



Adani Institute of Infrastructure

Management • Engineering

Course Content of Bridge Designing

1. Introduction of design.

- What is design?
- Types of design.
- Importance of design.

2. Introduction of structure.

- What is structure?
- Types of structure.
- Structural member.

3. Structural design process.

4. Structural connection.

5. Truss members and bracing.

6. Structural loads.

- Dead load.
- Live load.
- Wind load.
- Snow load.
- Seismic load.

7. Structural analysis.

8. Steel design.

- What is steel?
- Properties.



- Effect of carbon in steel.
- Disadvantage.

9. Concrete design.

- What is concrete?
- Properties.
- Concrete grade.

10. Introduction of staad pro.

- Advantages.
- Difference in auto cad and staad pro.
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Introduction to Geometry

- Creation of Geometry
- Modifying Geometry of Members.
- Use of Bracings in Structure.
- Placement of Bracings in Structure.
- Geometry of Bracings in Structure.
- Miscellaneous Geometry in the Structure - Curved Beams, Solids.
- Revision of Geometry of Structure as in Architectural Drawing.
- Meaning of Property of Members – Steel and Concrete.
- Releases in members.
- Meaning of Connections in Steel members.
- Concrete Joints and Connections.
- Use of Master/Slave Joints.
- Truss, Tension and Compression members.
- Introduction to various types of Supports- Fixed, Pinned, Fixed But and Enforced but Supports.
- Various Types of Loadings.
- Basics of Dead Load, Live Load and Snow Load.



- Various Types of Loadings- Continued.

11. Introduction of bridge.

- What is bridge?
- Importance of Bridge.
- Allowable Stress Design
- Load and Resistance Factor Design

12. Principles of Limit States Design.

- Design Procedures
- Allowable Stress Design (ASD)
- Load and Resistance Factor Design (LRFD)

13. Loads

- Permanent Loads
- Dead Loads
- Transient Loads
- Vehicular Live Load LL
- Pedestrian Live Load PL
- Water Load and Stream Pressure Force WA
- Wind Load WS and WL
- Earth Loads

14. Geotechnical Site Characterization

- Planning Exploration and Testing Programs
- Soil and Rock Variability
- Field Test Methods
- Ground Water Locati



15. Geotechnical Design Parameter Selection

- Test Method Selection
- Field Test Methods
- Parameter Evaluation
- Reliability of Tests for Estimating Design Parameters

16. Spread Footing Design

- Design Methods
- Comparison of Spread Footing Design Using LRFD and ASD
- Footing Embedment
- Buoyancy and Uplift

17. Driven Pile Design

- Introduction
- Design Methods
- Comparison of Driven Pile Design Using LRFD and ASD
- Geotechnical Design
- Fixity of Pile Cap Connection

18. Conventional Retaining Wall and Abutment Design

- Design Methods
- Comparison of Wall Design Using LRFD and ASD
- Loss of Passive Resistance
- Drainage



19. Mechanically Stabilized Earth (MSE) Wall Design

- Introduction
- Design Methods
- General Design Considerations
- Pullout of Reinforcing Elements
- Rupture of Reinforcing Elements
- Design Life

20. Bridge Substructure Rehabilitation

- Rehabilitation strategies - techniques to strengthen the bridge substructure without replacing it
- Bridge substructure assessment
- Material deterioration: concrete, steel, timber, fatigue assessment and seismic retrofit
- Foundation rehabilitation
- Substructure

21. Aerodynamics of bridge.

22. Types of bridges.

- Arch bridge.
- Cantilever bridge.
- Beam bridge.
- Cable stayed bridge.