

From: "Dr. David J. Elton" <elton@eng.auburn.edu>
To: Priscilla Burton <PRISCILLABURTON@utah.gov>
Date: 4/24/03 6:59PM
Subject: Re: Soil Engineering Question

Priscilla:

This is a Very high friction angle - unusual.

Please fax the report.

I don't understand how the strength can be characterized as "post-peak" if the soil continues to gain strength with strain. If, indeed, the stress-strain curve is continuing to rise, the test has not been run to a large enough strain to even see if it does peak, or what its "residual" strength is.

Usually, three samples are tested to get a strength value. Two is the minimum.

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PS I have relatives in Utah, and just spent a year at Utah State University on sabattical. Hope you enjoy Soils Magic!

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On Thu, 24 Apr 2003, Priscilla Burton wrote:

> Hello David,
>
> I attended the Soil Engineering for Non-Soils Engineers in October of
> 2002. At that time we discussed values for peak friction angles and
> cohesion. I am writing to ask for your opinion of the following
> information.
>
> I am reviewing a stability analysis where the backfill material is
> described as GM, a silty gravel with sand; post peak friction angle = 54
> degrees.

>
> The consultant indicates that using post-peak friction angle is
> appropriate, since the material continues to gain strength after
> shearing has begun. The displacement vs shear strength curve continues
> to rise and is nearly linear. The consultant explains that this is due
> to the larger particles in the material rotating and increasing shearing
> resistance.
>
> Since this material did not show any clear shearing point, the shear
> stress vs normal stress plot is of the maximum stresses applied and
> results in a cohesion of 1,877 psf which seems like a large number for a
> material that is also reported to be coarse and non-plastic.
>
> The consultant indicates that post-peak shear strengths are typically
> used in slope evaluation because the conservative assumption is made
> that the material has already undergone peak shearing.
>
> The reported Phi of 54 degrees seems very rare.
>
> Questions : Would you agree with this assessment of the typical use of
> post-peak shear strengths for coarse material?
> Is it possible that a coarse, non-plastic material
> could have such high cohesion?
> How many soil samples/volume of material are
> ordinarily run on a material to assure that the material is uniform?
>
> If you would like to see the laboratory reports for this material, I
> will fax them to you.
>
> Sincerely,
> Priscilla. Burton
> p.s. I bought your Soils Magic book!
>
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>
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CC: Professor Allen Wortley <wortley@engr.wisc.edu>