Postgraduate Certificate in Structural Steel Design

Steel Connection Design

Bolted connection: A type of steel connection where two or more steel members are joined together using bolts. The bolts are typically inserted through holes in the connected members and then tightened to clamp the members together.

Chord: In a steel truss, the top and bottom members that form the outline of the truss are called the top chord and bottom chord, respectively.

Connected members: The steel members that are being joined together in a steel connection.

Continuity plates: Plates that are used to provide continuity in a steel connection, typically by connecting the flanges of two or more connected members together.

End plates: Plates that are used to transfer loads between connected members in a steel connection. They are typically welded to the ends of the connected members.

Flange: The outer part of a steel beam or column that is parallel to the web. The flange is typically where the loads are applied to the member.

Gusset plate: A plate that is used to connect two or more steel members together at an angle.

Haunch: An extension of the web of a steel beam or column that provides additional strength and stiffness to the member.

Moment connection: A type of steel connection that is designed to transfer moment loads between connected members.

Net section: The area of a steel member that remains after any holes or notches have been removed.

Prying force: A force that is induced in a steel connection due to the deformation of the connected members.

Plate: A flat piece of steel that is used to connect two or more steel members together.

Shear connection: A type of steel connection that is designed to transfer shear loads between connected members.

Shear lag: The phenomenon where the distribution of stress in a steel member is not uniform due to the presence of holes or notches.

Stiffener: A plate or shape that is used to reinforce a steel member and increase its resistance to buckling.

Tee joint: A type of steel joint that is formed by connecting the flange of one steel member to the web of another member, forming a "T" shape.

Tension member: A steel member that is designed to resist tension forces.

Web: The vertical part of a steel beam or column that is perpendicular to the flanges.

Web stiffener: A plate or shape that is used to reinforce the web of a steel member and increase its resistance to buckling.

Yield strength: The maximum stress that a steel member can withstand before it begins to yield.

Bolted moment connection: A type of steel connection that uses bolts to transfer moment loads between connected members. These connections are typically classified as either flexible, semi-rigid, or rigid, depending on their stiffness.

Flexible bolted moment connection: A bolted moment connection that is designed to allow some rotation between connected members. These connections are typically used in buildings with seismic design requirements.

Rigid bolted moment connection: A bolted moment connection that is designed to prevent any rotation between connected members. These connections are typically used in buildings with statically determinate structures.

Semi-rigid bolted moment connection: A bolted moment connection that is designed to provide some rotation capacity while also providing a significant amount of stiffness. These connections are typically used in buildings with dynamic loads, such as wind or seismic loads.

Buckling: The phenomenon where a slender steel member fails due to compressive forces.

Buckling strength: The maximum compressive force that a steel member can withstand before it buckles.

Eccentrically loaded connection: A steel connection where the loads are applied at a distance from the centerline of the connection, resulting in moment loads.

End distance: The distance between the centerline of a bolt hole and the edge of a connected member.

End reaction: The reaction force that is generated at the end of a steel member due to the loads applied to it.

Fracture mechanics: The branch of engineering that deals with the study of fracture in materials.

Fracture toughness: A measure of a material's resistance to fracture.

Friction grip bolt: A type of bolt that relies on friction between the bolt and the connected members to transmit loads.

High-strength bolt: A bolt that is made from a material with a higher yield strength than a standard bolt.

Hole diameter: The diameter of a bolt hole in a connected member.

Load distribution: The way in which loads are distributed among the connected members in a steel connection.

Moment capacity: The maximum moment that a steel connection can transmit without failing.

Prying action: The phenomenon where the deformation of a steel connection results in a force being applied to the bolt, increasing the load on the bolt.

Reduced beam section: A section of a steel beam that has been notched or cut out to reduce its moment of inertia and increase its stiffness.

Slip critical connection: A bolted connection where the loads are transmitted through friction between the connected members.

Snug tight connection: A bolted connection where the bolts are tightened just enough to hold the connected members together.

Tension capacity: The maximum tension force that a steel connection can transmit without failing.

Torsional resistance: The ability of a steel connection to resist twisting forces.

Web crippling: The phenomenon where a steel web fails due to localized compressive forces.

Web yielding: The phenomenon where a steel web yields due to localized compressive forces.

Yield line theory: A method for analyzing the moment capacity of a steel connection based on the yield line pattern of the connection.

ACI 318: The American Concrete Institute's Building Code Requirements for Structural Concrete.

AISC: The American Institute of Steel Construction.

AISC 360: The American Institute of Steel Construction's Specification for Structural Steel Buildings.

ANSI/AWS D1.1: The American Welding Society's Structural Welding Code - Steel.

ASD: Allowable Stress Design, a method for designing steel structures based on allowable stresses.

Bolted flange connection: A steel connection that uses bolts to connect the flanges of two or more steel members together.

Bolted splice connection: A steel connection that uses bolts to connect two or more steel members end-to-end.

Bolt thread engagement: The distance that a bolt's threads engage with the threads in a nut or tapped

hole.

Bolted web connection: A steel connection that uses bolts to connect the web of one steel member to the flange or web of another member.

Cleat connection: A steel connection that uses a cleat, or a right-angle bracket, to connect two or more steel members together.

Clip angle connection: A steel connection that uses an angle, or a right-angle bracket, to connect two or more steel members together.

Connection design: The process of designing a steel connection to transmit loads between steel members in a safe and efficient manner.

Coped beam connection: A steel connection that uses a coped beam, or a beam with a notch or cutout, to connect to another beam or column.

End plate connection: A steel connection that uses an end plate, or a flat plate, to connect two or more steel members together.

Flange clevis connection: A steel connection that uses a flange clevis, or a U-shaped bracket, to connect two or more steel members together.

Fracture mechanics approach: A method for analyzing the fracture toughness of a steel connection based on fracture mechanics principles.

Fully restrained connection: A steel connection that fully restrains the rotation of connected members.

Gusset plate connection: A steel connection that uses a gusset plate, or a flat plate with holes for bolts, to connect two or more steel members together.

Hanger connection: A steel connection that uses a hanger, or a U-shaped bracket, to support a steel member from another member or structure.

LRFD: Load and Resistance Factor Design, a method for designing steel structures based on load factors and resistance factors.

Moment connection design: The process of designing a steel connection to transmit moment loads between steel members.

Partial joint penetration groove weld: A type of weld that partially penetrates the thickness of a steel member.

Pinned connection: A steel connection that allows rotation between connected members.

Plate girder connection: A steel connection that uses a plate girder, or a beam with a wide flange and web stiffeners, to connect two or more steel members together.