UNIT-1 Industrial Management

UNIT-2 Industrial Engineering

UNIT-3 Production Technology

UNIT-4 Electrical & Electronics Engineering

UNIT-5 Mechanics of Materials

UNIT-6 Heat Power Engineering

UNIT-7 Computer Applications

UNIT-8 Fluid Mechanics & Machinery

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"X" and "Y" Theory of Management

[illegible Tamil]

Management Styles. → contrasting one another

Theory 'x' & Y:-

X → work motivation. → [illegible Tamil]

Y → Management → → [illegible Tamil]

"Daglas mcGregor"

1960

Theory x:

Beliefs. 1. Little Ambition →

2. Avoid Responsibility →

3. Indivual goal oriented →

Theory X - Manger:

Employe → Less intelligent

Lazier

mangement. → Sustainable income
own self Interest.

Conclusion

Management → workers efficiently work under managers

Manager → All actions Should be traceable to Indivual responsible

Positive Negative.

Rewards punishment.

Management

To get work done through people is called management

Administration

It deals with finance and determination of goals and policies.

Organization

It is a process of of bringing together physical, financial and HR for achieving the goals.

MANAGEMENT THEORIES:

Tradition management

i. In – born quality
ii. As an art (trial and error)

Scientific management

i. By accurate
ii. Using techniques.

F.W. TAYLOR'S SCIENTIFIC MANAGEMENT:

i. F.W. Taylor is called as father of scientific management.
ii. In 1878 he joined as labours at Midvale steel company in USA
iii. Later in 1884 he become on chief engineer.

Objectives of job Evaluation

- It decides the Relative value of different Jobs.
- It helps to fix correct wage structure.
- It helps to fix Equal payment for all the jobs of Equal value.
- Find outs the authority and Responsibility for Each job.
- It Reduces the labour turn over by Providing job satisfication to Employees.
- It provides a base base for Recruitment and selection.
- It Provides a propel review of wage structure.

Merit Rating

- Merit Rating Evaluates the Persons.
- Merit Rating determines how much an Employer meets the job Requirements.
- Merit Fating decides about the rewards to be given to an Employee.
- It is also known as performance appraisal.

Objectives of merit rating

1. **Employee Performance**
    - Employee is informed about his performance level.
    - It lads self improvement.
    - It leads self improvement.
2. **Employee development**
    - Merit Rating find outs the drawbacks of individual Employee.
    - It helps to increase the training level.
3. **Incentives:-**
    - It helps to grant merit incentives to Employees.
4. **Promotion and Transfers**
    - It serves as a reliable tool for giving transfer, Promotion and lay off.
5. **Available quality of work force**
    - Management to know the quality of the Employees in company.

Factors affecting the wage structure

1) Cost of living
2) Demand and supply
3) Ability to pay

DEPRECIATION

Depreciation is the reduction is value of and asset (machine, building, equipment etc., Due to passage of time, because of certain causes. This is overhead expenditure.

Causes of depreciation:

The following are the causes of depreciation

- (i) Wear and tear
- (ii) Physical delay
- (iii) Obsolescence
- (iv) In-adequancy
- (v) Different maintenance

1. **Wear and tear:**
   Any assets, is kept to deteriorate when it is in use because of chemical and mechanical actions. This sort of deterioration, which can be rectified by proper repairs and renewals is known as wear and tear.
2. **Physical delay:**
   Even when assets (machine, building etc) are kept under good maintenance, there is some general deterioration.
   They will become unless due to passage of time. The delay may be 50 great that repairs are uneconomical. They need replacement. Such deterioration is called physical delay.
3. **Obsolescence:**
   Some assets may become outdated due to the introduction of modern types.
   For examples, by the introduction of capstan or turret lathe, the engine lathes were outdate. So they loose their value. This called obsolescence.
4. **Inadequate:**
   When industries are expanded higher capacity machines will be needed. Now so the available machine with low capacity becomes adequate, though the machine is in good condition. So the available

01. Factors influencing plant location.pdf

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Plant Engineering

1. **Plant**
   It is places where men, materials, money, equipment, machine are brought together for manufacturing.

2. **Plant Engineering**

   Deals with design, installation and improvement of plant with resources.

3. **Plant Location**
   Deciding a suitable location, area, and place for plant.

FACTORS CONSIDERED FOR THE SELECTION OF A SITE.

- Nearness top raw material.
- Land
- Transport facilities
- Availability of labour.
- Availability of fuel and power.
- Availability of water.
- Waste disposal.
- Financial and government concessions.
- Other factors

1. Nearness to raw material:

- To avoid transportation cost.
- Raw material is bulk and huge.
- E.g.: cement factory, sugar factory, iron and steel industry.

2. Land:

- Topography, area, cost, drainage.

TECHNIQUES TO IMPROVING PLANT LAYOUT.

- Flow diagram
- String diagram
- Templates
- Models

Flow diagram

- It shows the path of movement of the materials.
- By studying the flow diagram the unwanted material movement, back tracking and congestion is found out.

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1.1 Introduction

Various manufacturing processes are available for producing a component with required shape. Casting is one of the processes used for making component of complicated shapes in large numbers. The parts obtained by pouring the molten metal into the mould cavity and solidification are known as castings. The processes of making required shape in moulding sand with the help of a pattern is known as moulding. The cavity produced by moulding is known as mould or mould cavity. The place where moulding, melting and casting are done is known as foundry.

1.2 Pattern - Definition

Pattern is the model of casting. It is made of wood, metal or plastics. Mould is produced in moulding sand by using pattern.

1.2.1 Types of patterns

The following types of pattern are generally used in foundry.

1) Solid piece pattern
2) Split piece pattern
3) Loose pirce pattern
4) Match plate pattern
5) Sweep pattern
6) Skeleton pattern
7) Segmental pattern
8) Shell pattern

1) Solid piece or Single piece pattern

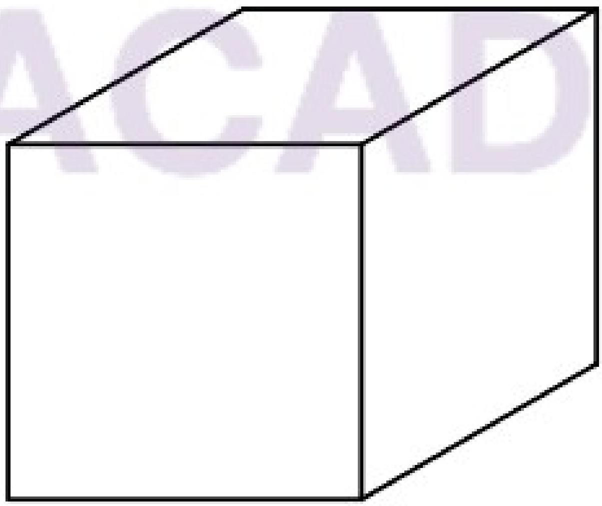

Fig.1.1 Solid piece pattern

WELDING TECHNOLOGY

2.1 Welding

Welding is the process of joining similar or different metal by heating. Welding can be done with or without the application of pressure. It can be done with or without the addition of filler metal. During welding, the edges of metal pieces are either melted or brought to plastic stage. Welding gives a permanent joint. Welding is used in the fabrication of automobile bodies, air craft, machine frames, boilers, ship building, railway wagons, etc.

2.1.1 Types of welding

The following are the two types of welding processes.

1) Plastic welding or pressure welding.
2) Fusion welding or non – pressure welding.

Plastic welding or pressure welding

In this type of welding, the metal pieces are heated to plastic stage and joined by applying sufficient pressure.

Example : Electric resistance welding.

Fusion welding

In this type of welding, the metal pieces are melted and joined with the help of filler material without applying pressure.

Example : Electric arc welding, gas welding.

2.2 Arc welding or metal arc welding

Arc welding is the process of joining two work pieces by melting their edges by an electric arc. An electric arc is produced when

01. Units.pdf

02. Ohms Law.pdf

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08. Three phase - AC Circuits.pdf

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1.1.1.Current

Flow of electrons in any conductor is called current. It is represented by the letter **'I'**

The unit of the current is **ampere**

$$\text{Current},\ I = \frac{\text{Charge}}{\text{Time}}$$

$$I = \frac{Q}{T}$$

Where 'Q' is in coulomb and 't' is in second.

1.1.2. One Ampere

One ampere can be defined as one coulomb of charge is transferred in one second.

1.1.3 Voltage

The difference of potentials between two points is called voltage or potential difference.

The voltage represented by the letter **'V'**

The unit of the voltage is **volt**.

1.1.4. One volt

One volt is defined as the potential difference across a resistance of one ohm carrying a current of one ampere

1.1.5. Resistance

The opposition offered by a substance to the flow of current is called resistance.

The resistance represented by the letter **'R'**

The unit of the resistance is **Ohm** (Ω)

Laws of Resistance

The resistance (R) of a conductor

- is directly proportional to its length (*l*)
- is inversely proportional to its area of cross section (a)

01. Mechanical properties of metals.pdf

02. Simple stresses & strains-Modulus of Elasticity.pdf

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3.1 Introduction

A vast range of materials are available today for the choice of engineer. A proper selection of material has to be made to suit the requirements. The best material is one which serves the required objective at the minimum cost. The selection of material for a particular application involves consideration of factors like mechanical properties, service requirements, manufacturing requirements and cost of the material. The mechanical properties of materials are those properties which describe the behaviour or the material under mechanical usage. Some important mechanical properties of materials are explained below.

3.2. Mechanical properties of materials

1) Elasticity

When a body is subjected to a system of external forces, deformation of body takes place. This deformation disappears at once the external forces are removed. This property of material by which a body regains its original shape and size after deformation when applied forces are removed is known as *elasticity*.

If the body regains it original shape completely, it is said to be *perfectly elastic*. However, this phenomenon holds good up to a particular value of stress known as *elastic limit*. Beyond this limit, the deformation does not entirely disappear when the force is removed. This residual deformation is known as *permanent set*. *The elasticity property is desirable in materials*

01. Basics of Thermodynamics.pdf

02. Thermodynamic Laws & Definitions.pdf

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Thermodynamics is a branch of science that deals with the relations between heat, and work.

Thermodynamics deals with the study of energy transformations within systems and transfer of energy across the boundaries of the system.

1.1.1 Definition and Units

1.1.2 Mass

Mass is the amount of matter contained in an object, and does not depends on gravity.

Mass is measured in grams or kilograms. Therefore it is denoted by letter 'W' and its unit is Kg.

1.1.3 Weight

Weight is the amount of mass of an object, and it's dependent upon gravity.

It is denoted by letter 'W' and *Its unit is Newton*. Mathematically,

$$\mathbf{W = m\,g\,.}$$

Where, 'g' is the acceleration due to gravity in m/s^2.

1.1.4 Force

According to Newton's second law of motion, the applied force or impressed force is directly proportional to the rate of change of momentum. It is denoted by letter 'F'. *Its unit is Newton (N)*. Mathematically,

$$F = \text{Mass x Acceleration}$$

$$\mathbf{F = m\,a}$$

Note:

$1N = 1kg\text{-}m/s^2$

1.1.5 Volume

Volume is defined as the ratio of mass to density. It is also defined as the space

2.1.5 OTTO CYCLE

These days, many gas, petrol and many of the oil engines run on this cycle. It is the also known as constant volume cycle, as the heat is received and rejected at a constant volume.

The engine conceived by Otto has air enclosed in a cylinder, whose walls are perfectly non-conductor of heat, but the bottom is a perfect conductor of heat. There is also a hot body and cold.

The ideal Otto cycle consists of two constant volume and two reversible adiabatic or isentropic processes as show on p-V and T-S diagrams in Fig. (a) and (b)

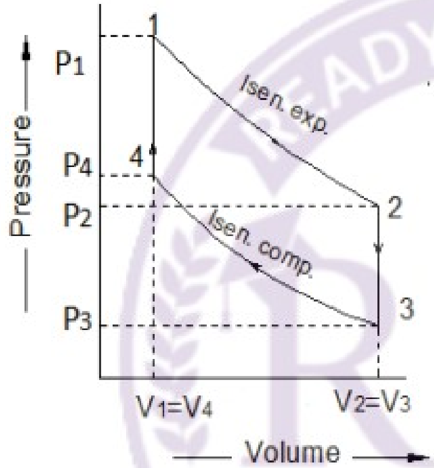

Fig 2.3 (a)

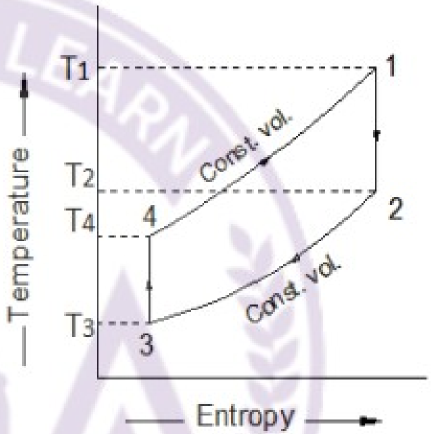

Fig 2.3 (b)

Let the engine cylinder contain m kg of air at point 1. At this point, let $p_1 T_1$ and V_1 be the pressure temperature and volume of the air. Following are the four stages of the ideal cycle.

Isentropic expansion: The air is expanded reversibly and adiabatically from initial temperature

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Working Principle and Constructional Details of a Computer

1. Introduction

A computer is a versatile electronic device that processes data according to a set of instructions, or software programs. It performs a range of tasks including calculations, data management, and communication. The operation of a computer is based on the principles of data input, processing, storage, and output.

2. Basic Components of a Computer

2.1 Central Processing Unit (CPU)

- **Function:** The CPU is the brain of the computer where all processing activities occur. It executes instructions from programs and manages the flow of data within the computer.
- **Components:**
  - **Arithmetic Logic Unit (ALU):** Executes arithmetic operations (addition, subtraction) and logical operations (comparison).
  - **Control Unit (CU):** Directs the operation of the processor. It interprets instructions from memory and initiates necessary actions.
  - **Registers:** Small, fast storage locations within the CPU used to hold intermediate data and instructions during processing.

2.2 Memory

- **Random Access Memory (RAM):** Volatile memory used for temporary storage of data and instructions that are actively being used or processed by the CPU. It allows for quick read and write access.
- **Cache Memory:** A smaller, faster type of volatile memory that provides high-speed

Classification of Computers

Understanding the classification of computers involves recognizing the different types based on their size, processing power, purpose, and data processing methods. Here's a detailed explanation suitable for diploma-level study, complete with examples of notable systems and advancements.

1. Introduction

Computers can be categorized based on various criteria including size, processing power, purpose, and architecture. Each classification highlights different functionalities and use cases, from personal devices to large-scale data processing systems.

2. Classification Based on Size and Processing Power

2.1 Microcomputers

- **Definition:** Personal computers designed for individual use.
- **Characteristics:**
    - **Components:** Typically include a CPU, memory, storage, input devices (keyboard, mouse), and output devices (monitor, printer).
    - **Examples:**
        - **IBM Personal Computer (PC):** Introduced in 1981, it set standards for the personal computing market.
        - **Apple MacBook Air:** Known for its portability and efficient performance.
        - **Smartphones (e.g., iPhone, Samsung Galaxy):** Miniaturized versions of microcomputers with advanced capabilities.
- **Applications:** Word processing, web browsing, gaming, and multimedia.

01. Properties of fluids.pdf

02. Pressure of fluids & Pascal_s Law.pdf

03. Manometers & its types.pdf

04. Mechanical Gauges.pdf

05. Flow of fluids.pdf

06. Venturimeter & Orfice Meter.pdf

07. Orfices.pdf

08. Flow through pipes.pdf

09. Pelton,Francis & Kaplan Turbines.pdf

10. Reciprocating pump & Comparison BW RP & CP.pdf

11. Centrifugal pump.pdf

12. Special Pumps.pdf

13. Gear Pump & Vane Pump.pdf

14. Quick return mechanism & Milling Machine.pdf

Fluid Mechanics

Fluid Mechanics is the branch of engineering which deals with the properties and behavior of fluids at rest and in motion.

Hydraulics

Hydraulics is the branch of engineering deals with the properties and behavior of water.

1.2. Definition of Fluid

Fluid can be defined as the substance which can flow with or without the aid of force

A fluid may be in three form like as liquid (or) a vapour (or) a gas

1.3. Types of Fluid

Fluids are classified as follows.

1. **Ideal (or) perfect fluid**

   A fluid having density only as property is called Ideal fluid . Ideal fluid one which has no viscosity, surface tension, cohesion and adhesion etc.

   Ex. Imaginary fluid

2. **Real fluid (or) Practical fluid**

   A fluid having viscosity, surface tension, cohesion, adhesion and density is called Real Fluid.

*Difference of pressure

Advantages

*simple construction

*precise measurement

*-ve pressure can be measured.

Types of Manometers

- Barometer
- Piezometer tube
- U tube manometer
- Differential manometer
- Inverted u tube manometer
- Micro manometer
- Inclined manometer

1.12.2. Barometer

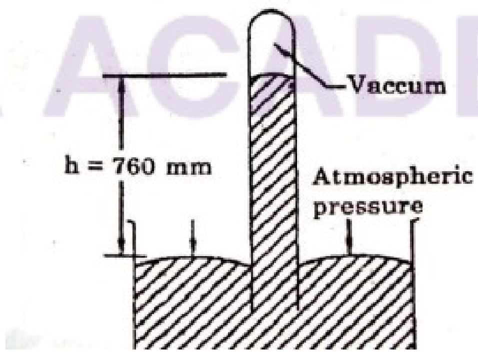
Barometer is used to measure the atmospheric pressure.

Types of Barometer

1. Mercury Barometer

2. Aneroid Barometer

Mercury barometer



3.2.2.Classification of Turbines

1. **According to action of water on moving blades.**
   i. Impulse turbine
   ii. Reaction turbine
2. **According to the direction of flow.**
   i. Radially inward flow turbine.
   ii. Radially outward flow turbine.
   iii. Parallel (axial) flow turbine.
   iv. Mixed flow turbine.
3. **According to the name of originators.**
   i. Pelton wheel
   ii. Francis turbine
   iii. Kaplan turbine
   iv. Girard turbine
4. **According to head of water**
   i. Low head
   ii. Medium head
   iii. High head
5. **According to the position of the turbine**
   i. Vertical turbine
   ii. Horizontal turbine
6. **According to the discharge**
   i. Low discharge
   ii. Medium discharge
   iii. High discharge

3.2.3.Impulse Turbine

- In an Impulse Turbine all the energy of water is first converted into kinetic energy by passing it through Nozzles.
- The water enters the running wheel in the form of a Jet which impinges on the buckets.
- The pressure of water is atmosphere throughout It's passage through the turbine as shown in fig 3.6.

- 01. CAD Definition.pdf
- 02. Geometric Modeling-Wirefram,Surface & Solid.pdf
- 03. Graphic standards – GKS, IGES, PHIGS and DXF.pdf
- 04. CAM Definition.pdf
- 05. Group Technology– Part families–Parts classification and Coding.pdf
- 06. CAPP & Types.pdf
- 07. CNC Definition.pdf
- 08. CNC Components(EM).pdf
- 08. Components of CNC-(TM).pdf
- 09. Automatic Tool Changer (ATC)(EM).pdf
- 09. Automatic Tool Changer (ATC)-(TM).pdf
- 10. CNC EDM(EM).pdf
- 10. CNC EDM-(TM).pdf
- 11. Part Program-(EM).pdf
- 12. Part program format coordinate system.pdf
- 13. Types of Motion Control-(TM).pdf
- 14. Types of Interpolation.pdf
- 15. G & M Codes.pdf
- 16. Sub program & Canned Cycles.pdf

1.1.0. Introduction

Computer Aided Design (CAD) is the technology concerned with the integrated design activities using a digital computer. This includes creation and modification of graphic images on a display, printing these images on a printer or plotter as a hard copy, analyzing and optimizing the design and storing and retrieving of design information for further process as database.

CAD can be described as any design activity that involves the effective use of computer to create and modify an engineering design. The use of a computer in the design of a product is to increase the productivity of the designer and to create a database for manufacturing.

1.1.1. CAD definition

CAD is the term which means Computer Aided Design. CAD can be defined that the computer is utilized in the creation of model, modification and analysis of a design to get the optimum model.

1.1.2. Design process

The design process is the pattern of activities followed by the designer in arriving at the solution of a technological problem generated. The design progresses are a step-by-step manner from identification of the problem to give the better solution for the problem.

There are different models available in the design process. They are Shigley, Pahl and Beitz, Ohsuga and Earle.

1.1.3. Shigley's Design process

The six steps involved in the Shigley model is shown in the flow chart and explained below.

1.3.2. Wireframe modeling

Wireframe model is the simplest geometric model that can be used to represent an object mathematically in the computer. It is also called as *line model* or *edge representation* of the object.

Typically, a wire frame model consists of points, lines, arcs, circles, conics, and curves. The word 'wireframe' is related to the fact that one may imagine a wire that is bent to follow the object edge to generate the model. An edge may be straight line, arc, or any other well defined space curve. A wireframe model of a three dimensional object consists of a finite set of points together with the edges connecting various pairs of these points.

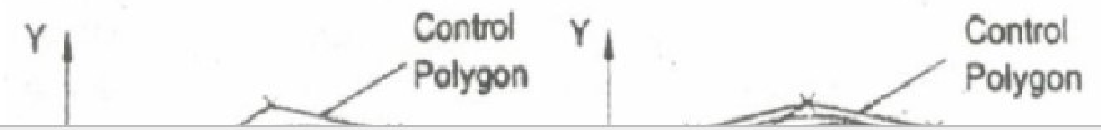
1.3.3. *Wireframe entities:* For constructing wireframe models the following entities are used. Cubic splines, B-splines and Bezier curves.

Cubic splines

Cubic splines are the curves with the parametric intervals defined at equal lengths. It passes over a given set of data points and start & end slopes. Cubic splines do not allow the user to change the smoothness of the curve.

Bezier curves

Bezier curve is a polynomial curve defined by a set of control points that are used for approximating the generated curve. The curve will pass through the first and last point with all other points acting as control points. Bezier curves exhibit a global control. Whenever a single vertex in the control polygon is moved, the entire curve will be affected. The flexibility of the curve becomes more with more control points.



3.2. COMPONENTS OF CNC MACHINES

3.2.1. Drives

Drives system-த்தின் முக்கிய வேலையானது machine tool-ன் spindle-யை தேவையான வேகத்தில் சுழல வைப்பதும், மற்றும் machine tool slides-களை தேவையான திசைகளில் நகர்த்துவதுமாகும். Drives ஆனது இரண்டு வகைப்படும்.

1. Spindle drives
2. Feed drives

3.2.2. Spindle drive

நாம் கொடுத்த command - க்கு ஏற்றவாறு spindle movement - ஐ தருவது spindle drive ஆகும்.

1. DC variable spindle drives
2. AC variable spindle drives

Spindle drive motor-களின் முக்கிய requirements.

- எளியதானதாக இருக்க வேண்டும்.
- Constant power எடுத்துக் கொள்ள வேண்டும்.
- விரைவான Response இருக்க வேண்டும்.
- Smooth running இருக்க வேண்டும்.
- அதிக accuracy இருக்க வேண்டும்.
- அதிக பட்ச spindle வேகம் இருக்க வேண்டும்.

01. Factors affecting selection of material(TM).pdf

02. Bearings & its Types(TM).pdf

03. Limits-Fits-Tolerances-Classifictation of fits.pdf

04. Cams & Followers - Types.pdf

1.3. Factors affecting the selection of materials

Machine element-க்கான material-ஐ தேர்ந்தெடுக்கும்போது கீழ்க்கண்ட அம்சங்களை கருத்தில் கொள்ள வேண்டும்.

1. பண்புகள் (Properties)
2. விலை (Cost)
3. தயாரிக்கும் முறை
4. ஆய்வு செய்யும் முறை
5. எண்ணிக்கை
6. வடிவம்
7. அளவு
8. உழைக்கும் காலம் (Durability)
9. Delivery date
10. துணுக்குகளின் பயன்பாடு (Scrap utilisation)
11. எளிதாக கையாள்வது
12. எளிதில் கிடைக்கும் தன்மை
13. தட்ப வெப்ப சூழ்நிலை
14. வேலை செய்யும் சூழ்நிலை. (Working environment)
15. பராமரிப்பு போன்றவை. (Maintenance)

மெக்கானிக்கல் பண்புகள் (Mechanical properties)

External forceக்கு உட்படும் material-ன் செயல்பாட்டினை விவரிப்பது mechanical properties எனப்படும்.

இவற்றில் சில,

(i) Strength (பலம்)

(ii) Ductility

(iii) Malleability

(iv) Stiffness (திண்மை)

(v) Toughness (உறுதி)

(vi) Hardness (கடினம்)

(vii) Fatigue

(viii) Creep

2.1 Introduction

The manufacture of interchangeable parts require precision. Precision is the degree of accuracy to ensure the functioning of a part as intended. However, experience shows that it is impossible to make parts economically to the exact dimensions. Therefore, the workman has to be given some allowable margin so that he can produce a part, the dimensions of which will lie between two acceptable limits, a maximum and a minimum. The study of limits, tolerances and fits is a must for technologists involved in production. The same must be reflected on production drawing for guiding craftsman on the shop floor.

2.2 Limit system

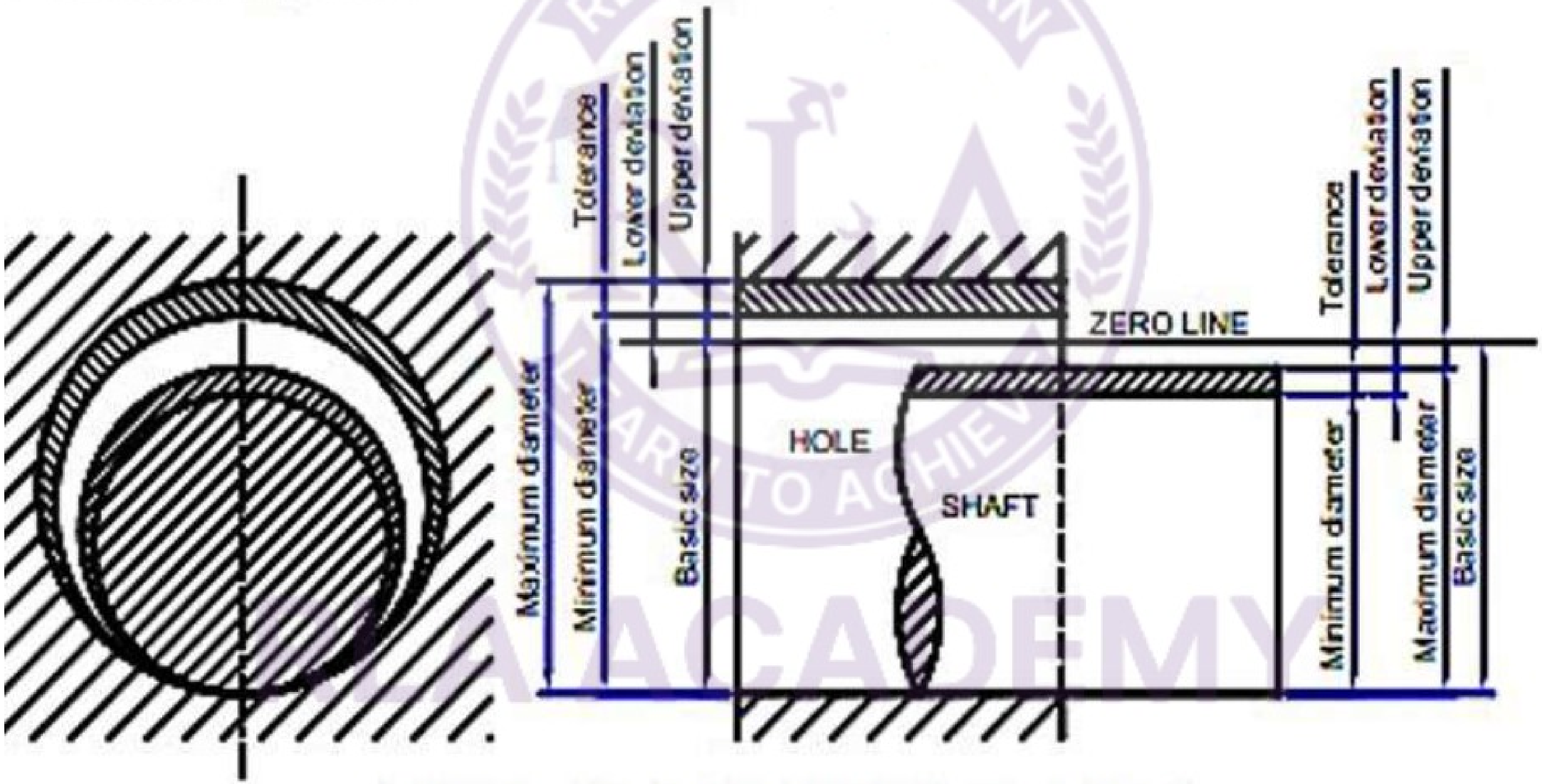


Fig 2.1 Basic size deviations and tolerances

- **Cam**: A cam is a rotating or sliding piece in a mechanical linkage that drives a follower through a prescribed motion path. The cam's profile (shape) determines the motion of the follower.
- **Follower**: A follower is a mechanical element that rests on the cam surface and moves according to the cam's profile. The follower translates the rotary motion of the cam into linear or oscillating motion.

2. Types of Cams

Cams can be classified based on their shape, motion, and method of operation:

1. **Based on Shape**:
   - **Disk (Plate) Cam**: A flat, disk-shaped cam where the follower moves radially or axially depending on the cam profile.
   - **Cylindrical Cam**: A cylindrical-shaped cam where the follower moves along the cylinder's axis or around its circumference.
   - **Translating Cam**: A cam that moves in a linear direction, with the follower moving in a parallel or perpendicular direction.
2. **Based on Motion**:
   - **Rotating Cam**: A cam that rotates around a fixed axis, commonly used in engines.
   - **Translating Cam**: A cam that moves in a straight line, typically found in linear actuators.
3. **Based on Operation**:
   - **Radial Cam**: The follower moves perpendicular to the camshaft's axis, following the cam's contour.
   - **Axial Cam**: The follower moves parallel to the camshaft's axis.

3. Types of Followers