while Working in a Workshop

1. One should not leave the machine ON even after the power is OFF and until it has stopped running completely. Someone else may not notice that the machine is still in motion and be injured.

2. Operator should not talk to other industrial persons when he is operating a machine.

3. One should not oil, clean, adjust or repair any machine while it is running. Stop the machine and lock the power switch in the OFF position.

4. One should not operate any machine unless authorized to do so by the authorize person in the shop.

5. Always check that work and cutting tools on any machine are clamped securely before starting.

6. The floor should be kept clean and clear of metal chips or curls and waste pieces. Scraps and chips or curls may cut through a shoe and injure the foot.

10. One should not try to stop the machine with hands or body.

11. Only trained operator should operate machine or switches as far as possible.

12. Always take help for handling long or heavy pieces of material.

13. Always follow safe lifting practices

14. No one should run in the shop at work time.

15. Always keep your body and clothes away from moving machine parts. Get first aid immediately for any injury.

16. Never talk to anyone while operating the machine, nor allow anyone to come near you or the machine.

17. Stop the machine before making measurements or adjustments.

18. Operator should concentrate on the work and must not talk unnecessarily while operating the machines.

19. Never wear necktie, loose sweater, wristwatch, bangles, rings, and loose fitting clothing while working in workshop.

20. Always wear overcoat or apron

22. Make sure that all guards are in their place before starting to operate a machine.

23. Do not attempt to operate a machine until you have received operating instructions.

24. Be thoroughly familiar with the ‘stop’ button and any emergency stop buttons provided on the machines.

25. Remove burrs, chips and other unwanted materials as soon as possible. They can cause serious cuts.

26. Do not leave loose rags on machines.

27. Wash your hands thoroughly after working to remove oils, abrasive particles, cutting fluid, etc.

28. Report all injuries to the foreman, howsoever small. Cuts and burns should be treated immediately.

29. Keep the work area clean.


HEXARMOR









Safety Precautions while Working with Different Hand Tools

(A) Screw Drivers

1. When working on electrical equipment use only a screw driver with an approved handle.
2. One should wear goggles when re-sharpening screw-driver tips.
3. Screws with burred heads are dangerous and must be replaced or the burrs removed with file or an abrasive cloth.
4. One should use the correct tip of screw drivers while screwing. Too arrow or too wide tip will damage the work.



Screw Drivers

(B) Wrenches

1. One should not hammer a wrench to loosen a stubborn fastener, unless the tool has been specially designed for such treatment.
2. Always pull on a wrench. One can have more control over the tool if pulling instead of pushing and there is less chance of injury.
3. It is dangerous practice to lengthen the wrench handle for, additional leverage. Use a larger wrench.
4. Choose a wrench that fit properly. A loose fitting wrench may slip and round off the corners of the bolt head and nut.

(C) Hammers

1. One should not operate the hammer unless its head is tightly fixed to the handle.
2. Place the hammer on the bench carefully. A falling hammer can cause serious foot injuries.
3. Never strike two hammers together. The faces are very hard and the blow might cause a chip to break off.
4. Never hold the hammer too far on the handle when striking a blow.
5. Unless the blow is struck squarely, the hammer may glance of the work.

Safety Precautions while Working with Different Cutting Tools

(A) Files

1. One should always use a file card to clean the file. Never use your hand. The chips may penetrate in hand and cause a painful infection.
2. One should not use a file without a handle.
3. Short burns formed in filling may cause serious cuts. Always use a piece of cloth to wipe the surface being field.
4. Files are highly brittle and should never be used as a hammer otherwise the file will break.

(B) Chisels

1. One should always hold the chisel in such a manner that the hammer blow may not miss the chisel to injure your hand.
2. Edges of metal cut with the chisel are often sharp and cause bad cuts.
3. Flying chips are dangerous. Wear transparent plastic safety goggles and use a shield, when using a chisel, to protect yourself and those working near you.
4. Sharp edges of chisels are removed by grinding or filing.
5. Mushroomed head of the chisel should be removed by grinding.

(C) Saws

1. One should not test the sharpness of the blade by a running a finger across the teeth.
2. One should not brush away the chips with your hand.
3. All hard blades can shatter and produce flying chips. Wear your toggles.
4. One should not be sure that the blade is properly tensioned.
5. Store the saw so that you will not accidentally reach into the teeth when you pick it up.
6. If the blade breaks while you are on cutting stroke, your hand may strike the works and cause an injury. Therefore saw operator should work carefully.

(D) Reamers

1. One should remove all bars from the reamed holes.
2. Never use your hands to remove chips and cutting fluids from the reamer and

(E) Taps and Dies

1. One should use a brush to clean away chips formed by hand threading. Never use your hand.
2. One should always wear goggles if the tap, die or threaded piece is to be cleaned with compressed air.
3. Tap operator should also be careful that other person working in the area also wearing goggles.
4. Handle broken taps as you would handle broken glass. They are sharp edges and are dangerous to handle.
5. Wash you hands after using cutting fluid. Skin-rashes caused by some cutting fluids can develop into a serious skin disorder if they are left on the skin for a long period.
6. Take care of any cuts immediately. Infection may occur when injuries

(F) Abrasives

1. If the lathe is used for polishing make sure that the machine is protected from the abrasive grains that fall from the polishing wheels during polishing. They can cause rapid wear of the precision parts.
2. One should not rub fingers or hand across a piece that has just been polished by abrasive.
3. Cuts and burns should always be treated immediately by using first aid facility.
4. One should remove all abrasive particles by washing them thoroughly after the polishing operation.