

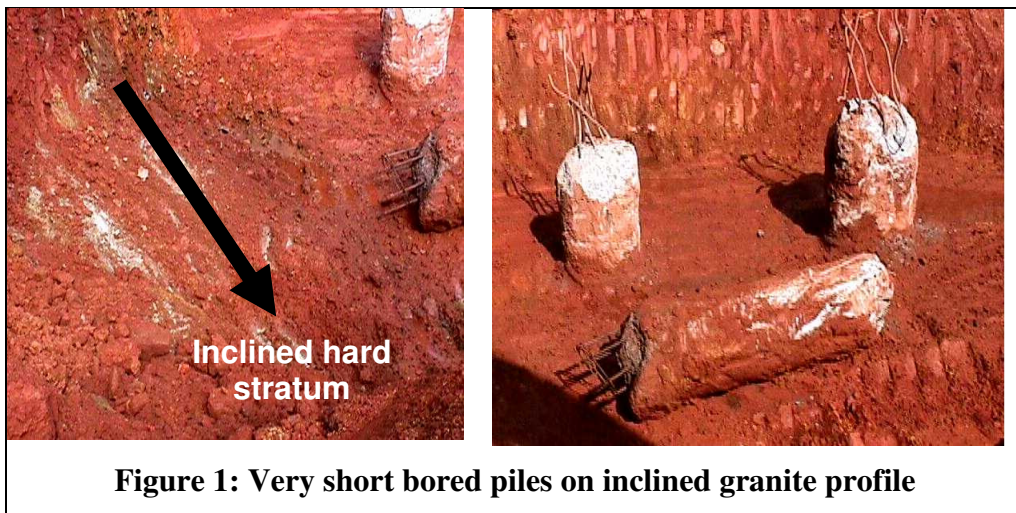
# IMPROPER USE OF BORED PILE FOUNDATION FOR 10-STOREY APARTMENTS

## Type of building work

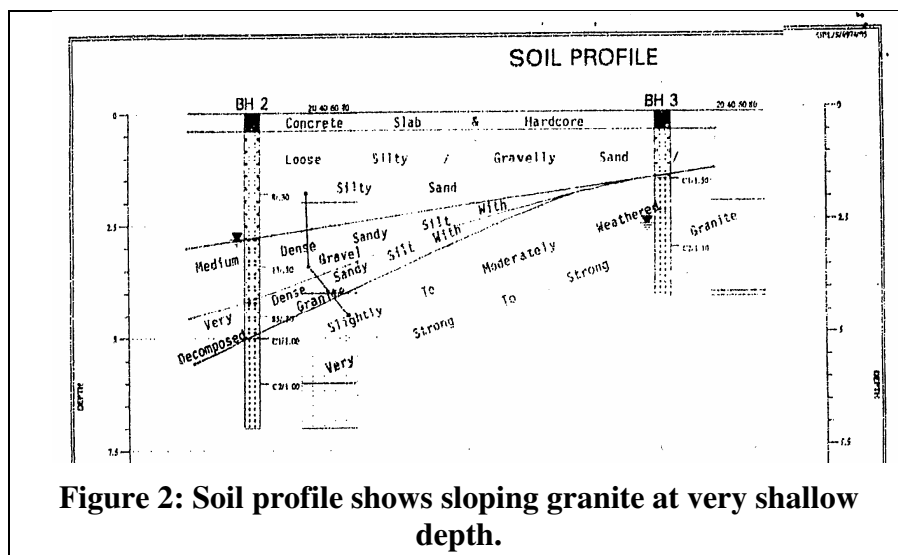
This involves construction of two blocks of 10-storey residential apartments each with a basement. Based on soil investigation results from 3 boreholes, the design called for use of bored piles with penetration depth of around 9m to 10m.

## What went wrong

Piles installed at one of the 10-storey apartment blocks were rather short, with effective length of bored piles of only 3 to 5m as granite was encountered below that. These very short piles were installed without adequate socketing depth which is crucial as the granite profile was inclined/sloping. Three bored piles with length less than 3m were extracted for investigation which revealed poor quality of concrete.



Although the soil investigation boreholes showed presence of granite at very shallow depth, this information was not taken into consideration when designing the foundation system. The foundation system for one building block was eventually changed to spread footing sitting directly on granite, and the other block was augmented with micropiles which were socketed 2m into the granite and steel casing left-in.



### **Learning points**

- a) Design of foundations should be based on proper soil investigation.
- b) Soil investigation data must be studied carefully prior to the selection of an appropriate foundation system.
- c) Where hard stratum at shallow depth is present, short piles must be socketed firmly into the hard stratum, especially when the profile of the hard stratum is inclined.