

ADVANCED SOIL MECHANICS FOR PROBLEMATIC SUBGRADE

CE 826

Soil Mechanics Applications to Highway Engineering: Soil formations, Types, Index properties, their determination, importance, various soil classification systems, Elastic properties of soil, Field determination of Elastic modulus- methods and equipment

Site Investigation: Introduction, Planning exploration programmes, Methods, Samplers, SPT, Subsoil investigation Report, Geophysical methods. Soil investigations for assessing the design details of road embankments and cuts, drainage requirements. Material surveys and investigations for availability and choice of basic and alternate materials for road construction and for soil stabilization.

Soil Compaction: Introduction, Lab Tests, Factors affecting, Structure & Engg behavior of compacted cohesive soil, Field compaction specifications, Field compaction control, Different types of Equipments used for compaction, their choice. Soil compaction for use in fill and subgrade of roads

Soil Stabilization: Principles, methods and tests, proportioning of materials and mix design, application of Rothfuch's method. Marginal and waste materials in road construction, their properties and scope in road construction. Use of Fly-ash in road embankment and cement concrete mixes, use of chemical stabilizers in road construction.

Problems of Construction of Roads in Marshy Areas and Weak / Expansive Soils and Water logged areas: Various effective measures for solving the problems, machinery required and method of construction. Control of water table, capillary rise and seepage flow in road construction. Design and construction of filter drains and capillary cut-off.

**References:**

1. B.C. Punmia, Ashok Kumar Jain and Arun Kumar, *Soil Mechanics & Foundation Engineering*, Jain, Laxmi Publications (P) Ltd, 16th edition, 2005.
2. P. Purushothama Raj, *Ground Improvement Techniques*, Laxmi Publications (P) Ltd., New Delhi, 2005.
3. John D Nelson and Debora J Miller, *Expansive Soils - Problems and Practice in Foundation and Pavement Engineering*, John Wiley and Sons, 1992.
4. Transport and Road Research Laboratory, *Soil Mechanics for Road Engineers*, HMSO, London, 1974.
5. Relevant IRC codes and Ministry Specifications.



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