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**CIVIL ENGINEERING
DRAWING - I**

**T P C
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AIMS

- To enable to understanding civil engineering drawing scale.
- To prepare simple building drawing
- To assist to understand the code & symbols used in civil engineering drawing .
- To enable to learning detail drawing of building components.
- To enable in learning detail drawing of different types of foundation, culvert, Road & truss.

SHORT DESCRIPTION:

Civil engineering drawing scale, drawing of single storied building, code and symbols used in drawing; Detail drawing of different types of foundation ,flooring system in/c beam & slab, road, doors & windows, steel structure .

DETAIL DESCRIPTION:

THEORY :

- 1 Understand the basic principles of engineering drawing scale.**
 - 1.1 Define scale.
 - 1.2 Identify & select the scale of FPS & MKS system.
 - 1.3 State the need & importance of scale.
- 2 Understand the components of a single storied building.**
 - 2.1 Identify the name of different parts of building.
 - 2.2 Define line plan of a building.
 - 2.3 Describe the plan over plinth of simple building.
 - 2.4 Explain the necessity of drawing, plan, elevation and section of building.
- 3 Understand the use and necessity of code and symbols in drawing.**
 - 3.1 State the use of code and symbols in drawing.
 - 3.2 Explain the necessity of covering for steel reinforcement according to code.
 - 3.3 Describe the significance of minimum thickness & size of structural member according to code.
 - 3.4 Explain the necessity of hooks, bend and lapping as per code.
 - 3.5 Define construction joint and expansion joint as per code.
- 4 Understand the significance of detail drawing.**
 - 4.1 Define the meaning of detail drawing.
 - 4.2 Mention the necessity of detail drawing.
 - 4.3 List different types of foundation.
 - 4.4 List different types of RCC footing.
 - 4.5 List different types of flooring system.
- 5 Understand the features of pile.**
 - 5.1 Define the terms pile.
 - 5.2 Mention the functions of pile cap.
 - 5.3 List different types of piles used.
 - 5.4 Explain the necessity of piles grouping.
- 6 Understand the features of doors and windows.**
 - 6.1 List different types of doors.
 - 6.2 Label different parts of doors.
 - 6.3 List different types of windows.
 - 6.4 Label different parts of windows.

- 7 Understand the features of road
 - 7.1 List different types of road.
 - 7.2 List different types of joints in rigid pavement.
 - 7.3 State the meaning of right of way.
 - 7.4 Identify different components of a rigid pavement.
 - 7.5 Identify different components of a flexible road.

- 8 Understand the features of steel structure.
 - 8.1 Define steel structure with truss & I- Joist.
 - 8.2 Define the term truss.
 - 8.3 Label different parts of a wooden truss.
 - 8.4 Label different parts of a steel truss.
 - 8.5 Distinguish between king post and queen post truss.
 - 8.6 Define I-Joist.
 - 8.7 Label different parts of a building made by I-Joist.
 - 8.8 Define the steel structure joints with rivets & welding.
 - 8.9 Define the flooring system of steel structure with decking panel & its fixing system.

PRACTICAL:

1 Prepare drawing of a single storied building with verandah

- 1.1 Draw the line plan of a single storied simple building with verandah.
- 1.2 Draw plan over plinth of simple building with verandah from the line plan as started in 2.1.
- 1.3 Draw front and side elevation of the simple building started in 2.2
- 1.4 Draw the cross section of simple building as started in 2.2
- 1.5 Assemble plan over plinth, sections and elevations of simple building with proper dimensions, heading and title block in proper places on one sheet according to given data.
- 1.6 Draw the isometric view of a given single roomed building showing front and one side elevation.

2 Apply different types of code in civil engineering drawing.

- 2.1 Use the different types of design code.
- 2.2 Use clear cover of different component of building for protection of reinforcement according to code.
- 2.3 Use anchorage of reinforcement according to code.
- 2.4 Use minimum thickness of structural members according to code.
- 2.5 Use minimum width of beam and least dimension of column according to code.
- 2.6 Use minimum requirement of reinforcement in footing, column, beam & slab according to code.

3 Apply different symbols in civil engineering drawing.

- 3.1 Draw the standard hooks and bends according to code.
- 3.2 Draw the compression joints in reinforcement bar.
- 3.3 Draw the tensile joints in reinforcement bars.
- 3.4 Prepare a bar-schedule with specification of reinforcement bars.
- 3.5 Draw the construction, expansion & contraction joints.

4 Prepare detail drawing of brick spread foundation and RCC footing.

- 4.1 Draw the brick spread foundation for load bearing wall with the given data or rule of thumb in/c showing of offsets & position of DPC.
- 4.2 Draw the details of basement floor showing damp proofing system.
- 4.3 Draw the brick wall with RCC footing , Grade beam & Floor beam.
- 4.4 Draw the RCC continuous (inverted T-beam) footing.
- 4.5 Draw the RCC cantilever footing.

- 5 Prepare the detail drawing of pile and pile cap.
 - 5.1 Draw the detail drawing of RCC cast-in-situ piles.
 - 5.2 Draw sections of a square pre-cast RCC pile.
 - 5.3 Draw the cross-section of a pile cap over a group of piles.
 - 5.4 Draw the shoe of a pile.

- 6 Construct detail drawing of floor.
 - 6.1 Draw timber floor.
 - 6.2 Draw typical cement concrete (CC) floor over single brick flat soling.
 - 6.3 Draw the typical reinforced cement concrete (RCC) floor.

- 7 Prepare detail drawing of doors and windows (wooden/steel/aluminum).
 - 7.1 Draw the elevation of a paneled door.
 - 7.2 Draw horizontal section of paneled door cutting plane passing through panels.
 - 7.3 Draw vertical section of paneled door cutting plane passing through panels.
 - 7.4 Draw the horizontal cross-section and elevation of metal window.
 - 7.5 Draw the horizontal and vertical section of a fully glazed window.

- 8 Prepare the detail drawing of road.
 - 8.1 Draw the right of way of a national highway in the embankment.
 - 8.2 Draw the cross-section of bituminous road on embankment showing foundation details.
 - 8.3 Draw the cross-section of rigid pavement on embankment showing foundation details.

- 9 Prepare detail working drawing of wooden truss.
 - 9.1 Draw elevation of king post/queen post roof truss on 25cm thick brick wall.
 - 9.2 Make detail working drawing of heel joint of wooden truss.
 - 9.3 Make detail working drawing of ridge of wooden truss.
 - 9.4 Make detail working drawing of joint (intermediate point) of beam in wooden truss.

- 10 Prepare working drawing of steel truss.
 - 10.1 Draw elevation of steel truss (pratt truss/warren truss) rests on 25cm x25cmRCC column.
 - 10.2 Make detail working drawing of heel joint of steel truss rests on RCC column.
 - 10.3 Make detail working drawing of ridge joint of steel truss.
 - 10.4 Make detail working drawing of joint on the rafter of steel truss.
 - 10.5 Make detail drawing of joint on the tie beam of steel truss.

- 11 Prepare the drawing of plan, elevation and section of a single storied steel building.
 - 11.1 Draw a plan of a two storied steel building using I-Joist.
 - 11.2 Draw the elevation of a two storied steel building using I- Joist .
 - 11.3 Draw the section of a two storied steel building using I-joist and decking panel as floor system.
 - 11.4 Draw the section of folded decking panel floor system in/c RCC slab resting on decking panel

REFERENCE BOOKS

- 1. Structural Detailing**
- 2. Civil Engg. Drawing**

- Peter H Newton**
- Guru Charan Sing**