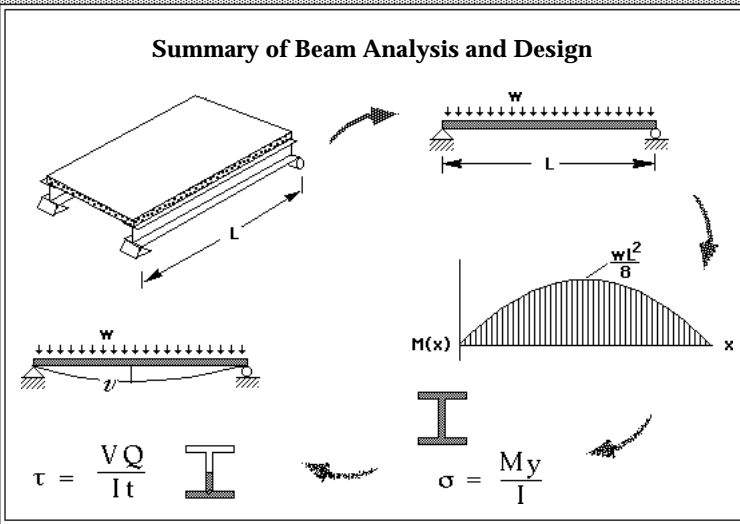


Summary of Beam Analysis and Design



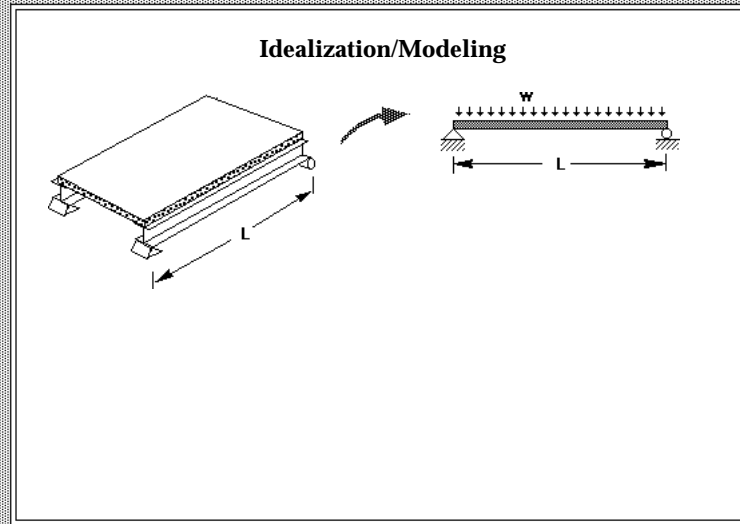
The diagram illustrates the process of beam analysis and design. It starts with a 3D perspective view of a beam of length L supported at both ends. An arrow points to a 2D schematic of the beam with a uniformly distributed load w and length L . A second arrow points to a bending moment diagram $M(x)$ showing a parabolic distribution with a maximum value of $\frac{wL^2}{8}$. A third arrow points to the shear stress formula $\tau = \frac{VQ}{It}$ and the normal stress formula $\sigma = \frac{My}{I}$, accompanied by a cross-section of an I-beam.

$\tau = \frac{VQ}{It}$

$\sigma = \frac{My}{I}$

Hide Text

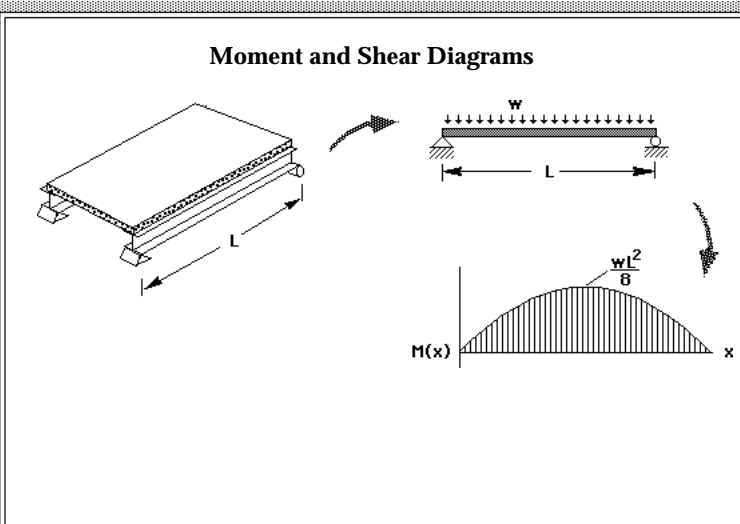
Idealization/Modeling



The diagram illustrates the idealization and modeling process. It starts with a 3D perspective view of a beam of length L supported at both ends. An arrow points to a 2D schematic of the beam with a uniformly distributed load w and length L .

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Moment and Shear Diagrams



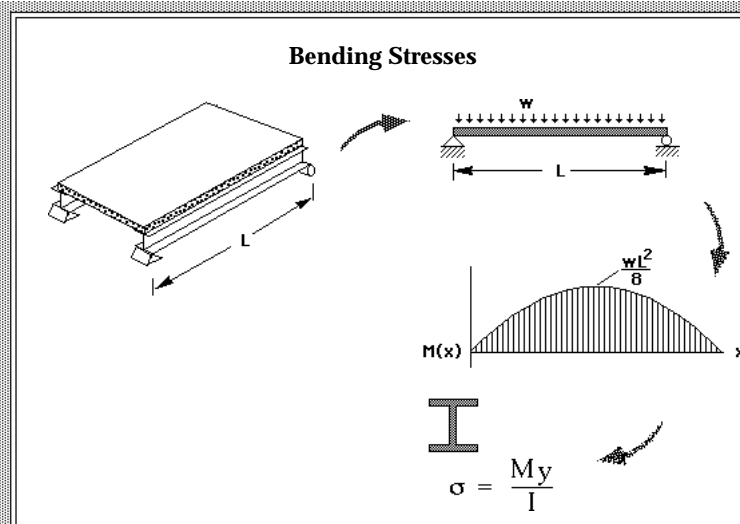
The diagram illustrates the process of drawing moment and shear diagrams. It starts with a 3D perspective view of a beam of length L supported at both ends. An arrow points to a 2D schematic of the beam with a uniformly distributed load w and length L . A second arrow points to a bending moment diagram $M(x)$ showing a parabolic distribution with a maximum value of $\frac{wL^2}{8}$.

$M(x)$

$\frac{wL^2}{8}$

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Bending Stresses



The diagram illustrates the process of determining bending stresses. It starts with a 3D perspective view of a beam of length L supported at both ends. An arrow points to a 2D schematic of the beam with a uniformly distributed load w and length L . A second arrow points to a bending moment diagram $M(x)$ showing a parabolic distribution with a maximum value of $\frac{wL^2}{8}$. A third arrow points to the normal stress formula $\sigma = \frac{My}{I}$ and a cross-section of an I-beam.

$\sigma = \frac{My}{I}$

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Bending Stresses/Member Selection

$$\sigma_{\max} = \frac{M_{\max} c}{I}$$

$$\sigma = \frac{My}{I}$$

Hide Text

Bending Stresses/Member Selection

$$\sigma_{\max} = \frac{M_{\max} c}{I}$$

$$I/c = M_{\max} / \sigma_{\text{all}}$$

$$\sigma = \frac{My}{I}$$

Hide Text

Check Deflections & Shear

$$\tau = \frac{VQ}{It}$$

$$\sigma = \frac{My}{I}$$

Hide Text

What else is there?

Hide Text

What else is there?

- Unsymmetric Cross-sections
- Inelastic Behavior
- Stability/Buckling
- Assemblages
- Various Methods of Analysis
- Composite Sections
- (Large Displacements)

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