COSMOS Guidelines for Characterization of Strong Motion Site Conditions

Characterizing the conditions at a ground response site is important for the use of the recorded strong motion data in earthquake engineering and seismology. In general, site conditions may be comprised of two parts, the near-surface geologic conditions and the nearby surroundings of the site.

Four levels of quality of information about near-surface geological conditions are defined. The shear wave velocity in the top 30 meters or more is an important parameter in characterizing the near-surface geology of a site.

Level 1 Direct Velocity Measurement

Direct measurement of shear wave velocity with depth; measurement is made by downhole or cross-hole methods, or by suspension-tool logging. Boring logs, penetration logs (SPT, CPT), and electrical logs are also valuable, if available. The measurements should be at the site, or they may be at a nearby location if the local geology is horizontally similar; the distance should be reported.

Level 2 – Indirect Velocity Measurement

Indirect measurement of shear wave velocity with depth, which is made at or near the site, by surface wave inversion methods, such as SASW, REMI, etc., or by refraction.

Level 3 – Estimated Velocity

Estimated Vs30, obtained through review of the mapped geology and/or topography near the site.

Level 4 – Descriptive Characterization

Descriptive text characterizing the near-surface geology (e.g., hard or soft rock, deep or shallow alluvium, etc.), as defined in the Suggested Geologic Classification Descriptions, Guideline 3.3.

The Level 4 descriptive characterizations may be used to complement the quantitative information of Levels 1 through 3 in order to most effectively communicate the geological conditions of a site.