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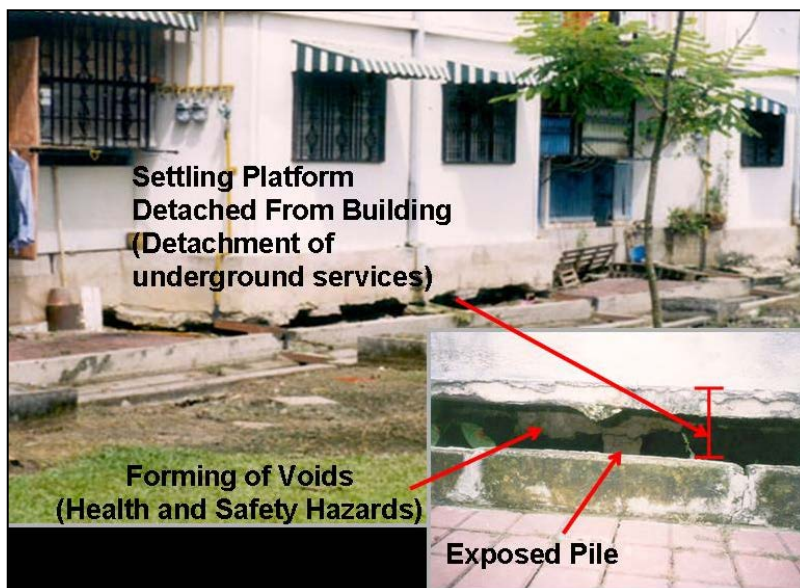
Dr. Ooi Teik Aun ■ Dr. Noppadol Phienwej

Floating Piled Raft Foundation on Soft Ground

Conventional piled foundation is usually designed to provide adequate load carrying capacity to limit the overall settlement and hence indirectly control differential settlement within tolerable limits. The piles are installed into competent stratum or to 'set' (terminate) in hard layer. Therefore when piles are installed in deep layers of soft compressible subsoil at low lying areas where the building platform needs to be

raised by earth filling to prevent flooding, the weight of the earth fill on top of the soft compressible subsoil will induce both primary and secondary consolidation settlement with time thus causing downdrag and a significant reduction in the working capacity of the piles. This often reduces the cost-effectiveness of such a 'conventional solution'.

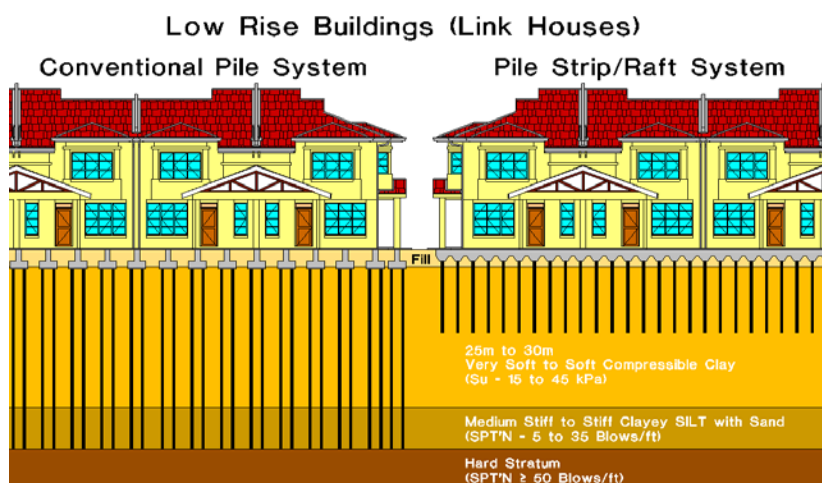
This conventional method also causes long-term serviceability problem such as large abrupt differential settlement between the piled building and the surrounding earth platform on compressible subsoil that are still settling with time. The abrupt differential settlement with a large enough magnitude will cause breakages of water and sewerage pipes. The hollow gap formed beneath the building, due to larger settlement of the earth platform compared to the building supported by piles installed into hard stratum, will cause both health and safety hazard to the public as mosquitoes, rats, snakes and other animals can make this area their habitat.



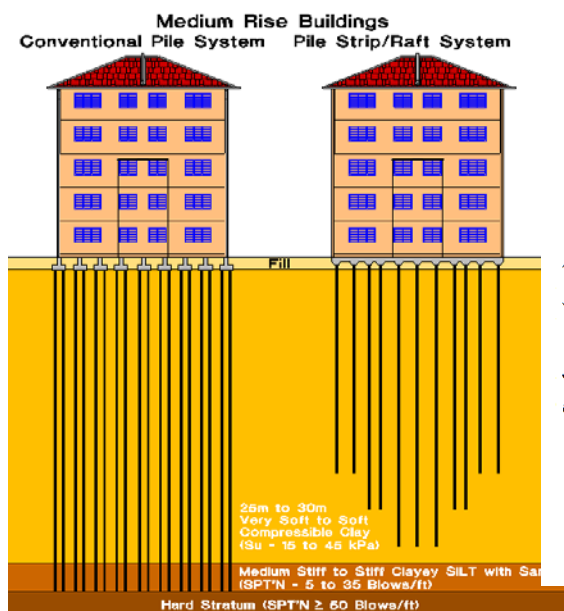
Problems for buildings with piled to 'set' foundation on soft ground

G&P Professionals Sdn Bhd, the consultant for the project in Klang, proposed a practical analysis and design methodology for an alternative foundation method of 'floating' piled raft foundation for low-rise buildings of 2 to 5

storeys on very soft and deep layer of compressible subsoil. This alternative foundation system is both technically superior and cost effective compared to conventional piled foundation for low rise buildings.

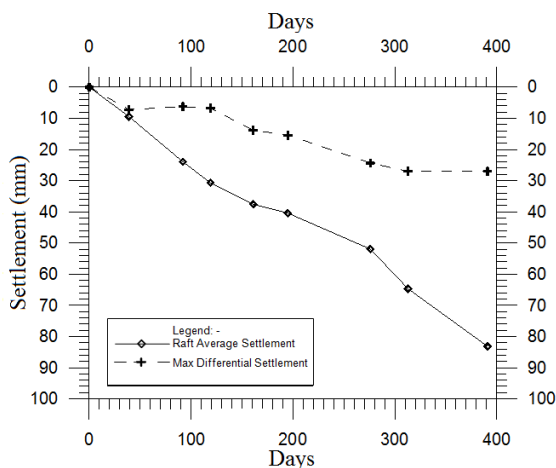


Comparison of conventional and proposed 'floating' piled strip-raft foundation



Comparison of conventional and proposed 'floating' piled strip-raft foundation

The 5-storey apartment adopted the 'floating' piled raft of varying piles constructed on very soft compressible subsoil termed as Klang Clay. The measured settlement monitoring results for nine months recorded over 80mm with a maximum differential settlement stabilized at about 27mm.



Average total settlement and maximum differential settlement

The monitoring results show that the piled raft with varying pile lengths are technically suitable to control differential settlement and angular distortion of buildings constructed on very soft and deep layer of compressible subsoil. These buildings have been occupied and exhibited no structural cracks since 2005 which amounts to more than 13 years. This is another cost-effective and efficient piled raft foundation system to support low rise buildings on soft compressible subsoil.