

PART VI
Appendix C

Seismic Design Parameters for Alternative Method of Base Shear Calculation

Table 6.C.1: Spectral Response Acceleration Parameter S_s and S_1 for Different Seismic Zone

Parameters	Zone-1	Zone-2	Zone-3	Zone-4
S_s	0.3	0.5	0.7	0.9
S_1	0.12	0.2	0.28	0.36

Table 6.C.2: Site Coefficient F_a for Different Seismic Zone and Soil Type

Soil Type	Zone-1	Zone-2	Zone-3	Zone-4
SA	1.0	1.0	1.0	1.0
SB	1.2	1.2	1.2	1.2
SC	1.15	1.15	1.15	1.15
SD	1.35	1.35	1.35	1.35
SE	1.4	1.4	1.4	1.4

Table 6.C.3: Site Coefficient F_v for Different Seismic Zone and Soil Type

Soil Type	Zone-1	Zone-2	Zone-3	Zone-4
SA	1.0	1.0	1.0	1.0
SB	1.5	1.5	1.5	1.5
SC	1.725	1.725	1.725	1.725
SD	2.7	2.7	2.7	2.7
SE	1.75	1.75	1.75	1.75

Table 6.C.4: Spectral Response Acceleration Parameter S_{DS} for Different Seismic Zone and Soil Type

Soil Type	Zone-1	Zone-2	Zone-3	Zone-4
SA	0.2	0.333	0.466	0.6
SB	0.24	0.4	0.56	0.72
SC	0.23	0.383	0.536	0.69
SD	0.27	0.45	0.63	0.81
SE	0.28	0.466	0.653	0.84

Table 6.C.5 Spectral Response Acceleration Parameter S_{D1} for Different Seismic Zone and Soil Type

Soil Type	Zone-1	Zone-2	Zone-3	Zone-4
SA	0.08	0.133	0.186	0.24
SB	0.12	0.2	0.28	0.36
SC	0.138	0.23	0.322	0.414
SD	0.216	0.36	0.504	0.648
SE	0.14	0.233	0.326	0.42

PART VI
Appendix D**Methods of Soil Exploration, Sampling and Groundwater Measurements****D.1 Methods of Soil Exploration**

The detailed methods of soil investigation usually include collecting undisturbed samples and or performing field tests. Listed below are some of the common methods of subsoil exploration.

D.1.1 Open Trial Pits

In this method trial pits are excavated exposing the subsoil thoroughly. Undisturbed samples are taken from intact sides and bottom of the trial pits. This is suitable for all types of formation but for cuts which cannot stand below water table, proper bracing shall be provided. This method is normally used for shallow depths (up to 3 m). Test pits are usually prepared by hand excavation which allows access for a full observation and description of the soil profile. Hand-cut samples known as block or chunk samples can be obtained from the test pit. In stiff clays it provides fairly accurate idea of the depth of open excavations or vertical cuts. It also provide better picture of the patchy ground where the soil lies in pockets

D.1.2 Auger Boring

Augers, hand or power operated, are rotated and forced into soil. Augers are withdrawn and emptied when full. Soil cuttings obtained are used to interpret stratification and soil type. The method is unsatisfactory for cohesionless soils above or below ground water.

D.1.3 Shell and Auger Boring

Manual or mechanized rigs are used for vertical boring. The tools consist of auger for soft to stiff clays, shells for very stiff to hard clays, shells or sand pumps attached to sectional boring rods for sandy strata. Hand operated auger can be used up to depths of 18 m to 21 m in stiff clay. Mechanically operated tools are required for higher depths. An auger is used for boring holes to a depth of about 6 m in soft soil. Soft to stiff clays are removed by a cylindrical auger. Hard clays and cohesionless deposits are removed by a shell. The soil recovered contains all constituent. Bailers are be used to remove soil cuttings. Care is taken while withdrawing the shell to avoid sand boiling. Special care is taken to minimize soil disturbance below borehole. The advantages of shell and auger boring are as follows:

- (i) Easy to identify the soil
- (ii) Easy to note changes in strata
- (iii) Soil profile and depths undisturbed sampling can be determined with greater accuracy
- (iv) Boring in partially saturated materials above the ground water level
- (v) Determination of ground water level is relatively easy