Safety in Workshop

Introduction

Human beings are initiative. Some invent ways of making equipment safe to use and procedures for safe use of equipment while others invent ways of circumvent the safety features and experimenting dangerously with the equipment. While carrying out manufacturing activities in workshop we are involved in operating different machines equipment's and tools. It is very essential for any one to know the basic needs of safety in workshop to prevent himself/herself from hazardous accidents and fatal injuries. Improper handling of machine and equipment can also damage machine and equipment itself. No matter how carefully designed and constructed, none of the machines used in manufacturing process is completely safe. Safety is ensured only when the machine is properly maintained, operated and used under normal conditions. The hazards associated with workshop work require special safety considerations. Whether you work in metal shop, wood shop, automotive shop, the potential hazards for personal injury are numerous. Industries are giving more attention towards safety measures. In US, Jahn Foundry

corporation, it has been reported in 1999 that due to catastrophic dust explosion in the foundry shell mold building has resulted in the death of 3 workers and serious injuries to 9 others. US Labor Departments Occupational Safety and Health Administration (OSHA) cited the company for a total of forty safety and health violations and assessed a fine of up to $ 150, 000.

In India as per the Employees State Insurance Act (ESI), *" A personal injury or occupational disease caused to a worker by accident arising out of and in the course of his employment for which compensation is recoverable by a workman from his employer under the workman compensation act."* These Government rules, regulations and company policies alone cannot prevent accidents. *Safety is not just the responsibility of safety officer.* It should be clearly understood that *safety is everyone's responsibility*. In this chapter we discuss few of the possible accidents/ hazardous accidents possible in different manufacturing processes. It is not possible to detail all the risks involved with shop work. However, it is possible to foresee many hazards by carefully planning each job. *To prevent accidents, utilize your knowledge and common sense.* Evaluate potential sources of injury, and attempt to eliminate any hazards.

Table 1 highlights common shop hazards, its causes and sources.

Table 1 Common shop hazards, causes and its sources

Potential Hazards	Causes	Hazard Sources
-Welding torches -Flying debris (chips) -Noise -Slipping -UV radiation -Shock -Sparks -Toxic Substances - Dust	Fire explosions, Fire hazards Burn injuries Hearing may get affected Injury to the operator Harmful to retina of the eye Electrical shock to operator Skin Burns Breathing problem, overall health may also get affected *Silicosis* which may permanently disable a person	- Oxygen, acetylene, air - All metal cutting operations - Power presses, Heavy duty machines - Oil, Grease etc. - Welding - Un ground tools, equipment - Welding, Grinding - Cleaning solvents, degreasers etc. - Foundry operations

The ones listed in this text are incomplete ones and no claim is made that the list is complete. Since the safety requirements are different for different manufacturing processes, we discuss these topics under different headings of different manufacturing processes. The topics are discussed in the context of personnel safety, machine and equipment safety and product safety.

General Safety Rules (Do's And Don'ts)

Following guidelines can be used as General safety rule in workshop.

Do's

- Use protective clothing, goggles, ear muffler etc. while doing operations.
- Do not wear sandals or open-toed shoes in workshop.
- Know the hazards associated with your work, its causes and remedies before you start the work.
- Be sure you are fully educated on the proper use and operation of any machine, equipment or tool before beginning a job.
- Do the work only if you are authorized.
- Inspect your tools, equipment. Use the right tool to complete a job safely, quickly and efficiently.
- Practice good house keeping. Keep your work places clean.
- Keep everything in its place. *Place for everything, everything in its place.*
- Switch off the machine when its not in use.
- All accidents, no matter how minor in your minds, must be reported to the instructor immediately.
- When in doubt consult your instructor, he knows better than you.

Don'ts

- Do not operate power tools when you are sick, fatigued or taking strong medication. If you feel uncomfortable, stop operating the machine and report immediately to instructor.
- Do not wear watches, bangles and loose fitting cloth while working on machines.
- Do not wear contact lenses in the shop floor. Contact lenses do not provide eye protection and may reduce the effectiveness of emergency eyewash.
- Do not attempt to remove chips by hand.
- Do not touch the work piece in the bare Hand while doing inspection or removing part.
- Do not clamp/unclamp the work when the machine is running.
- Do not use electrical machines without proper grounding.
- Do not rely on strength to perform an operation. The correct tool and proper method doesn't require excessive strength. If undue force is necessary, you may be using the wrong tool.

Safety Rules

These rules represent basic minimum safety instruction to be followed in the workshop while using different tools and equipment. Additional safety rules, precautions to be taken and procedures to be followed will be covered in the next section.

Use of Tools: Every tool has a specific purpose. Use it only for that purpose. Accidents occur when the tools are misused. *Use the right tool to complete a job safely, quickly and efficiently.*

Chisels: Keep both hands on the chisel at all times. Cut away from you. Never place chisels or other sharp tools in your pocket. When placing chisels on the bench, be sure that the sharp end doesn't overhang. When carrying a chisel hold the sharp end down.

Planes: Do not test the set of a plane by running your finger over the edge. Lay the plane on its side and do not let it overhang the bench top.

Hand Saws: When beginning a cut, place the thumbnail against the side of the blade and draw the saw backward a few strokes until kerfs is made. Move the thumb away and press down firmly to prevent the saw from jumping out of the cut.

Vises: Virtually all work is held in a vise or with clamps when using hand tools. Leave the vise loosely closed with handle vertical.

Nails: A nail protruding from a piece of work can be dangerous. Do not leave such piece on the bench or floor.

Handling of tools: Tools should be treated as fine instruments; never mistreated, tossed or thrown. Even though hand tool (hand tools are non-powered tools. They include axes, wrenches, hammers, chisels, screwdrivers, and other hand-operated mechanisms) injuries tend to be less severe than power tool injuries, hand tool injuries are more common. Because people take everyday hand tools for granted, they forget to follow simple precautions for safety.

The following causes the most common hand tool accidents:

- Failure to use the right tool.
- Failure to use a tool correctly.
- Failure to keep edged tools sharp.
- Failure to replace or repair a defective tool.
- Failure to store tools safely.

Power tools can be extremely dangerous if they are used improperly. Each year, thousands of people are injured or killed by power tool accidents. Common accidents associated with power tools include abrasions, cuts, lacerations, amputations, burns, electrocution, and broken bones. The following often causes these accidents:

- Touching the cutting, drilling, or grinding components.
- Getting caught in moving parts.
- Suffering electrical shock due to improper grounding, equipment defects, or operator misuse.
- Being struck by particles that normally eject during operation.
- Touching hot tools or work pieces.
- Being struck by falling tools.

Hammers: Select the proper hammer for the job; claw of wood, ball pen for metal, mallets and soft face hammers for delicate items.
Screwdrivers: When using a screwdriver select a tip that fits the slot, grip the work in a vise, and use both hands on the tool. Do not use screwdriver as chisel. Do not use chisel, knife as screwdriver.
Files: Never tap a file to clean it, use a brush or file card.

Clothing: All loose clothing and long hair should be tucked in or protected when working at a machine. Sleeves should be rolled up, watches and jewellery removed, shop aprons worn properly and all jackets and sweaters removed.

Eye Safety: Goggles must be worn when using any power equipment or performing any operation which endangers the eyes. Try never to rub your eyes while hands are dirty.

Portable Power Tools: Be sure that power cords and extensions are routed safely. Keep tools away from edges of benches.

Work Area: The shop work area must be as free of unnecessary books, clothing, chairs, stools etc. as possible to provide a safe working environment.

Tool use: Tools are normally stored in specific cabinets. As soon as you finish using a particular item it should e returned to the storage cabinet.

Power Tool Safety: Only one person operating a machine at any given time except when otherwise instructed. Observe safety island around each machine. Safety check all machines before applying power by seeing that there are no obstructions, that all adjustments have been made, and all parts tightened securely.

Moving Parts: Do not attempt to touch any moving part of a machine or work or attempt to measure work while it motion.