Soil Density - Standard vs Modified Proctor

Reinforced soil structures routinely specify that all soils be compacted to 95% of the maximum density determined by ASTM D698 - Standard Proctor Density for conformance with the design. However, Standard Proctor density criteria is typically utilized in the Eastern US whereas Modified Proctor density criteria is typically utilized in the Western US which can create some conflicting specification problems.

Research has been done showing the relationship between Standard and Modified Proctor density testing for different soils types as indicated below:

It is obvious from this limited data that a simple conclusion cannot be drawn but some general guidelines can be established when using Modified Proctor density testing in lieu of Standard Proctor testing for quality assurance testing of reinforced soil structures:

* 90% - 92% of Modified Proctor density is roughly equivalent to the specified 95% Standard Proctor density except for fine grained soils (ie: clay) where the difference may be significantly larger.

* Modified Proctor testing typically requires a lower optimum moisture content for achieving maximum density which is desirable for Keystone retaining wall construction and performance especially with silts and silty soils.

* The density difference between Modified Proctor and Standard Proctor density testing appears to increase with the percentage of fines in the soil matrix while the optimum moisture content decreases. It may be prudent to utilize 90% of Modified Proctor density and optimum moisture content when working with fine grained soils such as clays for best results.