



JYOTHISHMATHI INSTITUTE OF TECHNOLOGY & SCIENCE

Nustulapur, Karimnagar - 505481

DEPARTMENT OF CIVIL ENGINEERING

ADDITIONAL LAB EXPERIMENTS 2020-21

S NO	YEAR & SEM	NAME OF THE LAB	NAME OF THE EXPERIMENT
1	II & I	Surveying Lab	1. Chaining across obstacles 2. Two point problems in plane table survey
2		Strength of Materials Lab	1. Flexural test on beam 2. Tensile test on composite member.
3		Engineering Geology Lab	Physical Properties of Minerals -Agate, Bauxite and Pyrite
4	II & II	Computer aided Civil Engineering Drawing	1. Development of building components for roof trusses using CAD software 2. Buildings-Load bearing walls including details of doors and windows
5		Hydraulics and Hydraulic Machinery Lab	1. Reciprocating Pump 2. Flow over a Broad Crested Weir
4	III & I	Highway Engineering & Concrete Technology Lab	1. Rebound Hammer 2. Ultrasonic Pulse Velocity Test
5		Geotechnical Engineering Lab	1. Hydrometer Method 2. Cone Penetration Method
6	III & II	Environmental Engineering Lab	1. Sludge Volume Index 2. Determination of Turbidity
7		Computer Aided Design Lab	1. Design of Retaining Wall 2. Design of Water Tank


Head of the Department
HOD-CIVIL
Civil Engineering



DESIGN OF RETAINING WALL

Aim:

To create and design the Retaining wall using STAAD Pro.

Software:

STAAD Pro V8i

Procedure:

⇒ Preprocessing:

i) Create Model

a) New Project > Plane > length units as m > force units as KN > type the file name as (multi) Retaining wall > next >

b) Geometry > run structural wizard > Trapezoidal model > bay frame > type the length as 12.6, apply and transfer the model to STAAD Pro screen

ii) Property:

a) General > Property > define > trapezoidal > close

b) select trapezoidal and assign to view

3) Support:

Support > fixed support > select the bottom nodes > assign selected nodes.



4) Loads:

a) Load and definition > load case detail > add > change the title as DL > add > then change LL > add > WL > add > close.

b) Select DL > add > member load > uniform load > type w_1 as -40 kN/m < add

c) Similarly, click select > member parallel to x-direction > assign selected beams.

d) WL > select cursor > select the particular node > assign selected node.

5) Post Processing:

a) Then similarly type name as DL + LL + WL > FOS as 1.5 > in available load case. Select DL, LL and WL and send it other side > add. Select DL, LL & WL and send it other side > add.

b) Then similarly type name as DL + LL + WL > FOS as 1.2 > in available load case, select DL, LL, WL and send it other side > add.

6) Design Parameters:

a) Design concrete > IS 456 > define parameter > give f_c as 20000 kN/m^2 for M20 concrete > f_c as 30000 kN/m^2 for M30 concrete > add > f_r as 415000 kN/m^2 > add > select > ratio as 3 > add.



b) Select F_x → select entire structure using cursor assign it to selected beams, similarly do it for F_y and ratio then assign it.

Analysis:

Analysis and print → add → close → analyze → run analyze → save → post processing → done.

a) In post processing, you have to see the deflection, bending moment, shear, axial forces on the particular specified icons for all combinations already given.

b) Results → View value → beam results → maximum displacement → activate.

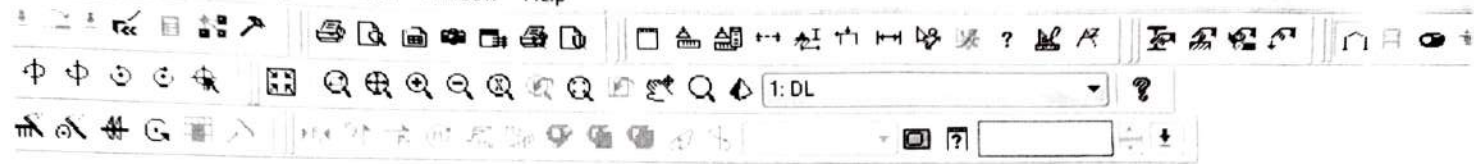
c) You can also see the animations of displacement in it.

Result:

The creation and designing of Retaining wall using STAAD software is completed.

tiltayer retaining wall

ometry Commands Analyze Mode Window Help



Piping Bridge Deck Postprocessing Foundation Design Steel Design Concrete Design Advanced Slab Design

g wall - Whole Structure

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Load

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*****
*
*          STAAD.Pro V8i SELECTseries6          *
*          Version 20.07.11.33                  *
*          Proprietary Program of              *
*          Bentley Systems, Inc.               *
*          Date= MAY 10, 2022                  *
*          Time= 9:52:12                       *
*
*          USER ID:                            *
*****

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1. STAAD SPACE
INPUT FILE: C:\Users\Civil HOD\Downloads\staad\Cantilever retaining wall.STD
2. START JOB INFORMATION
3. ENGINEER DATE 04-OCT-18
4. END JOB INFORMATION
5. INPUT WIDTH 79
6. UNIT METER KN
7. JOINT COORDINATES
8. 1 0 0 0; 2 0 5.2 0; 3 0 5.2 1; 4 0 0 1; 5 1.5 0 0; 6 1.5 0 1; 7 -1 0 0
9. 8 -1 0 1; 9 0 -0.45 0; 10 0 -0.45 1
10. ELEMENT INCIDENCES SHELL
11. 11 1 2 3 4; 12 7 1 4 8; 13 1 5 6 4; 17 9 1 4 10
12. ELEMENT PROPERTY
13. 12 13 17 THICKNESS 0.45
14. 11 THICKNESS 0.45 0.2 0.2 0.45
15. DEFINE MATERIAL START
16. ISOTROPIC CONCRETE
17. E 2.17185E+007
18. POISSON 0.17
19. DENSITY 23.5616
20. ALPHA 1E-005
21. DAMP 0.05
22. END DEFINE MATERIAL
23. CONSTANTS
24. MATERIAL CONCRETE ALL
25. SUPPORTS
26. 1 4 TO 10 FIXED
27. LOAD 1 LOADTYPE DEAD TITLE DL
28. SELFWEIGHT Y -1 LIST 11 TO 13 17
29. LOAD 2 LOADTYPE LIVE REDUCIBLE TITLE LL
30. ELEMENT LOAD
31. 13 TRAP X -68 -50
32. 12 TRAP X -80 -68
33. 11 PR -81
34. PERFORM ANALYSIS PRINT ALL


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P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS	10	NUMBER OF MEMBERS	0
NUMBER OF PLATES	4	NUMBER OF SOLIDS	0
NUMBER OF SURFACES	0	NUMBER OF SUPPORTS	8

SOLVER USED IS THE OUT-OF-CORE BASIC SOLVER

ORIGINAL/FINAL BAND-WIDTH=	9/	7/	12 DOF	
TOTAL PRIMARY LOAD CASES =	2,	TOTAL DEGREES OF FREEDOM =		12
TOTAL LOAD COMBINATION CASES =	0	SO FAR.		
SIZE OF STIFFNESS MATRIX =	1	DOUBLE	KILO-WORDS	
REQRD/AVAIL. DISK SPACE =	12.0/	73337.2	MB	





DESIGN AND ANALYSIS OF WATER TANK

Aim:

To design and analysis of water tank using STAAD Pro

Software:

STAAD Pro Ver

Procedure:

⇒ Preprocessing:

1) Create Model

a) New Project > Plane > length units as m > force units as kn > type the file name as Retaining wall > next > Water tank > next.

b) Geometry > run structural wizard > rectangular model > bay frame > type the length as 126, apply and transfer the model to STAAD processor

2) Property:

a) General > Property > define > trapezoidal > close

b) Select trapezoidal and assign to view.

3) Support:

Support > fixed supports > select the bottom nodes > assign selected nodes.



4) Loads:

a) Load and definition > load case detail > add > change the title as DL > add > then change LL > add > WL > add > close.

b) Select DL > add > member load > uniform load > type W₁ as - 40 kN/m < add.

c) Similarly, click ~~select~~ > member parallel to X-direction > assign selected beams.

d) WL > select cursor > select the particular nodes > assign selected node.

5) Post Processing:

a) Then ~~similarly~~ type name as DL + LL + WL > Fos as 1.5 > in available load case. Select DL, LL and WL and send it other side > add select DL, LL & WL and send it other side > add.

b) Then similarly type name as DL + LL + WL > Fos as 1.2 > in available load case, select DL, LL, WL and send it other side > add.



6) Design Parameters

a) Design concrete \rightarrow IS 456 \rightarrow Define Parameter \rightarrow
 give f_c as 2000 KN/m^2 for M20 concrete \rightarrow
 f_c as 30000 KN/m^2 for M30 concrete \rightarrow
 add \rightarrow f_y as 415000 KN/m^2 \rightarrow add \rightarrow select \rightarrow
 ratio as 3 \rightarrow add.

b) Select f_c \rightarrow Select entire structure using
 cursor assign it to selected beams. Similarly
 do it for f_y and ratio then assign it.

Analysis:

Analysis and Print \rightarrow add \rightarrow close \rightarrow analyze \rightarrow
 run analyze \rightarrow save \rightarrow post processing \rightarrow done.

a) In post processing you have to see the
 deflection, bending moment, shear, axial forces on the
 particular specified beams for all combinations.

b) Results \rightarrow view value \rightarrow beam results \rightarrow maximum
 displacement \rightarrow activate.

c) You can also see the animations of displace-
 -ment in it.

Experiment No.: ADDITIONAL - EXPERIMENT - 02

Page No.: 55

Date: 08-08-21



JYOTHISHMATHI
GROUP OF INSTITUTIONS
KARIMNAGAR

Result:

The analysis and designing of water tank is completed by using STAAD Pro software

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Name: K. Arkhila S

Roll No.: 1927520105

Overhead Water Tank

Capacity

1 cubic feet = 28.316 liters

3m = 9.84 ft

6m = 19.68 ft

Total Capacity = $19.68 * 19.68 * 9.84 * 28.31$
= 1,07,890.98 liters

Area of reinforcement

Beam (Use 12mm dia)

Ast provided = $(3.14 * 12^2) / 4 = 113.04 \text{mm}^2$

Ast = 6 * 113.04

Ast = 678.24 mm²

Beam (Use 16mm dia)

Ast provided = $(3.14 * 16^2) / 4 = 200.96 \text{mm}^2$

Ast = 4 * 200.96

Ast = 803.84 mm²

Column (Use 12mm dia)

Ast provided = $(3.14 * 12^2) / 4 = 113.04 \text{mm}^2$

Ast = 12 * 113.04

Ast = 678.24 mm²

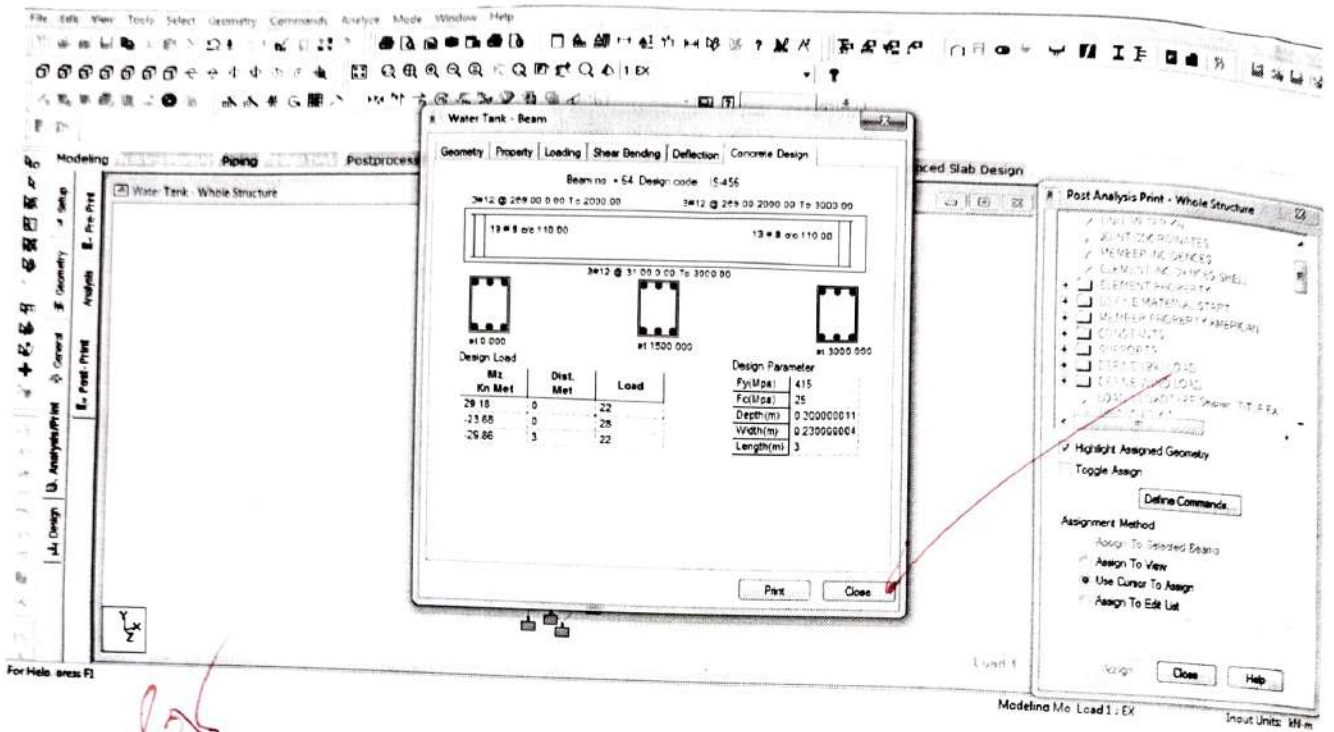
Column (Use 16mm dia)

Ast provided = $(3.14 * 16^2) / 4 = 200.96 \text{mm}^2$

Ast = 8 * 200.96

Ast = 1607.68 mm²

Beam Details



Beam no. = 64 Design code : IS-456

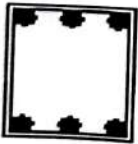
3#12 @ 269.00 0.00 To 2000.00

3#12 @ 269.00 2000.00 To 3000.00

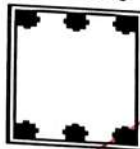
13 # 8 d/c 110.00

13 # 8 d/c 110.00

3#12 @ 31.00 0.00 To 3000.00



at 0.000



at 1500.000



at 3000.00

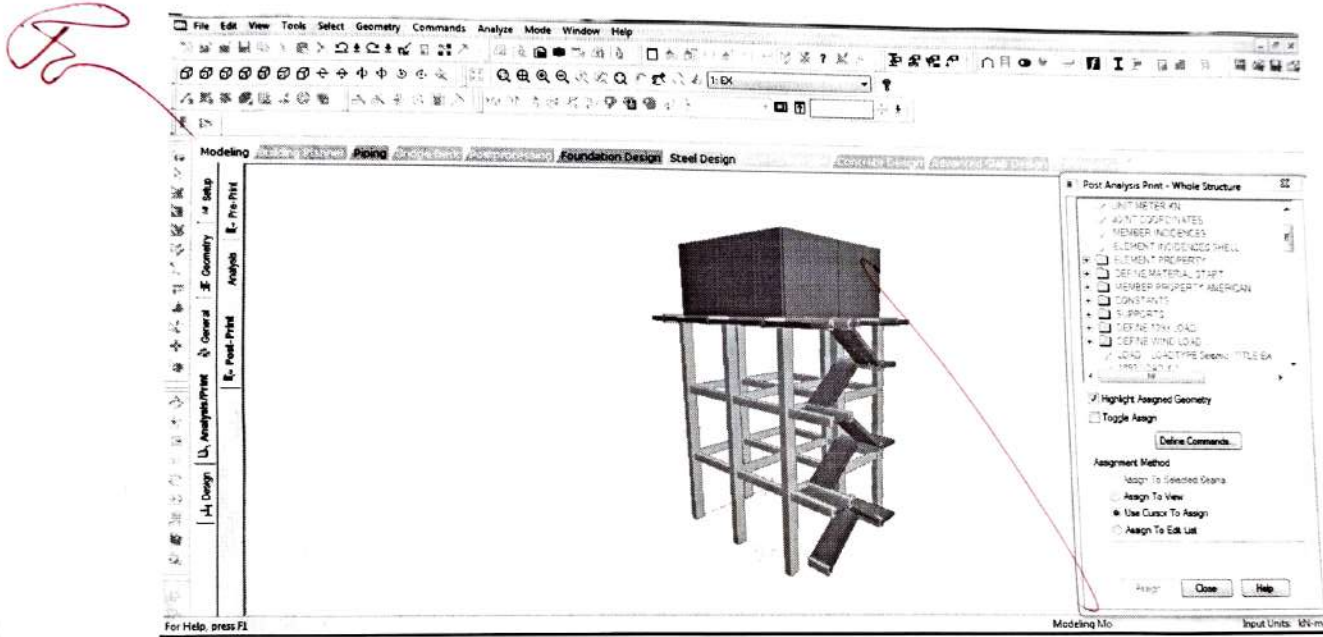
Design Load

Mz Kn Met	Dist. Met	Load
29.18	0	22
-23.68	0	28
-29.86	3	22

Design Parameter

Fy(Mpa)	415
Fc(Mpa)	25
Depth(m)	0.30000011
Width(m)	0.23000004
Length(m)	3

3D View



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Dimensions

