

AMTS19 ADVANCED FOUNDATION ENGINEERING

UNIT-1 MAT FOUNDATIONS

- 1.1 Introduction, combined footings, common types of mat foundations, differential settlement of mats, field settlement observations for mat foundations,
- 1.2 Compensated foundation, structural design of iv /at foundations.

UNIT-2 SHEET PILES WALLS

- 2.1 Construction methods, cantilever sheet pile walls, special cases for cantilever walls penetrating a sandy soil, cantilever sheet piling penetrating clay,
- 2.2 Special cases for cantilever walls penetrating clay, anchored sheet pile walls, free earth support method for penetration of sandy soil, moment reduction for anchored sheet pile walls,
- 2.3 Computational pressure diagram method for penetration into sandy soil, free earth support method for penetration of clay, holding capacity of anchor plates in sand,
- 2.4 Ultimate resistance of tiebacks, field observations for anchored sheet pile walls.

UNIT-3 BRACED CUTS

- 3.1 Pressure envelope for braced-cut design, pressure envelope for cuts in layered soil, design of various components of a braced cut, bottom heave of a cut in clay,
- 3.2 Stability of the bottom of a cut in sand, lateral yielding of sheet piles and ground settlement.

UNIT-4 PILE FOUNDATION

- 4.1 types of piles and their structural characteristics, estimating pile length, installation of piles, load transfer mechanism, equations for estimating pile capacity,
- 4.2 Meyerhof's method for estimating q_p , vesic's method for estimating q_p , janbu's method for estimating q_p , Coyle and Castello's method for estimating q_p in sand,
- 4.3 Other correlations for calculating q_p with spt and cpt results, frictional resistance (q_s) in sand, frictional (skin) resistance in clay, general comments and allowable pile capacity,
- 4.4 Point bearing capacity of piles resting on rock, pile load tests, comparison of theory with field load test results, elastic settlement of piles, laterally loaded piles, pile-driving formulas,
- 4.5 Stress on piles during driving, pile capacity for vibration-driven piles, negative skin friction, group efficiency, ultimate capacity of group piles in saturated clay,
- 4.6 Piles in rock, elastic settlement of group piles, consolidation settlement of group piles,

UNIT-5 DRILLED SHAFT FOUNDATIONS

- 5.1 Types of drilled shafts, construction procedures, other design considerations, load transfer mechanism, estimation of load-bearing capacity, and
- 5.2 Drilled shafts in sand: load-bearing capacity, settlement of drilled shafts at working load, lateral load-carrying capacity, and drilled shafts extending into rock.

UNIT-6 FOUNDATIONS ON DIFFICULT SOILS

- 6.1 Definition and types of collapsible soil, physical parameters for identification, procedure for calculating collapse settlement, foundation design in soils not susceptible to wetting,

- 6.2 Foundation design in soils susceptible to wetting, case histories of stabilization of collapsible soil, general nature of expansive soils, laboratory measurement of swell,
- 6.3 Classification of expansive soil on the basis" of index tests, foundation considerations for expansive soils, construction on expansive soils, general nature of sanitary landfills,
- 6.4 Settlement of sanitary landfills.

UNIT-7 SOIL IMPROVEMENT AND GROUND MODIFICATION

- 7.1 General principles of compaction, correction for compaction of soils with oversized particles, field compaction, compaction control for clay hydraulic barriers,
- 7.2 Vibroflotation, precompression, sand drains, an example of a sand drain application, prefabricated vertical drains, cement stabilization, fly-ash stabilization,
- 7.3 Stone columns, sand compaction piles, dynamic compaction.

Reference Books:

1. Advanced Foundation Engineering By V.N.S Murthy
2. Design Aids in Soil Mechanics and Foundation Engineering-Shenbaga R Kaniraj, TATA Mc-Grawhill
3. Design of Foundation Systems- Nainan P Kurian, Narosa publication house

