

CIVIL ENGINEERING DRAWING LABORATORY LAB MANUAL

CourseCode : **ACEB04**
Regulations : **IARE –R18**
Semester : **III**
Branch : **CE**

Prepared by

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INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043



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Program Outcomes	
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes(CE)	
PSO1	Engineering Knowledge: Graduates shall demonstrate sound knowledge in analysis, design, laboratory investigations and construction aspects of civil engineering infrastructure, along with good foundation in mathematics, basic sciences and technical communication.
PSO2	Broadness and Diversity: Graduates will have a broad understanding of economical, environmental, societal, health and safety factors involved in infrastructural development, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.
PSO3	Self-Learning and Service: Graduates will be motivated for continuous self learning in engineering practice and/ or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.



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ATTAINMENT OF PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES			
S No	Experiment	Program Outcome Attained	Program Specific Outcomes Attained
1	DRAW THE LOAD BEARING WALLS INCLUDING DETAILS OF THE DOORS AND WINDOWS.	PO 1	PSO 1
2	DRAW THE TWO STORED BUILDING INCLUDING ALL MEP, JOINERY AND REBAR DETAILS.	PO 1 PO 3	PSO 1
3	DRAW THE DETAILED FLOOR PLANS AND ELEVATIONS.	PO 5	PSO 1
4	UNDERSTAND THE SECTIONAL VIEWS OF A BUILDING FOR RCC FRAMED BUILDINGS.	PO 5	PSO 1
5	DRAW THE REINFORCEMENT DETAILS OF TYPICAL BEAMS.	PO 1	-
6	DRAW THE REINFORCEMENT DETAILS OF TYPICAL COLUMNS.	PO 3	PSO 1
7	DRAW THE REINFORCEMENT DETAILS OF TYPICAL SLABS.	PO 3	-
8	DRAW THE TYPICAL REINFORCEMENT DETAILS OF TYPICAL SPREAD FOOTINGS.	PO 1, PO 3	PSO 1
9	DRAW THE DETAILING OF NORTH LIGHT ROOF STRUCTURES.	PO 3	PSO 1
10	DRAW THE DETAILING OF TRUSSES.	PO 3	PSO 1
11	DRAW THE PERSPECTIVE VIEW OF ONE STOREY BUILDING.	PO 5	-
12	DRAW THE PERSPECTIVE VIEW OF TWO STOREY BUILDING.	PO 5	PSO 1



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Certificate

*This is to Certify that it is a bonafied record of Practical work done by
Sri/Kum. _____ bearing the
Roll No. _____ of _____ Class
_____ Branch in the
_____ laboratory during the Academic
year _____ under our supervision.*

Head of the Department

Lecture In-Charge

External Examiner

Internal Examiner

CIVIL ENGINEERING DRAWING LABORATORY

III Semester: CE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
ACEB04	Core	-	-	3	3	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			

COURSE OBJECTIVES:

The course should enable the students to:

- I. Communicate a design idea/concept graphically/ visually
- II. Develop Parametric design and the conventions of formal engineering drawing
- III. Produce and interpret 2D & 3D drawings

COURSE LEARNING OUTCOMES (CLOs):

1. Draw the load bearing walls including details of the doors and windows.
2. Draw the two storied building including all MEP, Joinery and rebar details.
3. Draw the detailed floor plans and elevations.
4. Understand the sectional views of a building for RCC framed buildings.
5. Draw the reinforcement details of typical Beams.
6. Draw the reinforcement details of typical Columns.
7. Draw the reinforcement details of typical slabs.
8. Draw the typical reinforcement details of typical Spread footings.
9. Draw the detailing of north light roof structures.
10. Draw the detailing of Trusses.
11. Draw the perspective view of one storey building..
12. Draw the perspective view of two storey building.

Week-1	BUILDINGS
Batch-I: Load bearing walls including details of doors and windows. Batch-II: Load bearing walls including details of doors and windows.	
Week-2	STAND DRAWING
Batch-I: Typical two storied building including all MEP, joinery, rebars, finishing and other details. Batch-II: Typical two storied building including all MEP, joinery, rebars, finishing and other details.	
Week-3	RCC FRAMED STRUCTURES-1
Batch-I: Floor plans, Elevations. Batch-II: Floor plans, Elevations.	
Week-4	RCC FRAMED STRUCTURES-2
Batch-I: Sectional views. Batch-II: Sectional views.	
Week-5	REINFORCEMENT DRAWING-1
Batch-I: Typical beams. Batch-II: Typical beams.	
Week-6	REINFORCEMENT DRAWING-2

Batch-I: Typical Columns. Batch-II: Typical Columns	
Week-7	REINFORCEMENT DRAWING-3
Batch-I: Typical Slabs. Batch-II: Typical Slabs.	
Week-8	REINFORCEMENT DRAWING-4
Batch-I: Typical Spread footings. Batch-II: Typical Spread footings.	
Week-9	INDUSTRIAL BUILDINGS-1
Batch-I: North light roof structures. Batch-II: North light roof structures.	
Week-10	INDUSTRIAL BUILDINGS-2
Batch-I: Trusses. Batch-II: Trusses.	
Week-11	PERSPECTIVE VIEW-1
Batch-I: One storey buildings. Batch-II: One storey buildings.	
Week-12	PERSPECTIVE VIEW-2
Batch-I: Two storey buildings Batch-II: Two storey buildings	

Manuals:

1. Bhash C Sharma & Gurucharan Singh, "Civil Engineering Drawing", Standard Publishers, 2005.
2. Ajeet Singh, "Working with AUTOCAD 2000 with updates on AUTOCAD 2001", Tata- Mc Graw-Hill Company Limited, New Delhi, 2002.
3. Sham Tickoo Swapna D, "AUTOCAD for Engineers and Designers", Pearson Education, 2009.
4. Venugopal, "Engineering Drawing and Graphics + AUTOCAD", New Age International Pvt. Ltd., 2007.
5. Balagopal and Prabhu, "Building Drawing and Detailing", Spades publishing KDR building, Calicut, 1987.
6. Malik R.S., Meo, G.S., "Civil Engineering Drawing", Computech Publication Ltd New Asian, 2009.
7. Sikka, V.B., "A Course in Civil Engineering Drawing", S. K. Kataria & Sons, 2013.

Web References:

1. http://www.aust.edu/civil/lab_manual/ce_100.pdf.
2. <https://www.wiziq.com/tutorials/civil-engineering-drawing>.
3. <http://civilengineering-notes.weebly.com/building-drawing.html>.

E-Text Books:

1. <https://www.wiziq.com/tutorials/civil-engineering-drawing>.
2. <http://civilengineering-notes.weebly.com/building-drawing.html>.
3. <https://www.pdfdrive.com/civil-engineering-drawing-books.html>.

WEEK – 1

BUILDINGS-LOAD BEARING WALLS INCLUDING DETAILS OF DOORS AND WINDOWS

OBJECTIVE:

To draw load bearing walls including details of doors and windows .

COMMAND USED : Limits , Zoom , Units , line , offset, fillet, trim , break, Arc . copy , rotate , move , hatch , extend, erase, text , Osnap .

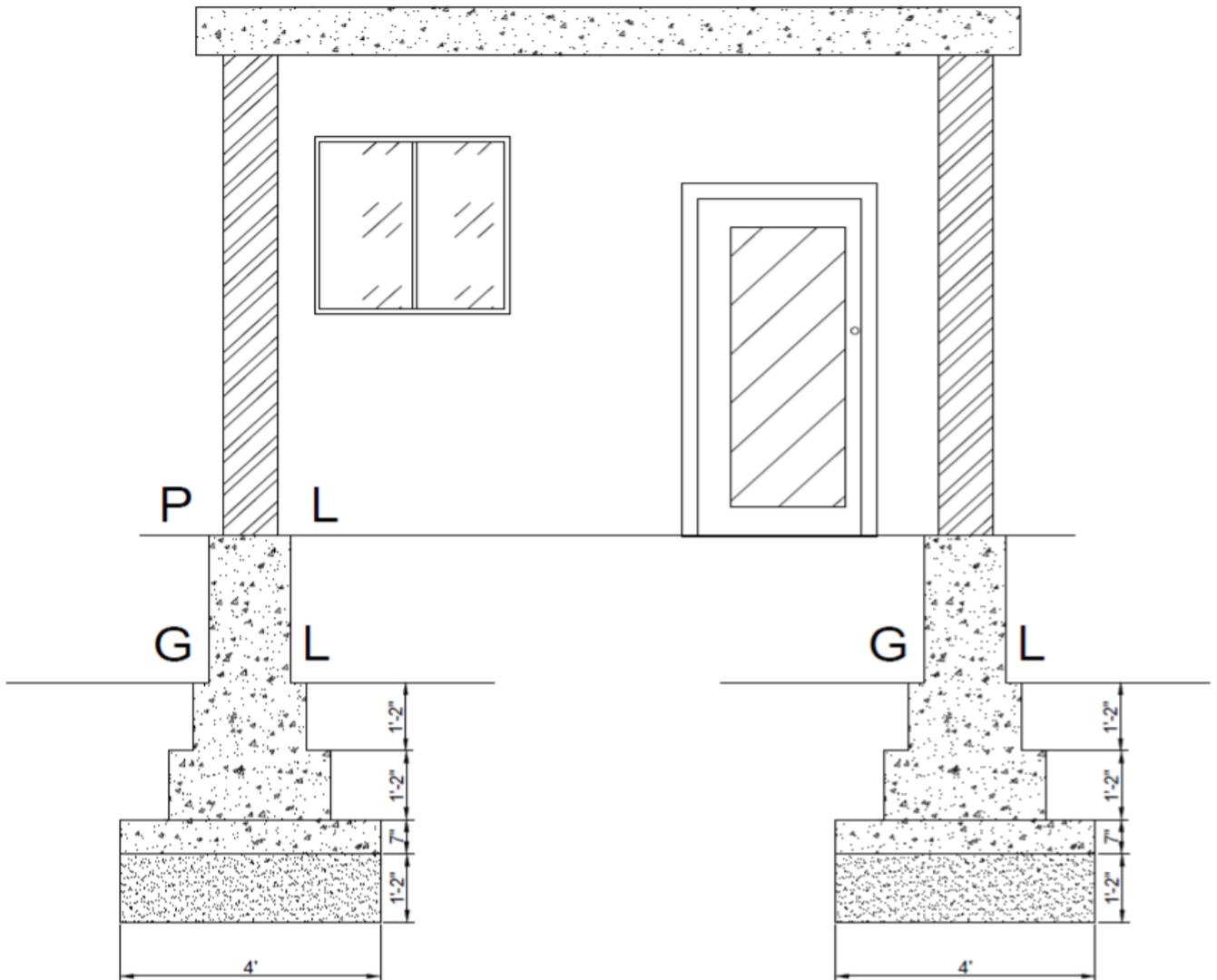
PROCEDURE :

1. The limits are set before starting the drawing. The lower left corner is set as default(0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
4. By using trim command the excess lines are trimmed.
5. By using line command, each room is drawn as per requirements.
6. The lines that cannot be trimmed using trim command are eliminated by break command.
7. Using arc command, the doors are drawn as per the requirements of each room.
8. Using copy command, the doors are copied if necessary multiply copy is used.
9. Using rotate command, the doors are rotated as per the required placement for each room.
10. Using move command, the doors are moved and fixed in the place on where it should be placed.
11. Using rectangle command and offset command, the window is drawn separately as per the required dimensions. By changing the line type from continuous to dashed lines, the sun shades and ventilators are drawn. The windows, ventilators and sunshades are copied, rotated and moved and placed in the required place. Using offset command, the plinth line is drawn.
12. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
13. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command. Using save command, the file having plan, elevation and section is saved by giving the corresponding path name.

RESULT:

The load bearing walls including details of doors and windows for a building is drawn using AutoCAD.

DIAGRAM:



PRE LAB VIVA QUESTIONS:

1. What are walls?
2. How many types of walls are there ?
3. What are load bearing walls ?

LAB ASSIGNMENT:

1. To draw load bearing wall.

POST LAB VIVA QUESTIONS:

1. What are the commands used ?
2. Which units have you followed for dimensions?

WEEK – 2

STANDARD DRAWINGS: TYPICAL TWO STORIED BUILDING INCLUDING ALL MEP , JOINERY, REBARS, FINISHING AND OTHER DETAILS

OBJECTIVES:

To draw typical two storied building including all MEP , joinery , rebars , finishing and other details.

COMMAND USED : Limits , Zoom , Units , line , offset, fillet, trim , break, Arc . copy , rotate , move , hatch , extend, erase, text , Osnap .

PROCEDURE :

1. The limits are set before starting the drawing. The lower left corner is set as default(0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
4. By using trim command the excess lines are trimmed.
5. By using line command, each room is drawn as per requirements.
6. The lines that cannot be trimmed using trim command are eliminated by break command.
7. Using arc command, the doors are drawn as per the requirements of each room.
8. Using copy command, the doors are copied if necessary multiply copy is used.
9. Using rotate command, the doors are rotated as per the required placement for each room.
10. Using move command, the doors are moved and fixed in the place on where it should be placed.
11. Using rectangle command and offset command, the window is drawn separately as per the required dimensions. By changing the line type from continuous to dashed lines, the sun shades and ventilators are drawn. The windows, ventilators and sunshades are copied, rotated and moved and placed in the required place. Using offset command, the plinth line is drawn.
12. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
13. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command. Using save command, the file having plan, elevation and section is saved by giving the corresponding path name.

RESULT:

To draw typical two storied building including all MEP , joinery , rebars , finishing and other details.

PRE LAB VIVA QUESTIONS:

1. What is MEP?
2. What are the types of finishings that can be done to building?

LAB ASSIGNMENT:

You are required to draw the standard drawing of a typical two storied building including all MEP , joinery , rebars, finishing , and other details.

POST LAB VIVAQUESTIONS:

1. What are the commands used?
2. What is the difference between plan , section , elevation?

WEEK – 3

RCC FRAMED STRUCTURES-1: FLOOR PLANS AND ELEVATIONS

INTRODUCTION: The detailed drawings of a building (may be residential, public building like schools, colleges, hostels, offices, hospitals, factory building, buildings meant for business) shall include.

(a) Plan

(b) Section along given vertical plane and

(c) Elevation.

(a) Plan: Plan of building represents, a horizontal section of building at given height seen from top. For buildings, it is a general convention to imagine that the building has been cut down by a horizontal plane at the sill level of the windows and is seen from the top after removal of the so cut part. Thus plan of a building means the details that can be seen which are below the window sill level.

(b) Section: Section means vertical section. It is imagined that a finished building is cut vertically along a line so that the building is separated into two portions along the imagined vertical plane right from top of the building to the lowest part of the foundation. The view that can be seen while traveling along this imaginary vertical plane when looking towards left is drawn to the same scale as that adopted for the plan and this view is called a sectional elevation, cross – section or simply section.

(c) Elevation: Elevation is the outward view of a completed building along any side of the building. When a building is seen by standing in front of it, the view that can be viewed is known as front elevation. Similarly, building can be viewed from back side (rear elevation) or from any side of it which is known as side elevation.

OBJECTIVES:

To draw floor plan and elevation of a RCC framed structure.

COMMANDS USED : units, line . Osnap , Dimension , Hatch

PROCEDURE:

3. Type „U“ ◀ (enter) and set up the units in meters.
4. Type „L“ ◀ give the dimensions for line as 5.0 ◀ and indicate the direction of line if ortho is ON
5. Proceed the above procedure for all the walls.
6. By typing „O“ ◀ give offset distance as 3.0 ◀ for external walls and 0.15 ◀ for internal walls
7. Type „Tr“ double enter ◀ ◀ for trim command then trim the extra and unnecessary lines.
8. By typing A ◀ give arc command to indicate or give doors.
9. Type DLI ◀ to give the dimensions for the plan.
10. Type DT ◀ to give text in each part of the plan.
11. Using the above commands section and elevation is also drawn by following same procedure.
12. Type „H“ ◀ for hatch command and indicate the cross section and indicate brick work, concrete and sand filling etc.,
13. Thus by following above steps required plan is obtained.

RESULT:

The floor plans and elevations of a RCC framed structure are drawn in AutoCAD.

PRE LAB VIVA QUESTIONS:

1. What is a RCC framed structure?
2. What is the difference between Plan and elevation?

LAB ASSIGNMENT:

You are required to draw the floor plans and elevations of a RCC framed structure..

POST LAB VIVA QUESTIONS:

1. What are the commands used?
2. How a RCC framed structure is different from other structures?

WEEK – 4

RCC FRAMED STRUCTURES-2: SECTIONAL VIEWS

OBJECTIVES:

To draw Sectional view of a RCC framed structure.

COMMANDS USED : units, line . Osnap , Dimension , Hatch

PROCEDURE:

1. The limits are set before starting the drawing. The lower left corner is set as default(0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters.
3. Plan can be started by using line command.
4. After completing the outline, offset command is used and the distance is given as the brick wall thickness.
5. Then door is drawn by using line, arc commands are copied as many times as needed by using copy command.
6. The door are moved and placed in the portion ascertained for them.
7. Then window is drawn by line, offset command copied as many times as needed and moved to their respective places
8. then section line is drawn with an arrow head
9. After completing the plan of the residential building its elevation is drawn by having an extension mode on the drafting setting dialog box by using OSNAP – setting in status bar or by using the command settings.
10. Elevation is drawn similar to plan, by using the line command.
11. After finishing elevation, cut section is drawn in the similar manner. After drawing the cut section lines, hatching of brick work, concrete, sand filling, and floor finish are done by using BHatch command.
12. Appropriate hatching style is selected from hatch or advanced and a preview is done. If it is ok, then enter is pressed. If it is not ok esc is pressed and esc hatching is repeated again.
13. Before hatching dimensions are marked by using the leader command.
14. The arrow mark lines were drawn by leader command.
15. To maximize any part of the drawing room command is used.
16. Arc command is used to draw arc for the representation of door.
17. Erase command is used to erase any selected object
18. To maximize any part of the drawing room command is used.
19. Using save command the file having plan, elevation and section is saved by giving the corresponding path name.

RESULT:

The Section of a RCC framed structure is drawn in AutoCAD.

PRE LAB VIVA QUESTIONS:

1. What is a RCC framed structure?
2. What is the difference between Plan and elevation?

LAB ASSIGNMENT:

You are required to draw the floor plans and elevations of a RCC framed structure..

POST LAB VIVA QUESTIONS:

1. What are the commands used?
2. How a RCC framed structure is different from other structures?

WEEK – 5

REINFORCEMENT DRAWINGS-1: TYPICAL BEAMS

OBJECTIVES:

To Draw reinforcement drawings of typical beams.

COMMANDS USED : Zoom , units , line , offset. Fillet , trim , break , arc, copy , rotate , move , Hatch , extend , erase , text, Osnap

PROCEDURE:

Detailing of reinforcement in Simply Supported Beam:

The following are the particulars of a singly Reinforced beam (partially fixed).

Clear Span – 5000mm

Width of support - 300mm

Size of Beams – 300x550mm

Clear cover to steel rods – 25mm

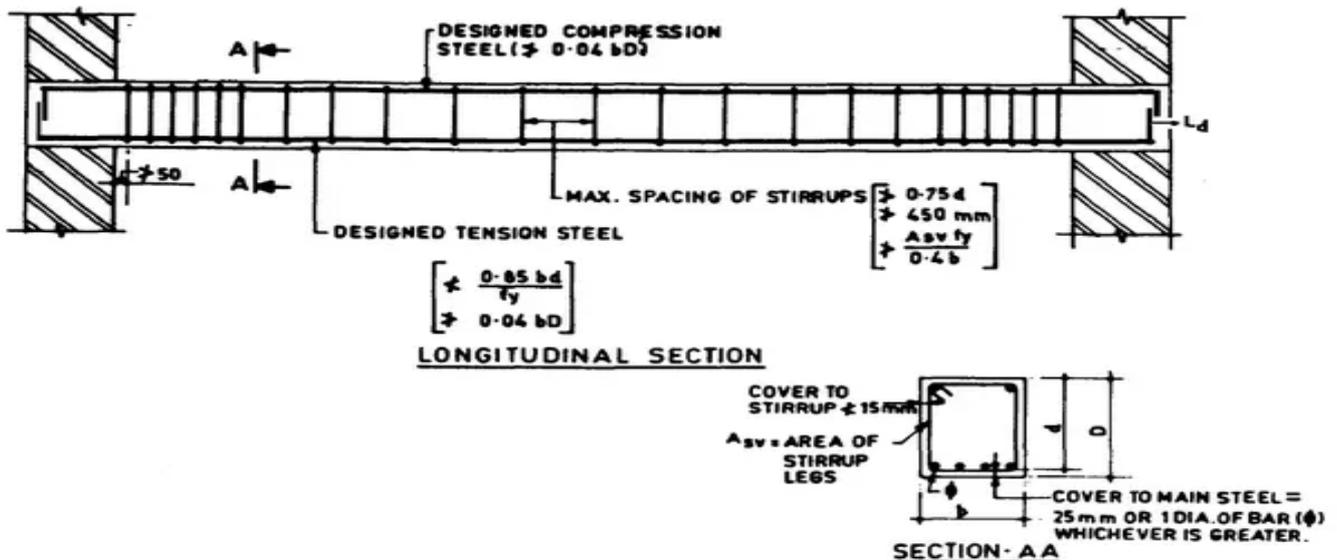
Main Reinforcements (tensile)-16mm Fe415steel-6no's

Hanger Rods - 12mm Fe415 steel-2no's

Shear Reinforcement –Two legged stirrups 800mm Fe 415 steel@ 150mm

Reinforcement at top at supports for negative moment 16mm Fe415 steel 3no's for a length of 0.11 or l_d whichever is greater and anchored sufficiently.

SP : 34(S&T)-1987



Detailing of reinforcement in Continuous beam:

The following are the particulars of a Continuous Reinforced beam

Clear Span – 4000m

Width of support - 230mm

Size of Beams – 230x550mm

Clear cover to steel rods – 25mm

Main Reinforcements (tensile)-16mm Fe415 steel-6no's

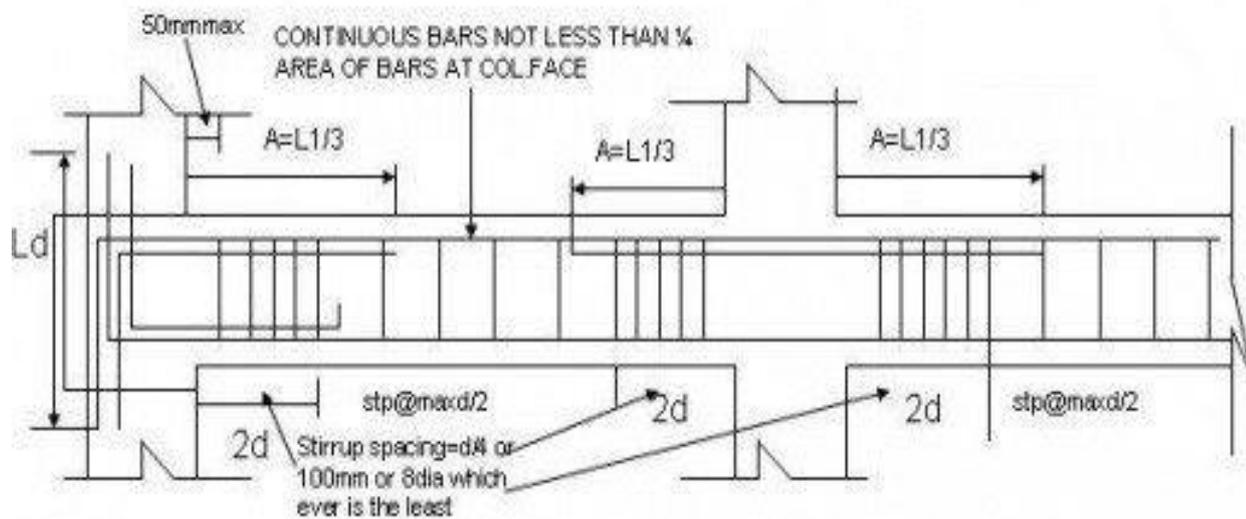
Hanger Rods - 12mm Fe415 steel-2no's

Shear Reinforcement –Two legged stirrups 800mm Fe 415 steel@ 150mm

Reinforcement at top at supports for negative moment 16mm Fe415 steel 3no's for a length of 0.11 or 1d whichever is greater and anchored sufficiently.

PROCEDURE:

Draw the details in AutoCAD:



Detailing of reinforcement in Cantilever beam:

The following are the particulars of a Cantilever beam

Clear Span – 1500m

Width of support - 230mm

Size of Beams – 230x550mm

Clear cover to steel rods – 25mm

Main Reinforcements (tensile)-16mm Fe415 steel-6nos

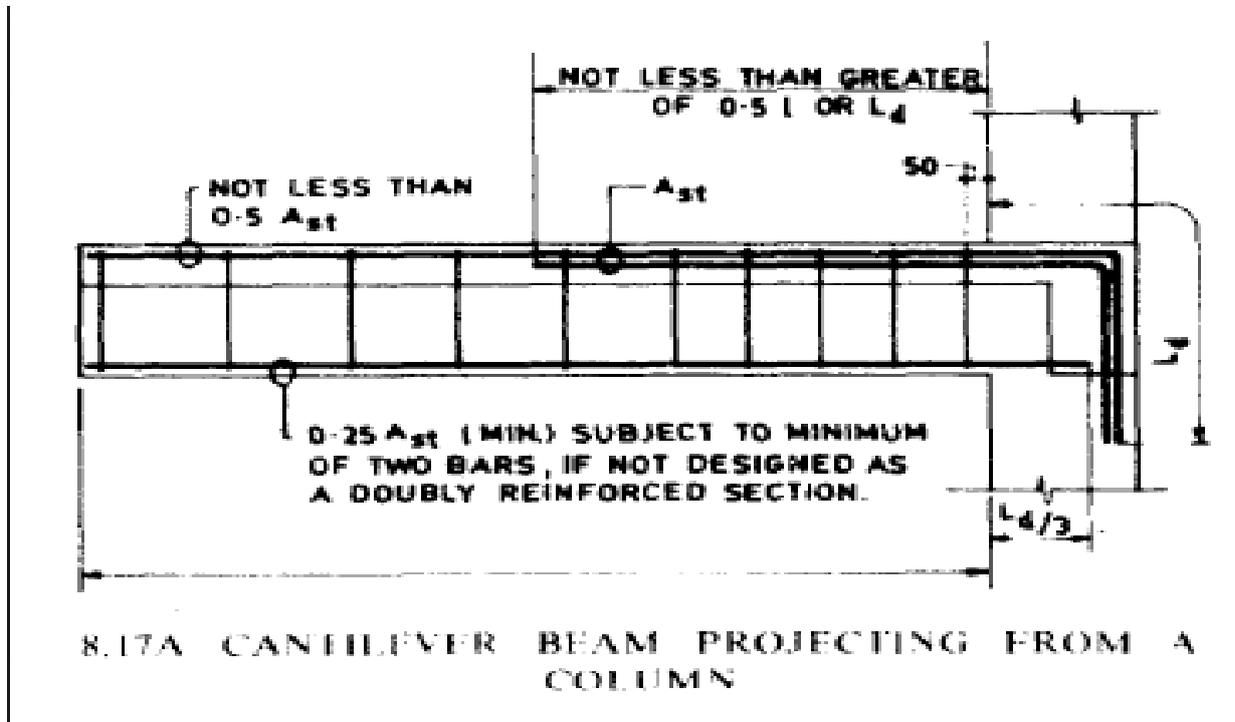
Hanger Rods - 12mm Fe415 steel-2nos

Shear Reinforcement –Two legged stirrups 800 Fe 415 steel@ 150mm

Reinforcement at top at supports for negative moment 16mm Fe415 steel 3nos for a length of 0.11 or 1d whichever is greater and anchored sufficiently.

PROCEDURE:

Draw the details in AutoCAD:



RESULT:

Simply Supported beam, Continuous beam and Cantilever beam are plotted in AutoCAD.

PRE-LAB VIVA QUESTIONS:

1. What do u mean by cantilever?
2. What is simply supported beam?
3. Define continuous beam?

LAB ASSIGNMENT:

You are required to draw typical beams.

POST-LAB VIVA QUESTIONS:

1. Explain the concept of shear force and bending moment?
2. What do u mean by U.D.L?
3. Define overhanging beam?
4. What are the commands used?

WEEK – 6
REINFORCEMENT DRAWINGS-2: TYPICAL COLUMNS

OBJECTIVES:

To Draw reinforcement drawings of typical beams.

COMMANDS USED : Zoom , units , line , offset. Fillet , trim , break , arc, copy , rotate , move , Hatch , extend , erase , text, Osnap

PROCEDURE:

Detailing of reinforcement in column:

The following are the particulars of a column

Clear Span – 3000m

Size of Column – 1'-4"x8" + 1'4"x8"

Clear cover to steel rods – 40mm

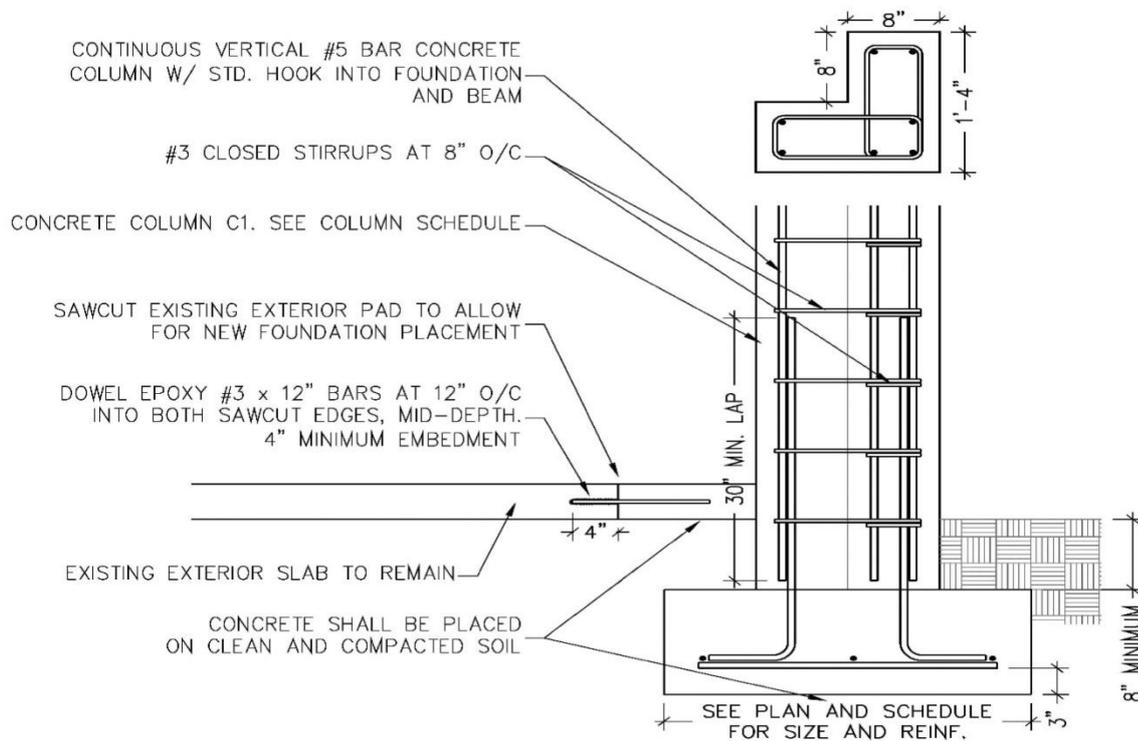
Axial Load =1500KN

Main Reinforcements (tensile)-12mm Fe415 steel- 8 no's

Shear Reinforcement –Two legged stirrups 8 mm Fe 415 steel @ 150mm

PROCEDURE:

Draw the details in AutoCAD:



Detailing of reinforcement in biaxial rectangular column:

The following are the particulars of a column

Clear Span – 3000m

Size of Column – 300x500mm

Clear cover to steel rods – 25mm

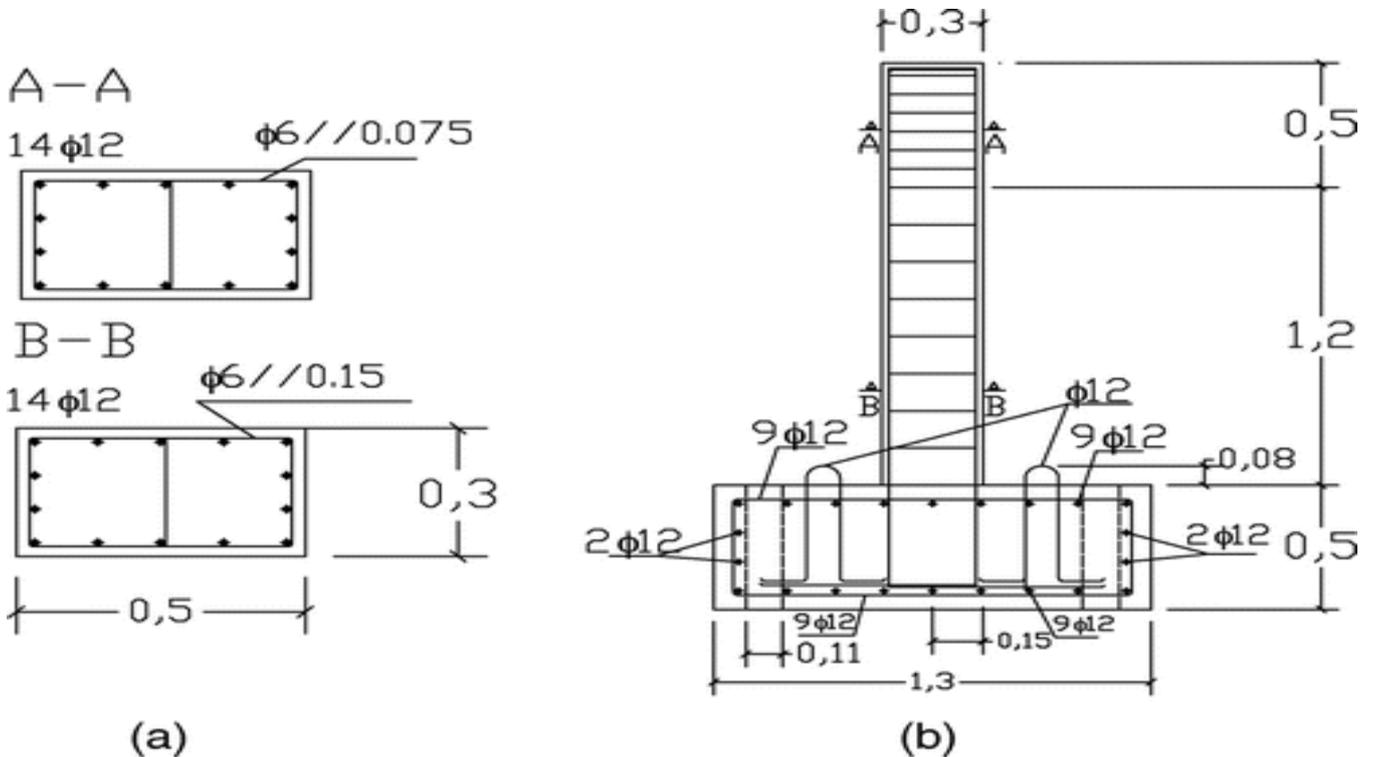
Axial Load =1500KN

Main Reinforcements (tensile)-16mm Fe415 steel-6nos

Shear Reinforcement –Two legged stirrups 8mm Fe 415 steel @ 150mm

PROCEDURE:

Draw the details in AutoCAD:



Detailing of reinforcement in circular column:

The following are the particulars of a column

Height – 3000m

Size of Column – 254mm dia

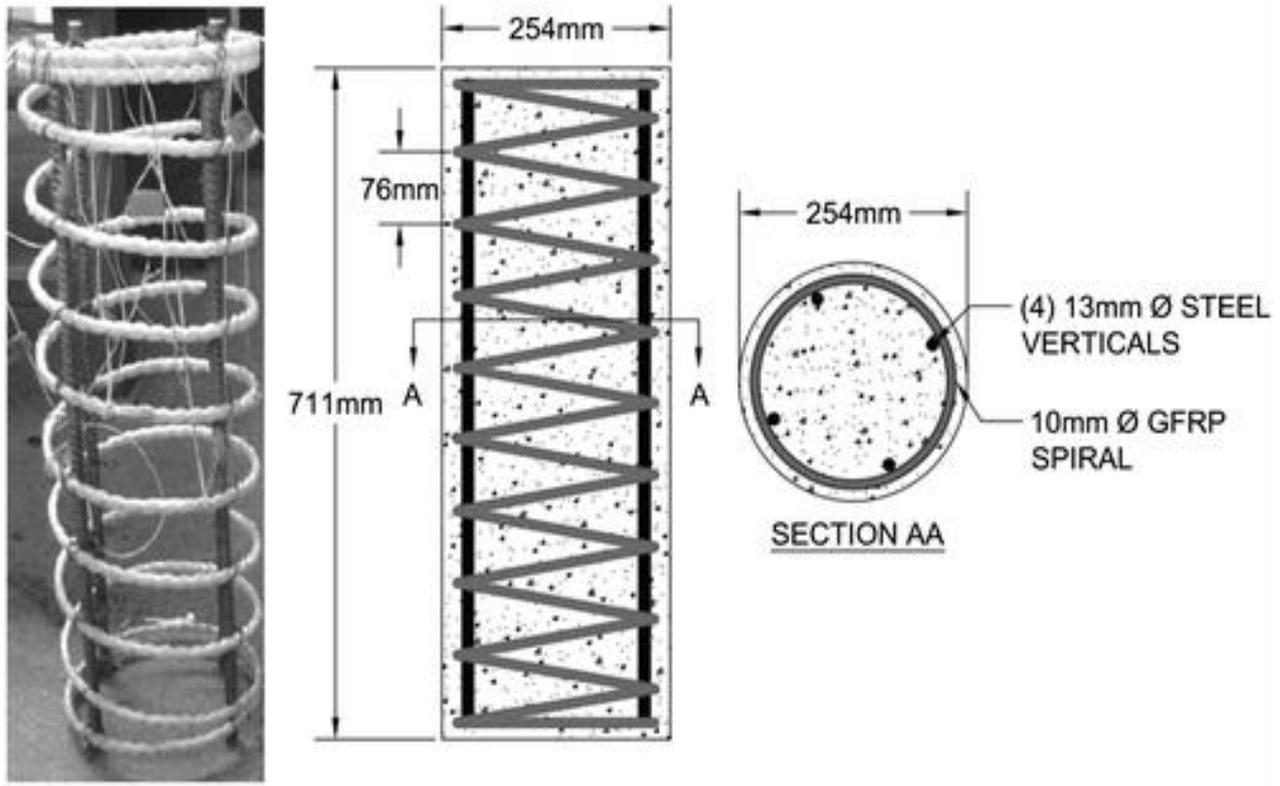
Clear cover to steel rods – 25mm

Main Reinforcements (tensile)-13mm Fe415 steel-4nos

Shear Reinforcement –Helical reinforcement 10mm dia Fe 415 steel @ 76mm

PROCEDURE:

Draw the details in AutoCAD:



RESULT:

The reinforcement drawings of typical columns have been drawn using AutoCAD.

PRE-LAB VIVA QUESTIONS:

1. What is a column?
2. What is a strut?
3. Define slenderness ratio?

LAB ASSIGNMENT:

Reinforcement drawings of a typical column are drawn using Auto Cad.

POST-LAB VIVAQUESTIONS:

1. What is the difference between a column and a strut?
2. State the assumptions used in deriving Buckling equation for columns?
3. Explain buckling in columns?

WEEK - 7
REINFORCEMENT DRAWINGS-3: TYPICAL SLABS

OBJECTIVE:

To draw Reinforcement Drawings of typical slabs

COMMANDS USED : Zoom , units , line , offset. Fillet , trim , break , arc, copy , rotate , move , Hatch , extend , erase , text, Osnap

PROCEDURE:

Detailing of reinforcement in RC one-way:

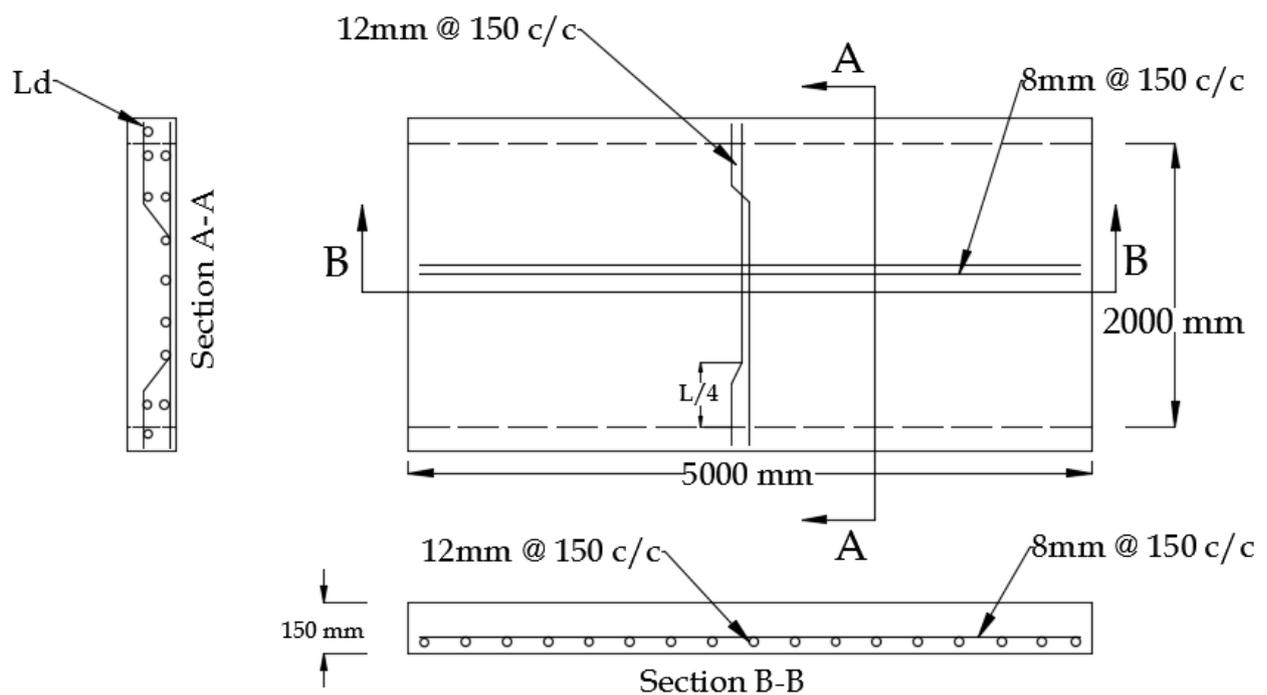
The following are the particulars of a one way slab

Size of Room = 2000x5000mm

Main Reinforcements longer direction (on 5m wide) – 12mm dia Fe415 steel @150mm c/c

Main Reinforcements shorter direction (on 2m wide) – 8mm dia Fe415 steel @150mm c/c

Draw the details in AutoCAD:



Detailing of reinforcement in RC two-way slabs:

The following are the particulars of a one way slab

Size of Room = 4000x3000mm

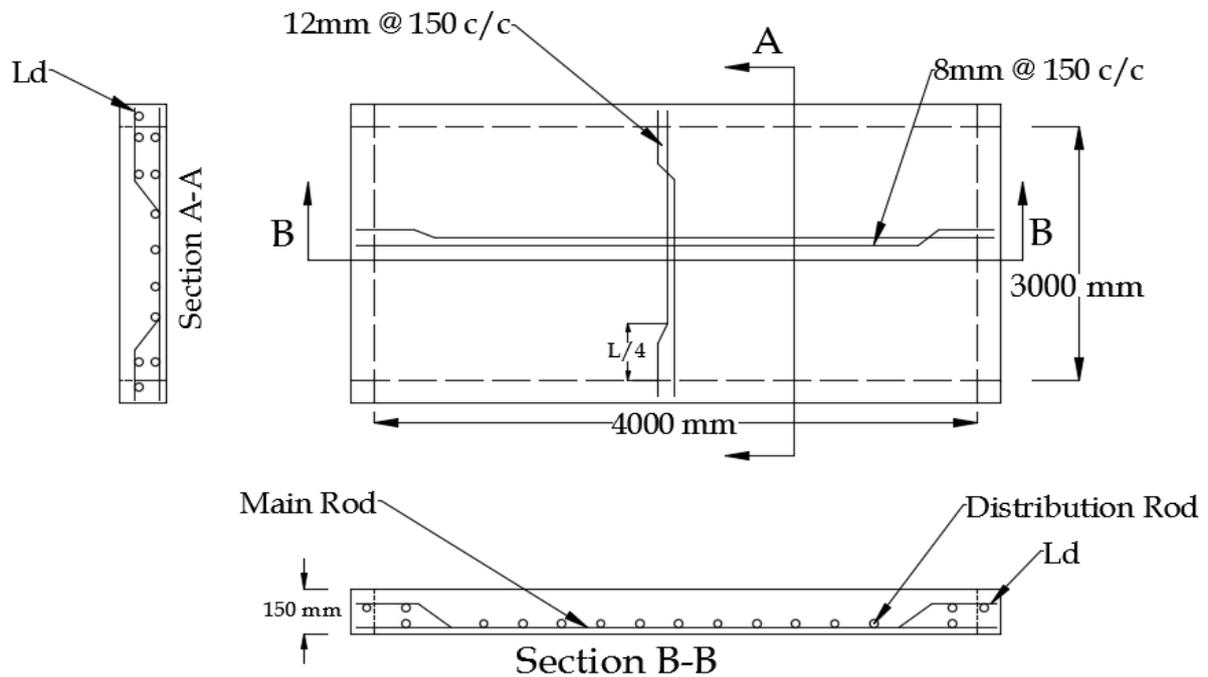
Main Reinforcements longer direction (on 4m wide) – 12mm dia Fe415 steel @150mm c/c.

Main Reinforcements shorter direction (on 3m wide) – 8mm dia Fe415 steel

@150mm c/c.

PROCEDURE:

Draw the details in AutoCAD:



RESULTS:

Reinforcement details of typical slab have been drawn using AutoCAD.

PRE-LAB VIVA QUESTIONS:

1. How many types of slabs are there?
2. How are slabs classified ?

LAB ASSIGNMENT:

To draw reinforcement details of typical slabs.

POST-LAB VIVA QUESTIONS:

1. How is the middle reinforcement taken in a slab?
2. what is the maximum cover taken in a slab?
3. What is the maximum codal thickness of a slab that can be considered?

WEEK – 8
REINFORCEMENT DRAWINGS-4: TYPICAL SPREAD FOOTINGS

OBJECTIVE:

To draw reinforcement drawings of typical spread footings.

COMMANDS USED : Zoom , units , line , offset. Fillet , trim , break , arc, copy , rotate , move , Hatch , extend , erase , text, Osnap.

PROCEDURE:

Detailing of reinforcement in RC isolated footings square:

The following are the particulars of a footing:

(Pu) axial load = 185 KN/m²

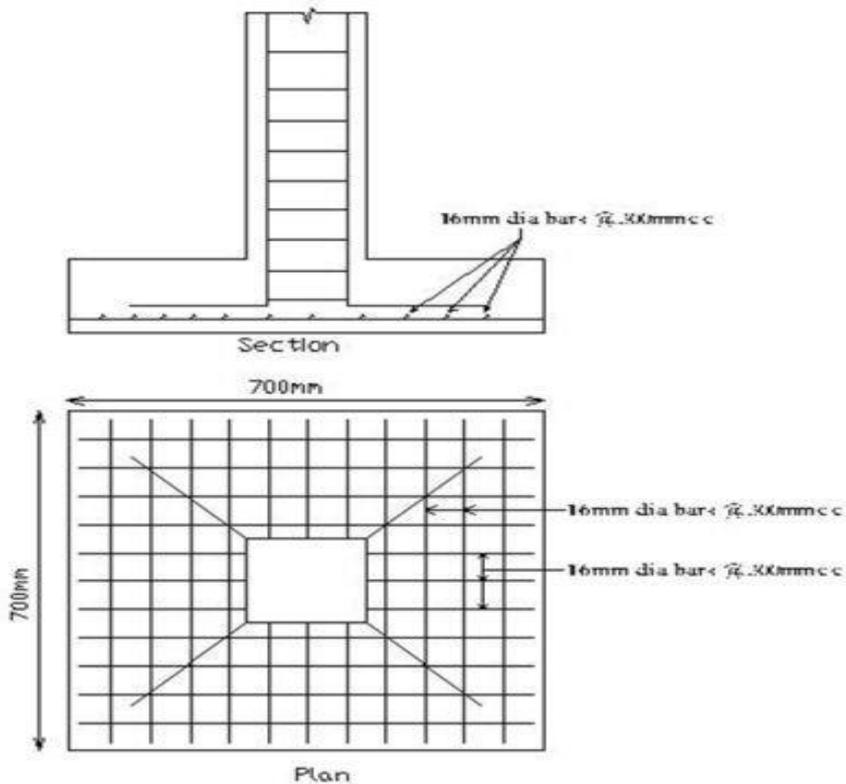
Size of Column – 250 mm dia

Size of Footing = 700 x 700mm

Clear cover to steel rods – 25mm

Main Reinforcements Both ways -16mm Fe415 steel-@ 300mm c/c

Draw the details in AutoCAD:



Detailing of reinforcement in RC isolated footings Rectangular & circular:

The following are the particulars of a footing:

Size of Footing (Rectangular) = a x b = 1000 x 1200mm

Size of Footing (Circular) = D (diameter) = 1000 mm

Main Reinforcements Both ways -16mm Fe415 steel-@ 300mm c/c

PROCEDURE:

Draw the details in AutoCAD:

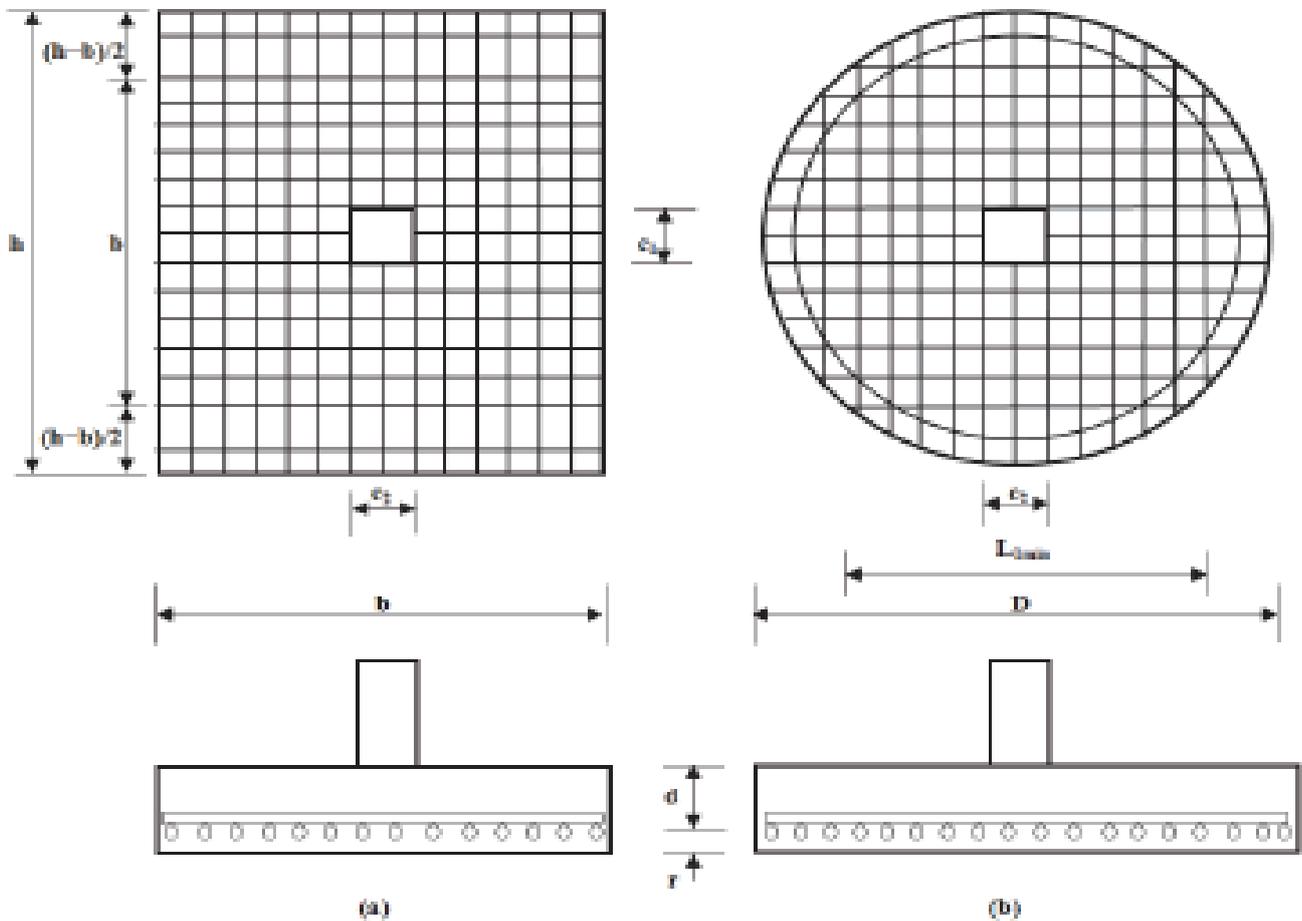


Figure 10. Typical isolated footings: (a) Rectangular, (b) Circular.
Source: Prepared by the author.

Detailing of reinforcement in RC combine footings:

The following are the particulars of a combined footing

Size of Column (Rectangular) = 300x300mm

Size of Column (Rectangular) = 300x380mm

Size of Footing (Rectangular) = 1000mm (B) x 4650mm (L)

Main Reinforcements one ways (B) -9nos. 16mm dia Fe415 steel

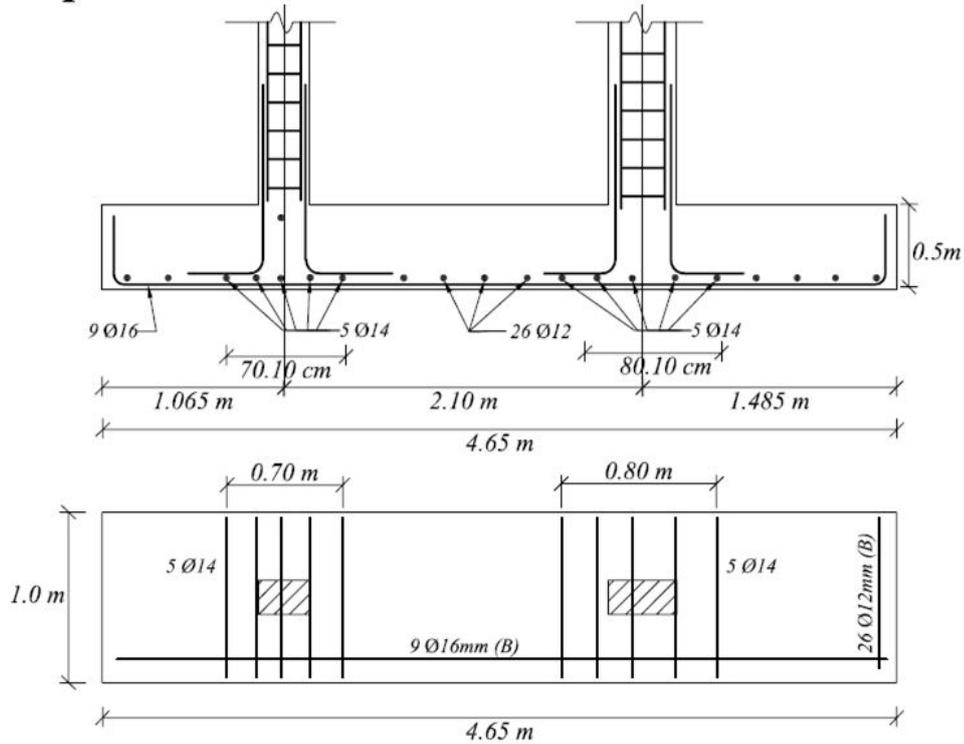
Main Reinforcements other ways (L) -26nos. 16mm dia Fe415 steel

PROCEDURE:

Draw the details in AutoCAD:

Combined Footings

Example



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RESULT:

The reinforcement details of a typical Spread footing has been drawn.

PRE-LAB VIVA QUESTIONS:

1. What is the difference between deflection and deformation? Explain?
2. What is the minimum length of the wall after which expansion joint is to be provided?
3. Explain what are column, slab, beams and cover?

LAB ASSIGNMENT:

To draw the reinforcement details of typical spread footing

POST-LAB VIVA QUESTIONS:

1. What is least cover provided for different RCC Members?
2. What are the functions of column in a building?
3. What do you mean by honeycomb in concrete?

WEEK-9

INDUSTRIAL BUILDINGS-1: NORTH LIGHT ROOF STRUCTURES

OBJECTIVE:

To draw a north light roof structure for industrial type buildings.

COMMANDS USED:

Limits, units, line, offset, trim , arc , copy , rotate , move , Hatch , extend , erase , text

PROCEDURE:

1. The limits are set before starting the drawing. The lower left corner is set as default(0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
4. By using trim command the excess lines are trimmed.
5. By using line command, each room is drawn as per requirements.
6. The lines that cannot be trimmed using trim command are eliminated by break command.
7. Using arc command, the doors are drawn as per the requirements of each room.
8. Using copy command, the doors are copied if necessary multiply copy is used.
9. Using rotate command, the doors are rotated as per the required placement for each room.
10. Using move command, the doors are moved and fixed in the place on where it should be placed.
11. Using rectangle command and offset command, the window is drawn separately as per the required dimensions. By changing the line type from continuous to dashed lines, the sun shades and ventilators are drawn. The windows, ventilators and sunshades are copied, rotated and moved and placed in the required place. Using offset command, the plinth line is drawn.
12. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
13. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command.
14. Using save command, the file having plan, elevation and section is saved by giving the corresponding path name

DIAGRAM:

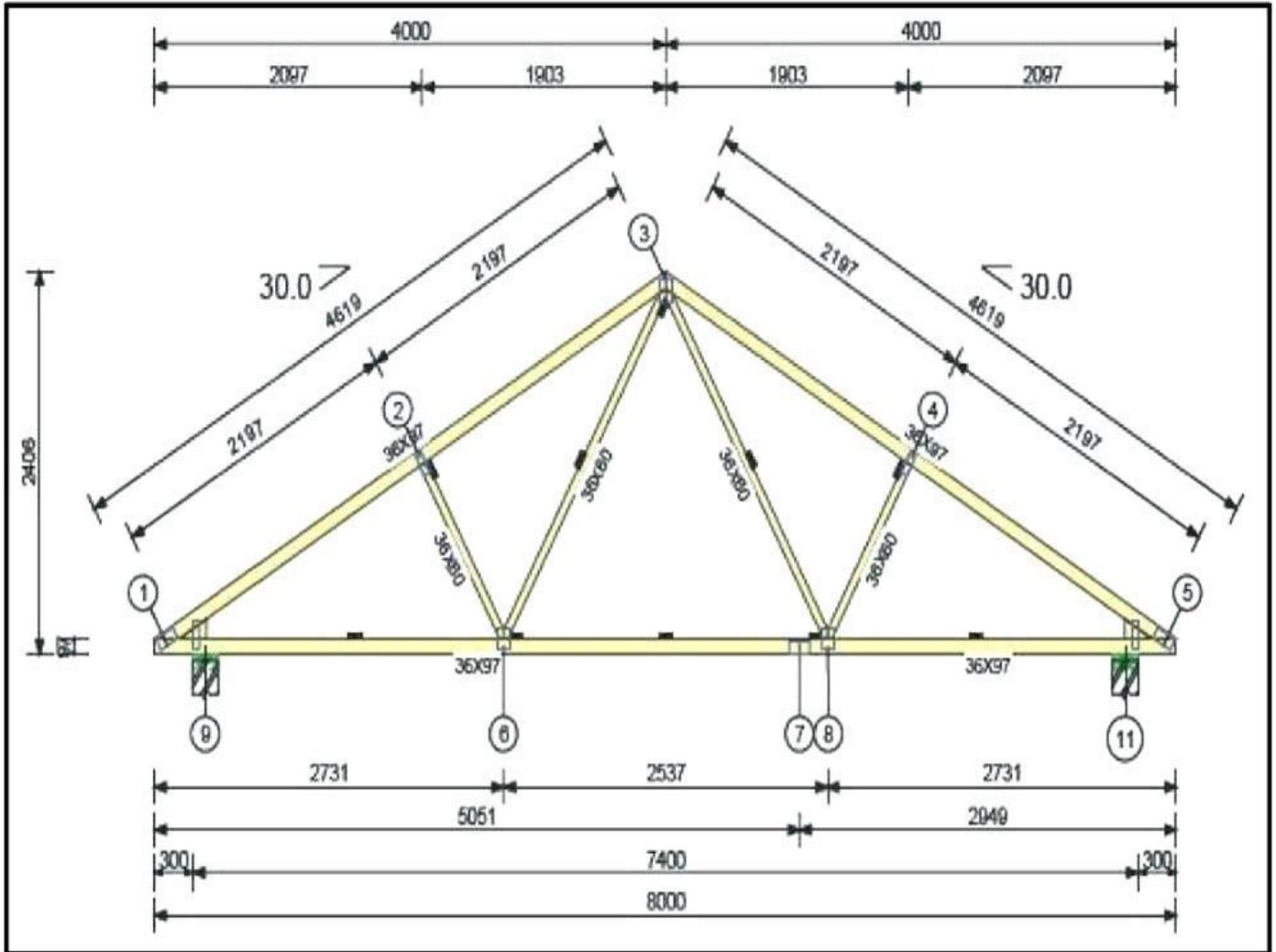
Effective Span: 8.0m

Clear Span: 7.4m

Height: 2m

All Members of roof trusses are: ISA 36X80X6

All Members of rafter and tie: ISA 36X97X6



RESULTS:

North light roof structure for industrial building is drawn using AutoCAD.

PRE-LAB VIVA QUESTIONS:

1. Slenderness ratio of compression members should be?
2. Effective length of a column with length L and both ends hinged is?
3. Lug angles are provided to?

LAB ASSIGNMENT:

To draw north light roof structure for industrial building

POST-LAB VIVA QUESTIONS:

1. Load carrying capacity of a tension member depends on?
2. Fillet weld is not used when the angle between the interface is?

WEEK – 10

INDUSTRIAL BULDINGS-2: TRUSSES

OBJECTIVE:

To draw a truss for industrial type buildings.

COMMANDS USED:

Limits, units, line, offset, trim , arc , copy , rotate , move , Hatch , extend , erase , text

PROCEDURE:

1. The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
4. By using trim command the excess lines are trimmed.
5. By using line command, each room is drawn as per requirements.
6. The lines that cannot be trimmed using trim command are eliminated by break command.
7. Using arc command, the doors are drawn as per the requirements of each room.
8. Using copy command, the doors are copied if necessary multiply copy is used.
9. Using rotate command, the doors are rotated as per the required placement for each room.
10. Using move command, the doors are moved and fixed in the place on where it should be placed.
11. Using rectangle command and offset command, the window is drawn separately as per the required dimensions. By changing the line type from continuous to dashed lines, the sun shades and ventilators are drawn.
12. The windows, ventilators and sunshades are copied, rotated and moved and placed in the required place. Using offset command, the plinth line is drawn.
13. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
14. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command.
Using save command, the file having plan, elevation and section is saved by giving the corresponding path name

DIAGRAM:

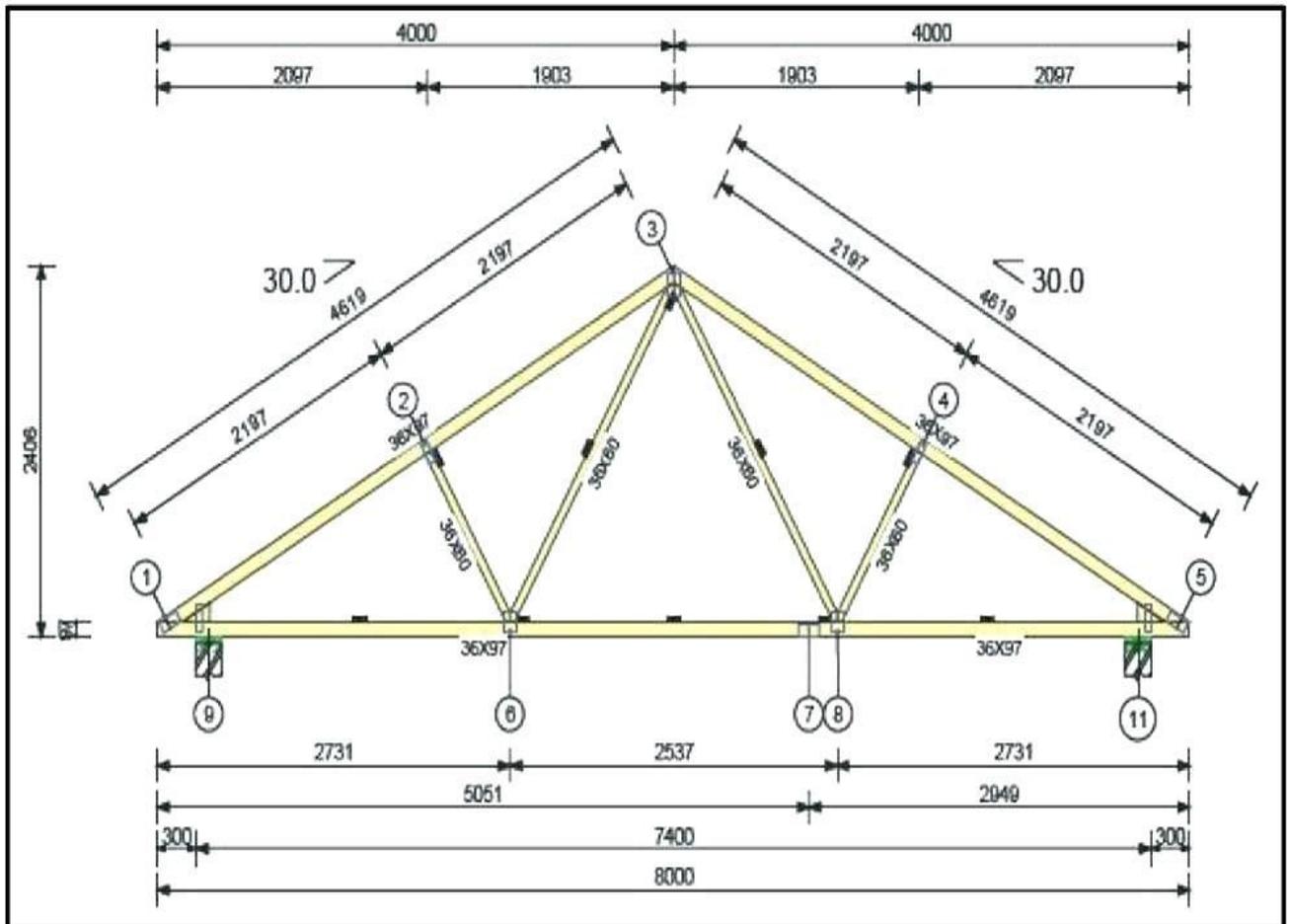
Effective Span: 8.0m

Clear Span: 7.4m

Height: 2m

All Members of roof trusses are: ISA 36X80X6

All Members of rafter and tie: ISA 36X97X6



RESULTS:

The truss for industrial type of building has been drawn.

PRE-LAB VIVA QUESTIONS:

1. Slenderness ratio of compression members should be?
2. Effective length of a column with length L and both ends hinged is?
3. Lug angles are provided to?

LAB ASSIGNMENT:

To draw truss for industrial type of building.

POST-LAB VIVA QUESTIONS:

1. Load carrying capacity of a tension member depends on?
2. Fillet weld is not used when the angle between the interface is?

WEEK – 11
PERSPECTIVE VIEW-1: ONE STOREY BUILDING

OBJECTIVE:

To draw perspective view of a one storey building

COMMANDS USED:

Limits, units, line, offset, trim , arc , copy , rotate , move , Hatch , extend , erase , text

PROCEDURE:

1. The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
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10. Using move command, the doors are moved and fixed in the place on where it should be placed.
11. Using rectangle command and offset command, the window is drawn separately as per the required dimensions. By changing the line type from continuous to dashed lines, the sun shades and ventilators are drawn.
12. The windows, ventilators and sunshades are copied, rotated and moved and placed in the required place. Using offset command, the plinth line is drawn.
13. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
14. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command. Using save command, the file having plan, elevation and section is saved by giving the corresponding path name

RESULTS:

The perspective view of one storey building is drawn

PRE-LAB VIVA QUESTIONS:

1. What is perspective view?
2. Why perspective view is useful?

LAB ASSIGNMENT:

To draw perspective view of one storey building

POST-LAB VIVA QUESTIONS:

1. What are the commands used?
2. Why perspective view is useful?

WEEK – 12
PERSPECTIVE VIEW-1: TWO STOREY BUILDING

OBJECTIVE:

To draw perspective view of a two storey building

COMMANDS USED:

Limits, units, line, offset, trim , arc , copy , rotate , move , Hatch , extend , erase , text

PROCEDURE:

1. The limits are set before starting the drawing. The lower left corner is set as default (0.0000, 0.0000). The upper right corner is changed as per our requirements.
2. By using units command, set the types as decimal/precision as 0.0000 and units to scale drag and drop content as millimeters. By using line command, the outer line of the plan is drawn with the required dimension
3. By using offset command, the outer line of the plan is drawn with the required dimension By using offset command, the wall thickness of the plan is given as per requirements.
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9. Using rotate command, the doors are rotated as per the required placement for each room.
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13. The elevation is drawn by extending the outer line of the plan using extend command and unwanted lines are erased using erase command. The doors, windows, sunshade and parapet are drawn in same distance in elevation as drawn in same distance in the plan. The section is drawn on the adjacent side of the elevation by extending the lines.
14. The various representations of brickwork, sand filling and concrete are completed in the section using hatch command. Using save command, the file having plan, elevation and section is saved by giving the corresponding path name

RESULTS:

The perspective view of two storey building is drawn

PRE-LAB VIVA QUESTIONS:

1. What is perspective view?
2. Why perspective view is useful?

LAB ASSIGNMENT:

To draw perspective view of two storey building

POST-LAB VIVA QUESTIONS:

1. What are the commands used?
2. Why perspective view is useful?