# SNS COLLEGE OF TECHNOLOGY
## Coimbatore-35
## An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

# DEPARTMENT OF CIVIL ENGINEERING

**19CET203- Mechanics Of Solids**

**II YEAR     III SEM**

UNIT 2 – SHEAR AND BENDING BEAMS

## SHEAR FORCE:

The algebraic sum of the vertical forces at any section of a beam to the right or left of the section is known as **Shear Force.**
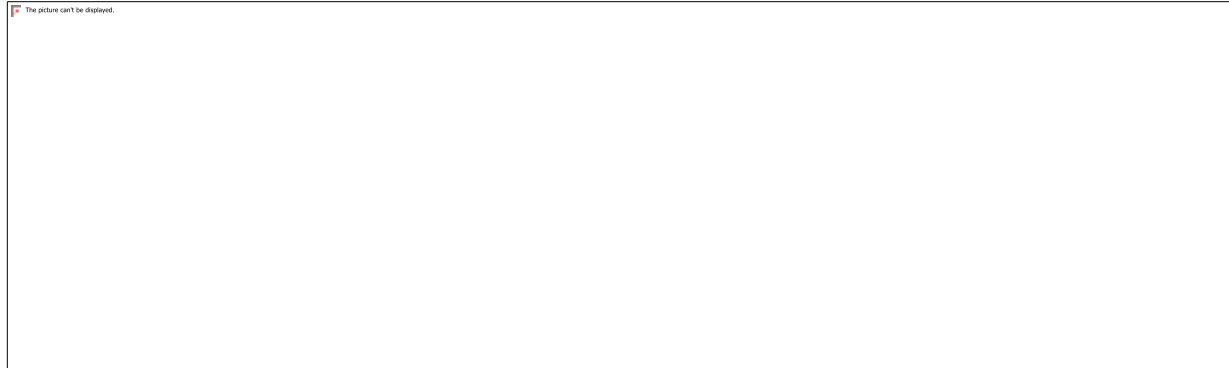
## BENDING MOMENT:

The algebraic sum of the moments of all the forces acting to the right and left of the section is known as **Bending Moment**

## Types of Beam:

- Cantilever Beam
- Simply Supported Beam
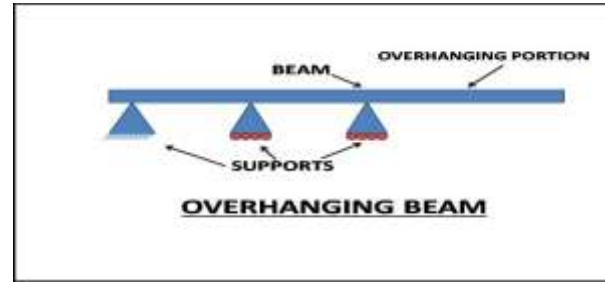- Overhanging Beam
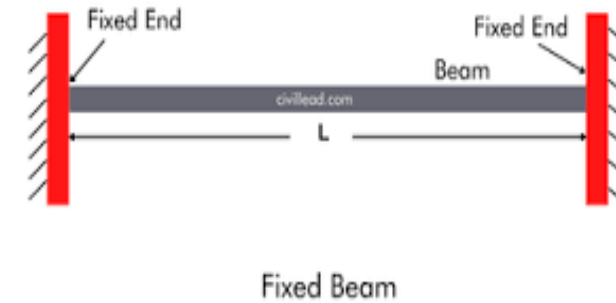- Fixed Beam
- Continuous Beam

# 1. Cantilever Beam:

The picture can't be displayed.

# 2. Simply Supported Beam:



Pinned Support          Roller Support

Simply Supported Beam

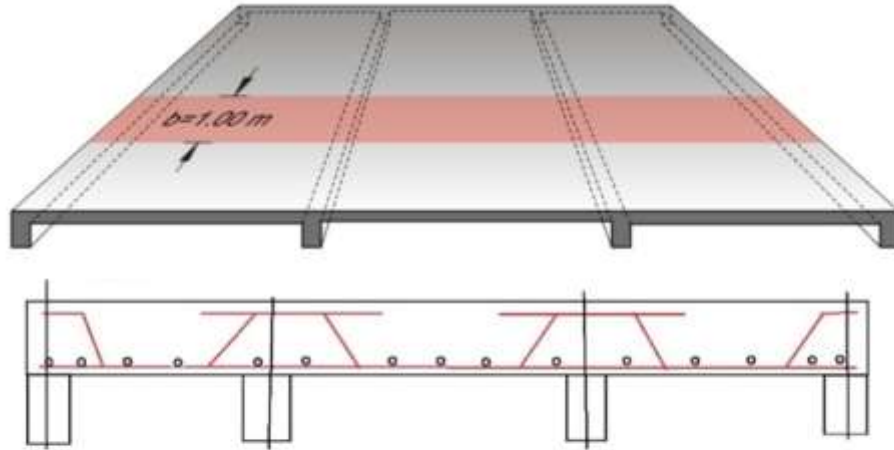# 3. Overhanging Beam:



OVERHANGING BEAM

# 4. Fixed Beam:





Fixed Beam

# 5. Continuous Beam:
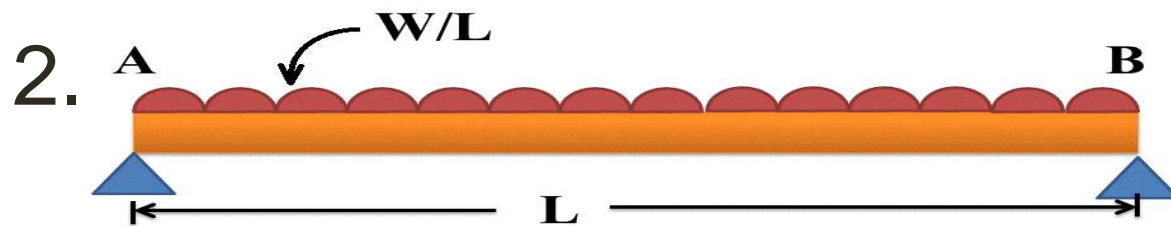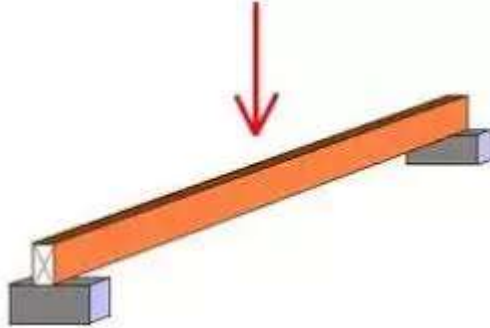


**Continuous Beam and Non-prestressed One-way Slab Design**

# TYPES OF LOAD:

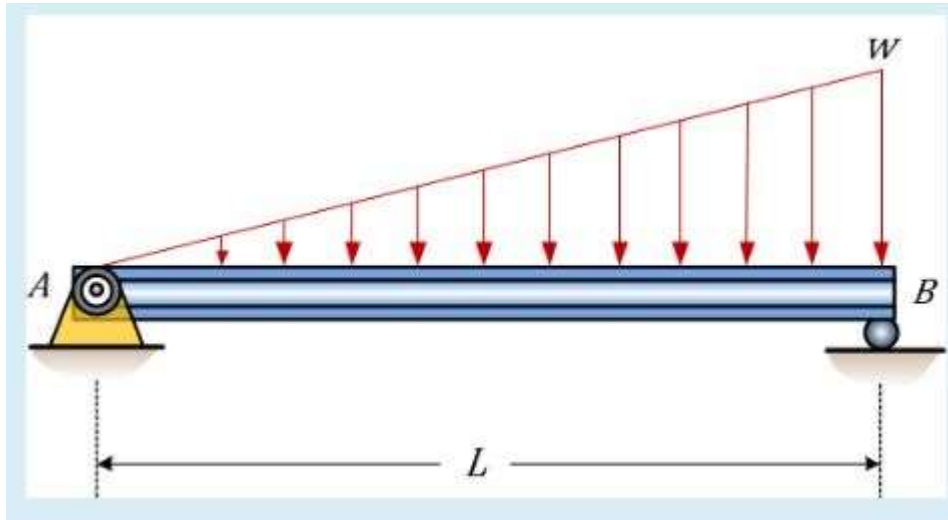## 1. Concentrated or Point Load:



2. 

**W/L**

A                                    B

**L**

**Uniformly Distributed Load(UDL)**

# 3. Uniformly Varying Load:

# STATICALLY DETERMINATE STRUCTURES AND STATICALLY INDETERMINATE STRUCTURES:

If a structure is determinate, you can determine reactions, the stresses developed, and the deflection by just applying the principle of equilibrium;

On the other hand, if it is indeterminate, you would need to find additional conditions based on compatibility.

Majority of real-life structures are indeterminate and a lot harder to analyse compared to determinate structures.

# CLASSIFICATION OF STRUCTURAL ANALYSIS PROBLEMS

| Statically determinate | Statically indeterminate |
| --- | --- |
| Equilibrium equations could be directly solved, and thus forces could be calculated in an easy way | Equilibrium equations could be solved only when coupled with physical law and compatibility equations |
| Stress state depends only on geometry & loading | Stress state depends on rigidities |
| Not survivable, moderately used in modern aviation (due to damage tolerance requirement) | Survivable, widely used in modern aviation (due to damage tolerance property) |
| Easy to manufacture | Hard to manufacture |

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# THANKYOU