

Highway & Transportation Engineering

Code: CE601

Contact: 3L

Credits: 3

1. Introduction to Highway Engineering: Scope of highway engineering; Jayakar Committee Report; saturation system; highway financing ('pay as you go method and credit financing method) and highway economics (quantifiable and non quantifiable benefits to highway users, cost of vehicle operation, annual cost method, and benefit-cost ratio method) [2]

2. Highway Alignment: Requirements: factors controlling alignment; engineering surveys for highway alignment and location. [2]

3. Highway Geometric Design: Cross-sectional elements; design speed, passing and non-passing sight distances; PIEV theory, requirements and design principles of horizontal alignment including radius of curvature, super elevation, extra-widening, design of transition curves, curve resistance, set back distance, grade compensation and vertical alignment. [12]

4. Pavement design: Evaluation of soil subgrade, sub-base, base and wearing courses; design factors for pavement thickness (including design wheel load and ESWL, strength of pavement materials and plate load tests, and effect of climatic variations) Group Index and CBR, IRC method of flexible pavement design; Westergaards analysis of wheel load stresses in rigid pavements; frictional stresses and warping stresses; IRC recommendations for design of rigid pavements; design of expansion and contraction joints. Benkelmen Beam Test, Fialure of flexible and rigid pavements. [8]

5. Pavement construction Technique: Types of pavement; construction of earth roads, gravel roads, WBM, bitumen and cement concrete roads; joints in cement concrete pavements. [4]

6. Traffic Engineering: Traffic characteristics, theory of traffic flow, intersection design, traffic sign and signal design, highway capacity [8]

7. Road Materials and Testing : Soil, Stone Aggregate, Bitumen, Marshal Stability Test [**]

**** To be covered in CE 691 (Highway and Transportation Engineering Lab)**