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Session - 1

Brief Introduction and concepts of analysis and design

E T A B S: - Extended three dimensional analysis of Building System.

Founded by a company called CSI

CSI: Computers and Structures INC

Initially the ETABS software was just a program and was developed by a group of people (Masters Students) in the year of 1975.

Later an official copy of integrated analysis and design software was released in the year of 1985.

Case Study: - 1st Project worked out using ETABS was Burj Khalifa, ETABS was used to make the mathematical model of Burj Khalifa. (**Total height 828m**)

The following are the products of CSI

- SAP 2000
- CSI BRIDGE
- **ETABS**
- **SAFE**
- PERFORM - 3D
- CSICOL

Structural analysis and design concepts

More than to say structural analysis and design it could be called as an art, An art that has got a history as good as the origin of human beings on this earth. In due course of civilization for the progressive well being of mankind.

One of the best examples for this art is the construction of pyramids of Egypt in the late 2000 years B.C. which is still a testimony for the modern day architects and designers.

Structural analysis and design in today's world

1. Load acting on the structures is ultimately transferred to ground.

2. In the process of load transferring, various components of the structures are subjected to internal stress and strain.

Stress=LOAD (P)/AREA (A) & strain=CHANDE IN LENGTH (ΔL)/ORIGINAL LENGTH (L)

3. For example load acting on a building will be transferred to ground in t he following path-way.

Slabs **>** Beams **>** Column **>** Footing **>** Ground

Definitions

Structural Analysis: - Applying the loads on a structure and assessing the internal stress in the components of a structure is known as structural analysis

e.g:- SFD & BMD

Structural Design: - Based on the analysis results finding the suitable size or cross section of a particular type of structural component is known as design of structures .

e.g:- Depth and amount of steel

Type of Structures

1. Masonry

2. R.C.C

3. Steel

Or combination of all the above and is often called as Composite Structures.

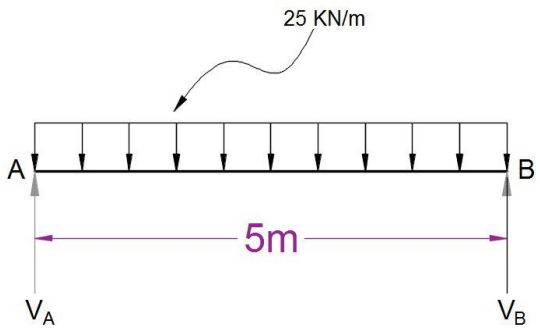
Types of structural analysis wise

1. **Deterministic Structures**: - Structures that could be analysed by using static equilibrium equations are known as deterministic structures.

The following are the static equilibrium equation:-

- ∑m = 0
- ∑H = 0
- ∑V = 0

e.g:- Consider Simply supported beam with UDL



No., of unknowns is two V_A and V_B

No., of SEE is 3

Therefore we can solve it manually and
Hence it is a deterministic structure.