Dear Editor of Jurutera,

I have the following comments on the feature "Shear Strength Due to Unsaturated Conditions for Vacuum Consolidation Works" by Fauziah Kasim, Lim Sern Wang and Faisal Ali in December 2006 JURUTERA.

This paper presents the output results from the authors' runs using the SoilVision software. It would have been more instructive had the authors included data from their laboratory tests on physical soil specimens after subjecting them correctly to processes that depicted the vacuum consolidation works to permit the results of their software runs to be justified.

It appears that the authors may have mistakenly equated the term 'matric suction' (or simply called 'soil suction' commonly) with 'vacuum pressure' used in the context of consolidation works for soft soils. They are 2 entirely different phenomena. Whilst matric suction is generated primarily by water surface tension effects in soil states with relatively low saturation, the latter is brought about by effecting a pressure reduction collectively to the pore fluids (preferably to the liquid phase). Matric suction intensities in unsaturated soil can reach many atmospheres whereas vacuum intensities in saturated ground conventionally cannot attain even 1 atmosphere.

Table 3 in the paper proposes vacuum intensities up to 185 kPa for use in Malaysian soils. Would the authors be able to identify possible means to attain a vacuum intensity in excess of 96 kPa (the highest possible vacuum (taking into account water vapour pressure limitations at 29 ˚C) that can be generated by air / water evacuation from the ground surface)?

Incidentally, subjecting soil testing equipment immersed in water under vacuum is a proven technique to ensuring high saturation in the equipment. Saturating the fine pore-sized ceramic filter element for piezocone pore water pressure transducer system by immersing in water inside a vacuum chamber in the early days of the piezocone development is a routine example of this procedure. This being the case, it seems completely contradictory now to expect soft soils undergoing vacuum consolidation works to result in their desaturation.

Soft soils needing engineering improvement using vacuum consolidation, by and large, occur in the field close to complete saturation at elevations below the ground water table. No reduction in saturation can occur unless the water-filled vertical drainage channels (incorporated in conjunction with vacuum consolidation works) can be dried out. This cannot, however, occur since the vertical channels have to flow full for them to be evacuated which means that they have to remain fully filled with water. The surface boundary application of vacuum or partial vacuum to the pore fluids within the vacuum consolidation scheme in fact leads to raising the water table within the vacuumed area and is unlikely to lead to reduction in saturation in the soil in the ground. Matric suction would then be virtually non-existent in such circumstances. This makes the employ of unsaturated soil treatment approach not relevant for such a process. ■

Regards,
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BULLETIN EDITOR'S COMMENTS

We thank the author and all others who have shown interest in this matter. We welcome all contributions towards healthy and constructive discussions based on sound engineering practices and principles and the sharing of experiences towards the life-long learning curve. At the same time, we appeal to contributors to observe professional ethics and refrain from any unintentional offence to other fellow professionals during such discussions.