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LUNAR SOIL PARTICLE SIZE DISTRIBUTION CLASSIFIED BY STATION

Abstract

Particle size distribution is the most important geotechnical property which influences the strength and compressibility of the material, as well as its optical, thermal, and seismic properties. It has been used for many years to understand the lunar soil and is a benchmark for regolith simulant production. Numerous investigators have measured the particle size distribution of nearly 350 samples taken in the vicinity of seven landing sites on the Moon: Apollo 11, 12, 14, 15, 16, and 17, and Luna 24. Although an earlier compilation of these data exists (Carrier), roughly 90% of the available lunar soil particle size distribution is generalized, including data for all the lunar missions. To understand the lunar soil more specifically, it is important to know the particle size distribution of soils from different environments. Thus, we categorized the data by both landing site and by station to draw comparisons between areas. Many of the available particle size data are restricted to sub-mm sieve test results, which do not represent the real particle size distribution. Actual lunar soils also contain ‘particles between 1 mm and 10 mm diameter. These ‘coarse fines’ must be considered when designing equipment for the lunar surface. The authors recalculated each subsample particle size distribution including coarse particles based upon original published data. To evaluate the study method, the result will be compared with the maturity index of each sample. The new benchmark of lunar soil particle size distribution will give a better understanding of details of each station soil and will be important for geotechnical studies of lunar soil.