

AUTHORS' REPLY ON "GEOTECHNICAL HAZARDS IN BANGKOK - PRESENT AND FUTURE" DISCUSSION

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The Authors are very much delighted with informative discussion made by our ex-colleagues (and ex-teachers) at AIT. The paper aimed at drawing attention of many readers who may not be familiar with current and, possibly, future geo-hazards in Bangkok area, implying that the paper is a type of incomplete S-O-A report rather than original paper. The geo-hazards highlighted in the paper were floods, land subsidence and seismic risk. The discussion dealt with the second topic by showing excellent case histories regarding geotechnical civil engineering aspects of the ground subsidence. These case histories are all addressed to the effects of pore pressure drawdown in Bangkok clay induced by deep well pumping. In this regard, the Authors pay great respects to writers' long-term efforts and excellent work on the subsidence due to deep well pumping.

The Authors share the writers' worry that bearing capacity of pile foundations will confront with a danger of considerable reduction when recharge of ground water is achieved. The concern may also be extended to the sustainable stability of embankments and slopes. A critical review of existing pile foundations should be urgently made by using effective stress analysis.

Case history at Nong Ngu IIao, the site for second international airport, is also of interest. The Authors agree with writers' perspective that the variability in the soil property with time ought to be checked whenever a new project is launched. We cannot rely completely on soil properties as investigated a decade ago, for example. It is attributed to continuous change in water pressure distribution in subsoils in Bangkok as well demonstrated in the case history. The properties of crust subjected to seasonal drying and wetting also play an important role when considering ground settlement.

In the paper, the Authors pointed out that the installment of PVDs into the domain showing pore pressure drawdown may induce undesirable consolidation over the zone covered by PVDs since further drawdown of pore pressures would take place in the improved area. Conversely, the writers showed different perspective that the vacuum preloading in Bangkok is often ineffective below 10m depth possibly due to interconnection among sand layers. The writers' opinion must be true since the notion is based on their experiences. However, the Authors would like to draw attention to the fact that ground improvement work by vacuum preloading with PVD is a three-dimensional problem in nature. As previously pointed out by some researchers, conventional one-dimensional effective analysis tends to overestimate ground settlement during preloading, which in turn underestimate residual settlement. Obviously, the size of improvement to the thickness of soft clay layer is a crucial factor when considering 3-D effects.

In summary, the Authors pay tribute to excellent work with valuable experiences on the mechanism of ground subsidence, together with the improvement work presented in the current discussion. It is our hope that we could exchange our views on this specific topic through research collaboration in near future.

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