Module 1

Chapter 1 :	Introduction to	Transportation systems
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1-1 to 1-29

1.1 Introduc	tion	to Tra	nsportati	on	Engineering	:
Comparison	of	various	modes	of	transportation	on
(Roadways, Ra	ailway	s, Airways	and Wat	erwa	ıvs).	

- 1.2 Introduction to Railway Engineering sectional elements of railway track (Foundation, Ballast, Sleepers and Rail), Introduction to turnout, Super elevation design, Negative Super elevation, Construction and Maintenance of Railway track.
- 1.3 Introduction to Airport Engineering: Elements of Airport, Site selection of Airport, Design of Runway length, Taxiway and Exit Taxiway design.
- 1.4 Introduction to Waterways: Definition of Docks, Harbour and Ports. Elements and types of Docks, Harbour and Port

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Chapter 2: Planning & Geometric Design of Highways 2-1 to 2-39

- 2.1 Classification of roads based on various criteria: Road development plans, agencies related to highway development, Highway alignment (basic requirement and factors governing), hill roads, Surveys for highway location.
- **2.2 Terrain Classification :** Vehicular Characteristics, Cross section elements of highways (width of carriage way, shoulders, medians, width of road way, right of way, camber & its profile).
- **2.3 Design speed :** Sight distance, perception time, break reaction time, analysis of safe sight distance, analysis of overtaking sight distance, intersection sight distance.
- 2.4 Horizontal curves: Design of super elevation, its provisions, minimum radius of horizontal curves, widening of pavement, transition curves.
- 2.5 Gradients: Different types, maximum, minimum, ruling exceptional, grade compensation on curves.

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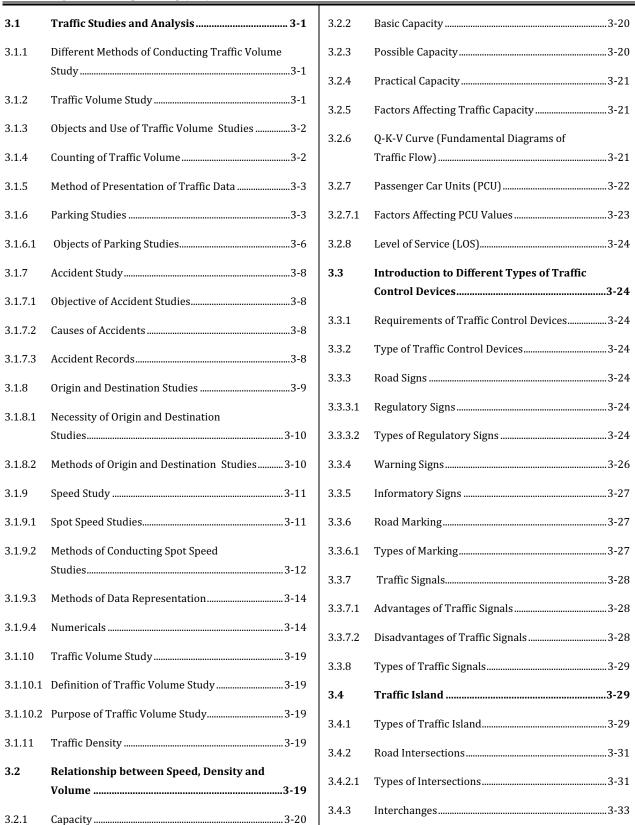
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	Module 3

Chapter 3 : Traffic Engineering

3-1 to 3-34

- **3.1** Introduction to various traffic studies such as speed study, volume study, parking study, accident study, O&D study etc. Speed study: methods to determine speed, types of speed (Spot speed, Design speed, Upper & lower limit speeds, Mean Median and Modal speed); Traffic Volume study (flow): Definition, AADT, ADT, Design volume, methods of determining traffic volume. Traffic density: Definition, importance.
- **3.2** Introduction to Relationship between speed, density and volume: Capacity: Q-K-V curve, Different types and factors affecting capacity, Concept of PCU and LOS.
- **3.3** Introduction to traffic control devices Traffic signs, signals (no design), road marking.
- **3.4** Different types of Intersections At-grade and Grade Separated ; Grade separated interchanges; rotary intersection.







Module 4

Chapter 4: Pavement Material and Design 4-1 to 4-49

4.1 Types of pavements : comparison of flexible and rigid pavements, Requirements of pavement materials, Soil: requirement of soils as subgrade material, CBR test.

Aggregate : Requirements of aggregate as Pavement material, Tests on aggregate with specified values. Bitumen: Requirements of bitumen as pavement material test on bitumen with specified values, variants of bitumen Bituminous mix design using Marshall Stability test.

- **4.2 Flexible pavement design :** Concepts related to flexible pavement design such as tyre pressure, contact pressure, ESWL, VDF and LDF. IRC approach for design (IRC: 37- 2001, IRC: 37- 2012), also IRC SP 72-2007/2015 and IRC 77 2008.
- **4.3 Rigid pavement design :** Modulus of subgrade reaction, equivalent radius of resisting section, radius of relative stiffness, stresses on rigid pavement, combine loading temperature stress.; Design of rigid pavements (IRC: 58- 2002; IRC: 58- 2011, IRC: 58- 2015. IRC: SP- 62-2004, IRC: SP- 62-2014).

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