ETABS WORKSHOP CONTENT

DAY-1:

TOPICS:

Introduction to ETABS, History & Features of ETABS, Application, ETABS GUI, Workflow, Beam Analysis

Introduction to ETABS:

ETABS - Extended Three dimensional Analysis of Building System. (.edb)

History & Features of ETABS:

- Etabs is the product of CSI company

- CSI produces five primary software packages: SAP2000, CSiBridge, ETABS, SAFE, and PERFORM-3D
- Computers and Structures, Inc. (CSI) is founded in 1975 by "Ashraf Habibullah" recognized globally as the pioneering leader in software tools for structural and earthquake engineering
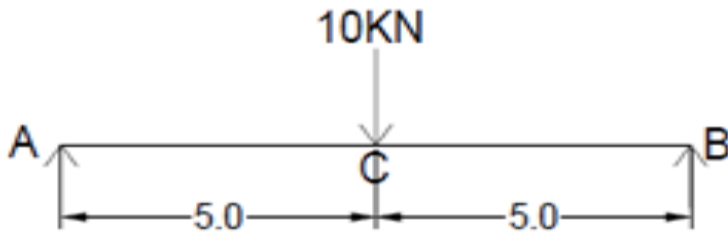
Workflow:

1) Create New model
2) Define Materials
3) Define Structural Elements
4) Assign Structural Elements
5) Load Assignment
6) Model check
7) Analysis
8) Results
9) Design

Beam:

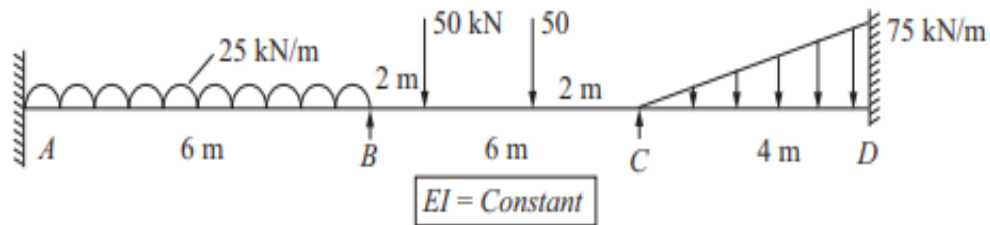1) **Example :**
- Define a single frame section (beam)

- Assign support conditions

- Assign point load on frame section

- Change mass in Property Modifier or Load pattern

- Beam Cross section 230*230MM

- M25, FE 415

10KN

A ‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑‑ B
C
|‑‑‑‑‑5.0‑‑‑‑‑|‑‑‑‑‑5.0‑‑‑‑‑|

2) Example:

50 kN |50
25 kN/m
2 m   2 m   75 kN/m

A   6 m   B   6 m   C   4 m   D

EI = Constant

Ans:

(i) $R_A = 75.39$ kN, $R_B = 127.59$ kN, $R_C = 97.85$ kN, $R_D = 99.17$ kN

$M_A = -75.78$ kNm, $M_B = -73.44$ kNm, $M_C = -55.55$ kNm, $M_d = -55.2$ kNm.

3) Example:
- Analyze a beam which is shown in Fig, properties of beam are as follows
- Beam section: 230x300 mm2, Fck: M25, Fy: HYSD415
- Load Type: Dead Load

20KN/M

10KN

A

B

C

|‑‑‑2.00‑‑‑| 1.00

|‑‑‑‑‑‑‑4.00‑‑‑‑‑‑‑| 2.00
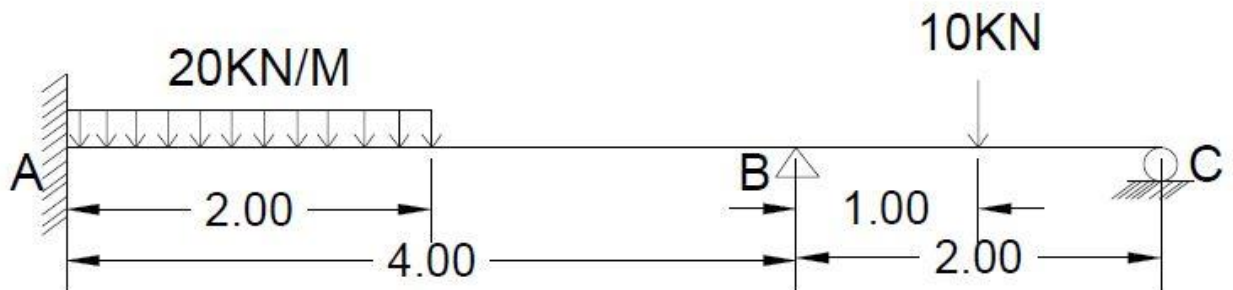
DAY-2:

TOPICS:

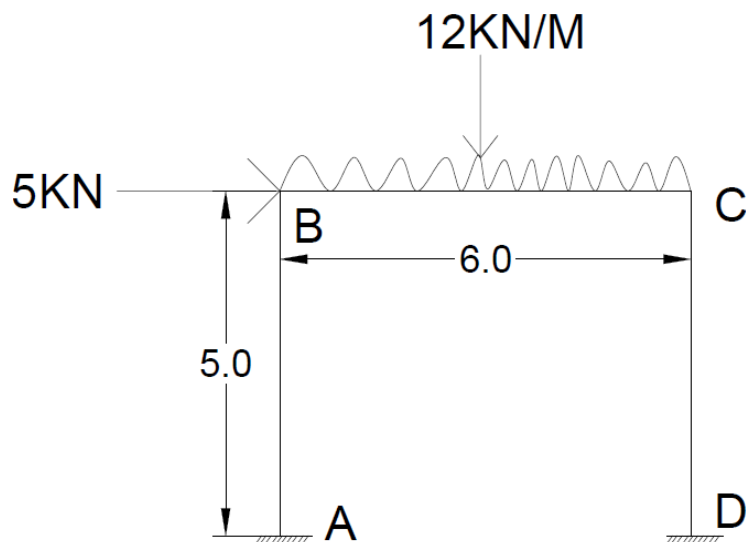2D- Frame Analysis, 3D-Grid Generation, 3D-Skeletal Structure Modelling

2D Frame Analsyis:

1) **Example:**
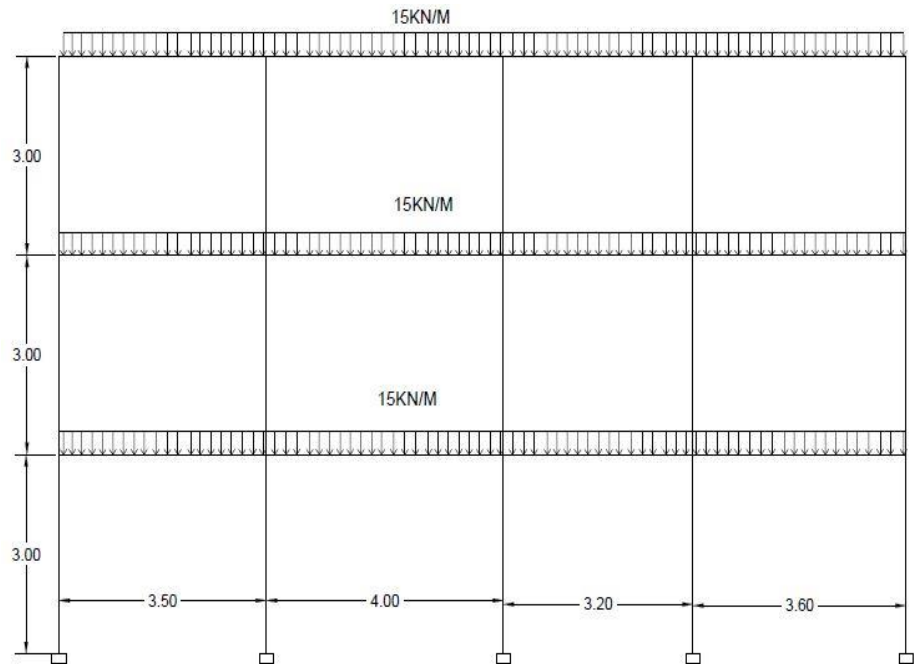   Analyze a 2-D frame as shown in Fig with the following considerations
   - Beam Sections: 230mmx300mm
   - Column Sections: 230mmx230mm
   - Concrete Grade : M20
   - Steel Grade : HYSD415

2) **Example:**
   Analyze the 2-D frame as shown in Fig with the following considerations
   - Beam Section: 230mmx300mm
   - Column Section: 300mmx230mm
   - Concrete Grade : M25
   - Steel Grade : HYSD415

3) **Example**;
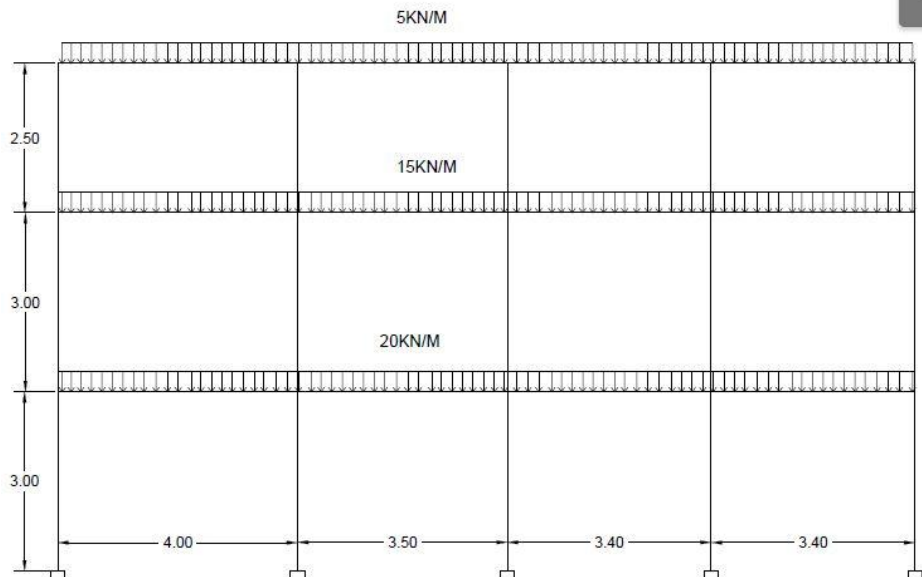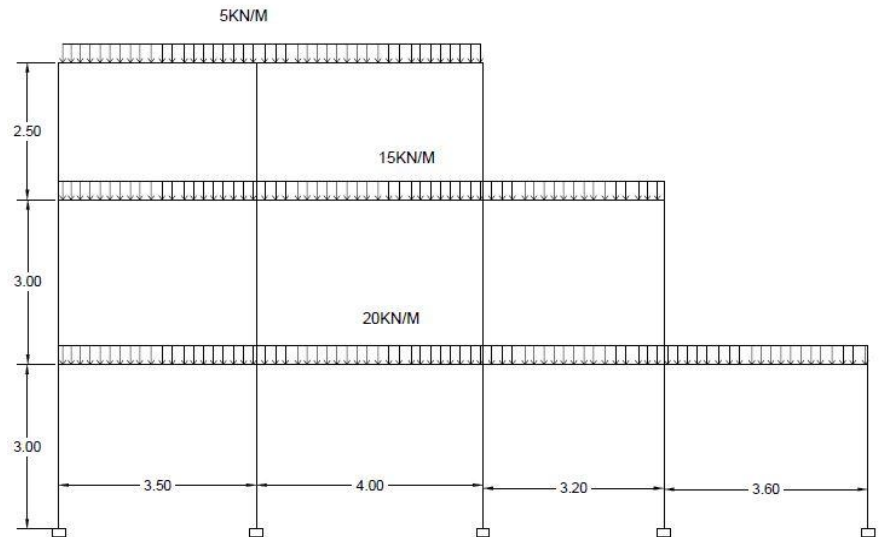   Analyze the frame as shown in Fig with the following considerations
   - Beam Section: 230mmx300mm
   - Column Section: 300mmx230mm
   - Concrete Grade : M25
   - Steel Grade : HYSD415

4) **Example:**
   Analyze the 2-D frame as shown in Fig with the following considerations

- Beam Sections: 230mmx300mm
- Column Sections: 230mmx300mm
- Concrete Grade : M25
- Steel Grade : HYSD415

3D Frame:

1) **Example:**
   o 6 story building of 3m typical story height & 2.5 m bottom story height
   o 3 spans of 5m in x direction   4 Grids
   o 2 spans of 4.5m in y direction   3 Grids
   o Beam section of 230X450mm
   o Column section of 230X500mm
   o F_{Ck} – 30 MPa; F_y- 500 Mpa
   o Slab of 125mm thickness

DAY-3:

TOPICS:

Types of Loads & Load Calculation, 3D- structural Analysis for Gravity Loads

2) **Example:**

● 5Story Building – 3.0 m typical height – bottom story – 2.5 m

● x-direction : 4 Spans – 5.0, 3.5, 5.0, 4.0 m

● y –direction : 5 Spans – 5.0, 4.5, 3.0, 5.5, 3.5 m

- F_{Ck} – 30 MPa; F_y- 500 Mpa

- Beam Section – 230x 450 mm

- Column Section – 450 x 300 mm

- Slab – 125mm thick

Types of Loads & Load Calculation:
- **IS: 875 (Part 1)-1987**- includes the dead load to be considered for the structure.

- **IS: 875 (Part 2)-1987**- this code involves the imposed load or live load acting on the structure. It includes the imposed load i.e. roof load, dust load, loads due to partition etc.

- **IS: 875 (Part 3)-1987**- this code involves the wind load consideration for a structure.

- **IS: 875 (Part 5)-1987**- this involves the special code and load combinations to be considered. The different combination of dead load, live load, wind load and erection load after proper application of factor is given in this code.

- **IS: 1893(Part 1)-2016-** Includes Seismic Load Considerations

- **IS 456: 2000 –** Plain And Reinforced Concrete Design

DAY-4:

TOPICS:

Wind Analysis of a Multi Storied Building¸ Seismic (Linear Static) Analysis of Building

DAY-5:

TOPICS:

Response Spectrum (Dynamic) Analysis , Shear Wall Analysis, Analysis and Design of Plan Imported from AutoCAD

DAY-6:

TOPICS:

Failure Sections Modification, AutoCAD plan Import & Modelling

NOTE: From Day-4 to Day-6 interlink sessions every part is related to calculation for analysis using different code books

College Name: JNTUA College of Engineering, Pulivendula

Program Name: Structural Analysis Using ETABS

Workshop Dates: 28-08-2023 to 02-09-2023

M. Pravallika