

BRIDGE ENGINEERING AND DESIGN

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Introduction to Bridge Engineering: Components on bridge structures, Planning of bridges (traffic, hydro-technical, geotechnical, environmental and constructability/economic feasibility studies), Bridge types and selection criteria, Geometric design considerations, Aesthetics, Bearings, Piers, Abutment, and Introduction to IRC/IRS bridge design codes; Bridge Loads and Design Methods: Highway bridge loads as per IRC codes, Load combinations, Design philosophies (ASD/LSD) for various bridge types; Bridge Deck Analysis: Simplified deck analysis and load distribution methods (Pigeaud, Courbon, Morrice-Little methods), Influence functions and girder line analysis, and refined analysis using grillage and FEM; Culverts: General considerations, hydraulic and structural design; Concrete Bridge Design: Behavior and design of RC and pre-stressed concrete (PSC) flexural members, Solid slab and T-beam, box section and girder bridges; Steel & Composite Bridge Design: Behavior and design of steel flexural members, steel plate girder and composite bridges; Substructure Design Subsurface investigation and design considerations for bridge foundation types, design of bridge piers, pile cap, and abutments