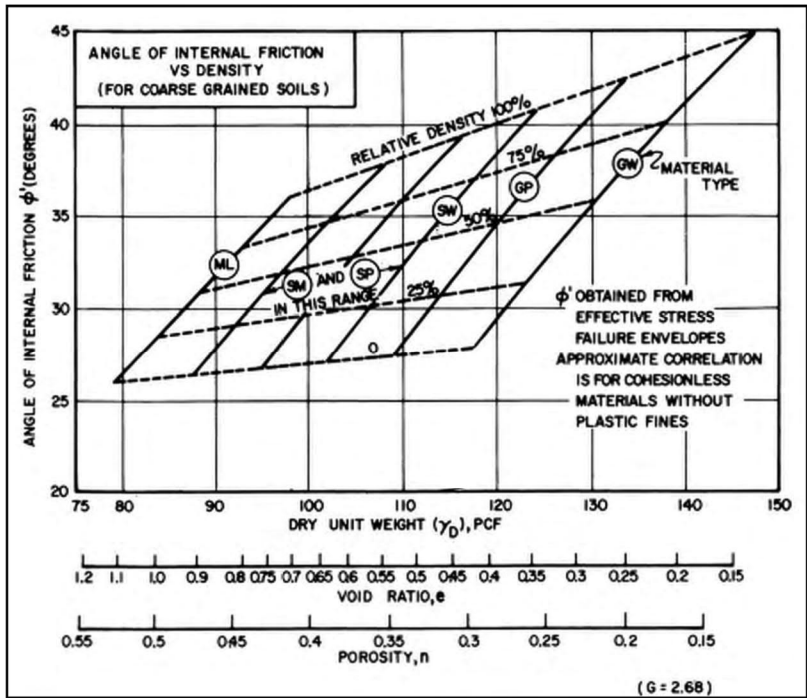


# Compaction and Strength of Soils

Proper placement and compaction of soils is essential to the successful performance of retaining wall structures. Post construction settlement is an obvious concern with poorly compacted materials as well as excessive lateral wall movement and/or insufficient shear strength to perform as intended. Soils must be compacted in lifts to achieve maximum soil shear strength and validate the design.

The chart below indicates a relationship between peak shear strength and soil density for cohesionless granular materials with no plastic fines as shown. As the relative density of the material is increased, significant gains are realized in shear strength. Therefore, it is necessary that levels of compaction and lift thickness be specified and obtained during construction to insure proper structure performance in accordance with the design.



## Correlations of Strength Characteristics for Granular Soils

(Ref. from NAVFAC DM 7.01)

Clean granular soils are much more tolerant to variations in the placement and compaction process than the finer silts and clays which require close monitoring of moisture content and compaction procedures. The standard minimum soil density specification for the structural fill behind Keystone walls is indicated below. Higher values may be mandated by project specifications and local practice. Moisture content is typically limited to optimum moisture with finer grained materials to avoid overly "wet" soils being placed and compacted behind the wall which can causing wall alignment issues during construction due to temporary pore pressure conditions and "pumping" backfill soils.

Test Criteria	Minimum %	Moisture %	ASTM Method	AASHTO Method
Standard Proctor	95%	+0, -3	D698	T-99
Modified Proctor	90-95%	+0, -3	D1557	T-180