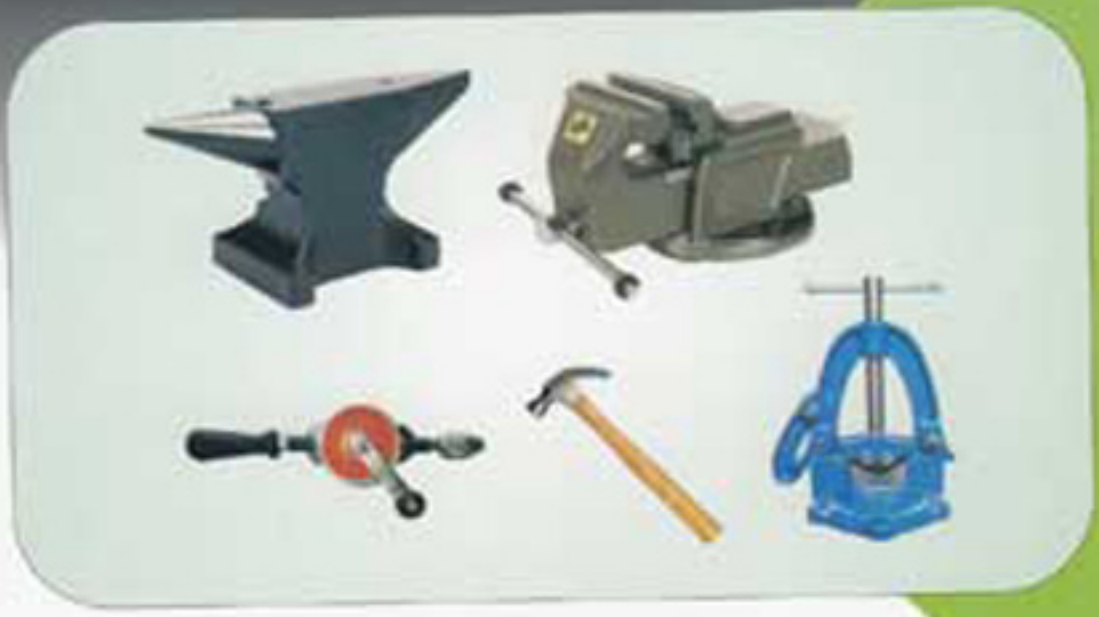
SEMESTER-I

FIRST YEAR DIPLOMA
Engineering and Technology

MSBTE's I SCHEME

WORKSHOP PRACTICE



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NIRALI PRAKASHAN
ADVANCEMENT OF KNOWLEDGE

Text Book Of

WORKSHOP PRACTICE

For

Semester - I

First Year Diploma in Mechanical, Production, Automobile, Fabrication Technology and Erection, Civil, Electrical, Chemical, Plastics Engineering

As Per MSBTE's 'I' Scheme Syllabus

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Preface ...

It is indeed a great pleasure and proud privilege for the authors to present this book on the subject "Workshop Practice" for First Year Diploma in Mechanical, Production, Automobile, Fabrication Technology and Erection, Civil, Electrical, Chemical, Plastics Engineering for Semester I.

This book is strictly written according to "New Revised 'I' Scheme Syllabus" of M.S.B.T.E. effective from June 2017.

In this book, the complete subject is explained in a lucid manner. Aim of this book is that the engineers and those in allied fields are able to know Basic Workshop Processes; Read and interpret job drawing; Identify, select and use various marking, measuring, holding, striking and cutting tools and equipments; Inspect the job for specified dimensions; Produce jobs as per specified dimensions; Adopt safety practices while working on various machines.

The authors express their sincere thanks to Shri. Dineshbhai Furia, Shri. Jigneshbhai Furia and All the staff of Nirali Prakashan especially Mr. Shashikant Patel, Mrs. Manasi Pingle, Mr. Akbar Shaikh and Miss Chaitali Takle for their non-stop efforts for making this book so excellent.

Suggestions and comments from teachers, professionals and students are most welcome, as these will help us to move towards excellence.

... Authors

Syllabus ...

1. General Workshop Practice

1.1 Safety Practices, Causes of Accidents, General Safety Rules, Safety signs and Symbols.

1.2 First Aid.

1.3 Fire, Causes of Fire, Basic Ways of Extinguishing the Fire, Classification of Fire, Class A, B, C, D, Firefighting Equipment, Fire Extinguishers and their types.

1.4 Workshop Layout.

1.5 Issue and Return System of Tools, Equipment and Consumables.

2. Fitting

2.1 Fitting Hand Tools: Bench Vice, Hammers, Chisels, Files, Hacksaw, Surface Plate, Punch, V-Block, Angle Plate, Try Square, Marking Block, Steel Rule, Twist Drills, Reamers, Tap set, Die set and their Specifications.

2.2 Operation of Fitting Shop Machineries – Drilling Machine, Power Saw, Grinder, their Specifications and Maintenance.

2.3 Basic Process: Chipping, Filing, Scraping, Grinding, Marking, Sawing, Drilling, Tapping, Dieing, Reaming.

3. Plumbing

3.1 Plumbing Hand Tools: Pipe Vice, Pipe Bending Equipment, Pipe Wrenches, Dies and their Specifications.

3.2 Pipe Fittings – Bends, Elbows, Tees, Cross, Coupler, Socket, Reducer, Cap, Plug, Nipple and their Specifications.

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3.4 Basic Process: Cutting, Threading.

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5.3 Operation of Wood Working Machineries – Wood Turning Lathe, Circular Saw, their Specifications and Maintenance

5.4 Basic Process – Marking, Sawing, Planning, Chiseling, Turning, Grooving, Boring.

6. Sheet Metal

6.1 Sheet Metal Hand Tools: Snip, Shears, Sheet Gauge, Straight Edge, L Square, Scriber, Divider, Trammel, Punches, Pliers, Stakes, Groovers, Limit Set and their Specifications.

6.2 Operation of Machineries in Sheet Metal Shops – Sheet Cutting and Bending Machine, their Specifications and Maintenance.

6.3 Basic Process – Marking, Bending, Folding, Edging, Seaming, Staking, Riveting.

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Chapter 1

GENERAL WORKSHOP PRACTICE

Contents

Objectives

- To understand the procedure for extinguishing the given type of fire.
- To understand the procedure to use the given firefighting equipment.
- To locate the specified equipment in workshop.
- Knowing the ways to maintain good housekeeping in the given situation.

1.1 SAFETY PRACTICES, CAUSES OF ACCIDENTS, GENERAL SAFETY RULES, SAFETY SIGNS AND SYMBOLS

Introduction

- It has been observed that a lot of accidents occur due to the lack of safety awareness. The result of those accidents is either the death or happening of temporary and permanent disability of the persons found in the accidents. For being safe in accident, preventive care can be achieved with the help of the following points:
  (i) Development of safe working conditions,
  (ii) Creation of safe work habits on a personalized basis,
  (iii) Promotion of the employee participation in the safety, and
  (iv) Corrective action when the safety rules are being ignored.
- To prevent accidents, safety rules have to be enforced to do the job safely.

1.1.1 Safety Practices

- The following common precautions should be taken while working in a carpentry shop in order to ensure safety for self, clothes, machines and tools etc.
  1. Loose clothing should always be avoided.

2. Tools which are not being used should always be kept in their respective places. They should not be allowed to scatter on the work place or bench.
3. While using chisels, take care that cutting is performed in the direction away from your body.
4. The tools should always be kept well sharpened since a blunt or dull tool is apt to slip and cause injury.
5. The shop floor should always be kept clean and free from debris and scraps, otherwise anybody may slip over it and fall.
6. Boards and other wooden pieces carrying nails should never be allowed to remain on the floor, otherwise anybody may unknowingly step onto them and the foot may be injured.
7. Most of the modern machines are equipped with proper guards for their moving parts and they should be fully utilized.
8. The floor area all around the machine should always be kept free from any obstructions.
9. No machine should be operated without the permission of the shop incharge.
10. Before starting a machine it should be ensured that the guards are in proper places and well secured.
11. While working on a circular saw, always avoid standing in a line with the plane of the rotating blade and always keep your hands at a distance from the blade.
12. Never try to feed the stock faster than cutting capacity of the machine and always use a push stick to force the end of the stock beyond the rotating wheel.
13. In working on a bandsaw adjust the guides properly.
14. Before starting cutting, allow the saw to attain the full speed.
15. Feed the stock directly against the moving band and do not press from sides.
16. In working on a lathe, the job should be properly held between centres, tool rest should be properly adjusted to correct height and close to the work, a correct spindle speed should be employed, goggles worn and the turning tools held firmly.
17. While working on a jointer never use a stock less than 30 cm in length, feed it in correct direction of grains keeping the hands away from the rotating knife and use proper guards.
18. In working on a spindle moulder, feed the work by holding it firmly and avoid use of stock that carries knots.

1.1.2 Causes of Accidents

- Accidents arise from unsafe behaviour and/or unsafe conditions. An important factor is the safety climate or safety culture of an organization. Safety culture concerns how workplace safety is managed, consisting of the shared attitudes, beliefs, perceptions and values among employees. Faulty equipment can also cause serious personal injuries, a common example is accidents from faulty ladders. If the rubber feet are absent, the base of the aluminum stile can slip suddenly on a hard floor and the user fall.

  Following are the some causes of accidents:

  (i) Fatigue
  (ii) Stress
  (iii) Slips
  (iv) Trips
  (v) Toppling objects
  (vi) Hazardous material
  (vii) Repetitive motion
  (viii) Lifting
  (ix) Workplace violence
  (x) Collisions

1. Fatigue

If someone is pushed -- or pushes herself -- beyond reasonable limits to stay on top of workload, the results often are physical and mental exhaustion. This translates to impaired judgment, slower reflexes in operating machinery or motor vehicles, a delayed response to emergency situations and inattention to details and instructions.

2. Stress

Job security, finances, health issues and anxiety about personal relationships all factor into the stress equation. When an employee's mind is too distracted by real or perceived threats, he is not only more likely to make mistakes that could cause injury but also invites an increased risk of a heart attack, stroke or hypertension.

3. Slips

Office kitchens and break rooms are common places for slips to occur because of the number of liquids that get splashed there and are subsequently not cleaned up. Linoleum, hardwood and tile flooring surfaces are particularly hazardous after they have been mopped or waxed. Another consideration is the type of footwear worn by employees.

4. Trips

Items left sitting out in a high-traffic corridor, extension cords that are not properly taped down and carpeting that has come loose, all are contributors to tripping employees and sometimes causing more than just stubbed toes. Poorly lit hallways and stairs are danger spots, too, because they obscure the ability to see what is underfoot.

5. Toppling Objects

If tall pieces of furniture such as bookcases and filing components are not securely anchored, an earthquake could cause them to pitch forward and dislodge their contents, putting nearby workers in peril. Workplace injuries also can be caused by heavy objects such as supplies and file boxes that are stacked on high shelves and are shifted precariously to the edge each time they are put back or the structure gets bumped.

6. Hazardous Materials

Protective clothing, eye wear and gloves are mandatory for employees whose jobs require them to be around hazardous materials, chemicals and toxic waste. Slip-ups in these rules can result in burns, explosions, respiratory diseases, blindness and skin infections.

7. Repetitive Motion

Carpal tunnel syndrome is a common occurrence for workers engaged in repetitive motion activities that put pressure on the median nerve, causing numbness and pain in the fingers, wrists and hands. Typists, key data operators and beauty salon employees are at particular risk for developing this excruciating condition.

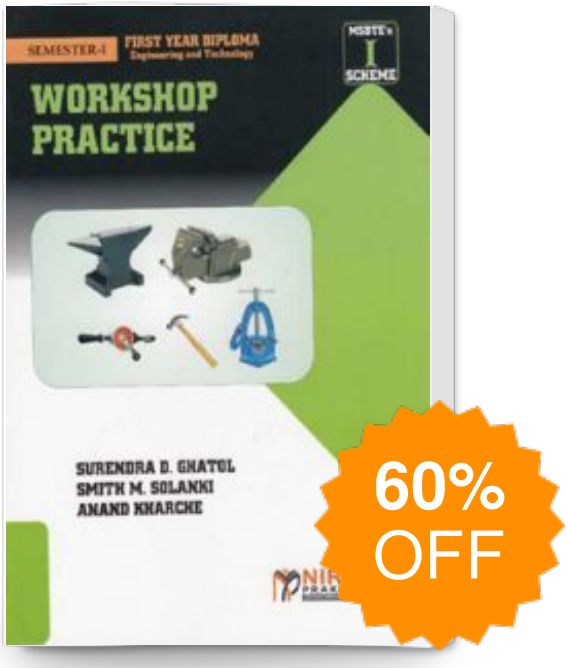
8. Lifting

Many back injuries and pulled muscles that occur in the workplace are the result of picking up something that is too heavy, not bending the legs, not asking a partner to assist or trying to lift or hold a heavy object above the shoulders.

9. Workplace Violence

Despite increased security measures and limiting office access to individuals who have a legitimate reason to be on the premises, innocent victims are often involved when estranged spouses, disgruntled former employees or even total strangers with a vendetta show up with an intent to commit harm. Managers and workers must likewise stay sensitive to suspicious mail or package phone threats and evidence of any security violations.

Workshop Practice



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