

Example 2.6 Pile foundation in sand

A building is to be supported on 450 mm diameter bored piles founded entirely in a medium dense to dense sand spaced at 2m centres. The piles are bored with temporary casing, filled with water, and concreted on the same day as boring. Each pile carries a characteristic vertical permanent load of 300 kN and a characteristic vertical variable load of 150 kN. This is a small project for which there will be no load testing. It is believed that settlement in service will not govern the design.

The sand is a Pleistocene fine and medium sand. Bedding is essentially horizontal. The sand is covered by Holocene layers of loose sand, soft clay, and peat (see Figure 2.6b). One CPT was carried out at a distance of 5 m from the boring to determine the strength profile of the ground (see Figure 2.6b). The CPT has been performed and evaluated according to DIN 4094:2002 "Subsoil – Field testing – Part 1: Cone penetration tests" using a tip of 10 cm² without measurement of sleeve friction and pore water pressure. The ground level is at about NN +2.5 m (where NN = reference level) and essentially horizontal. No fill will be placed on the ground. The water table is about 1.4 m below ground level.

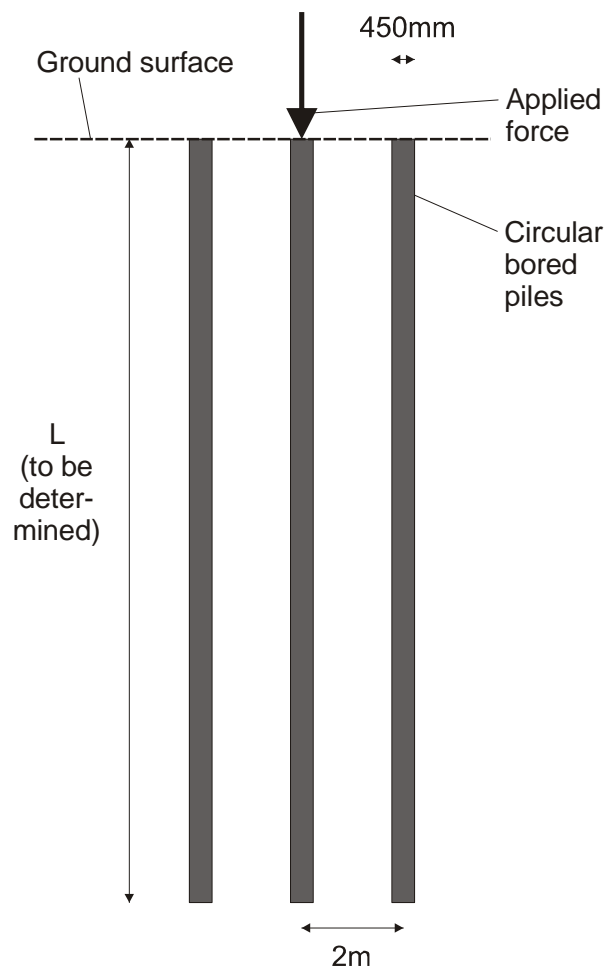


Figure 2.6a: Pile arrangement

Using Eurocode 7, determine the design length of the piles shown in the Figure 2.6a.

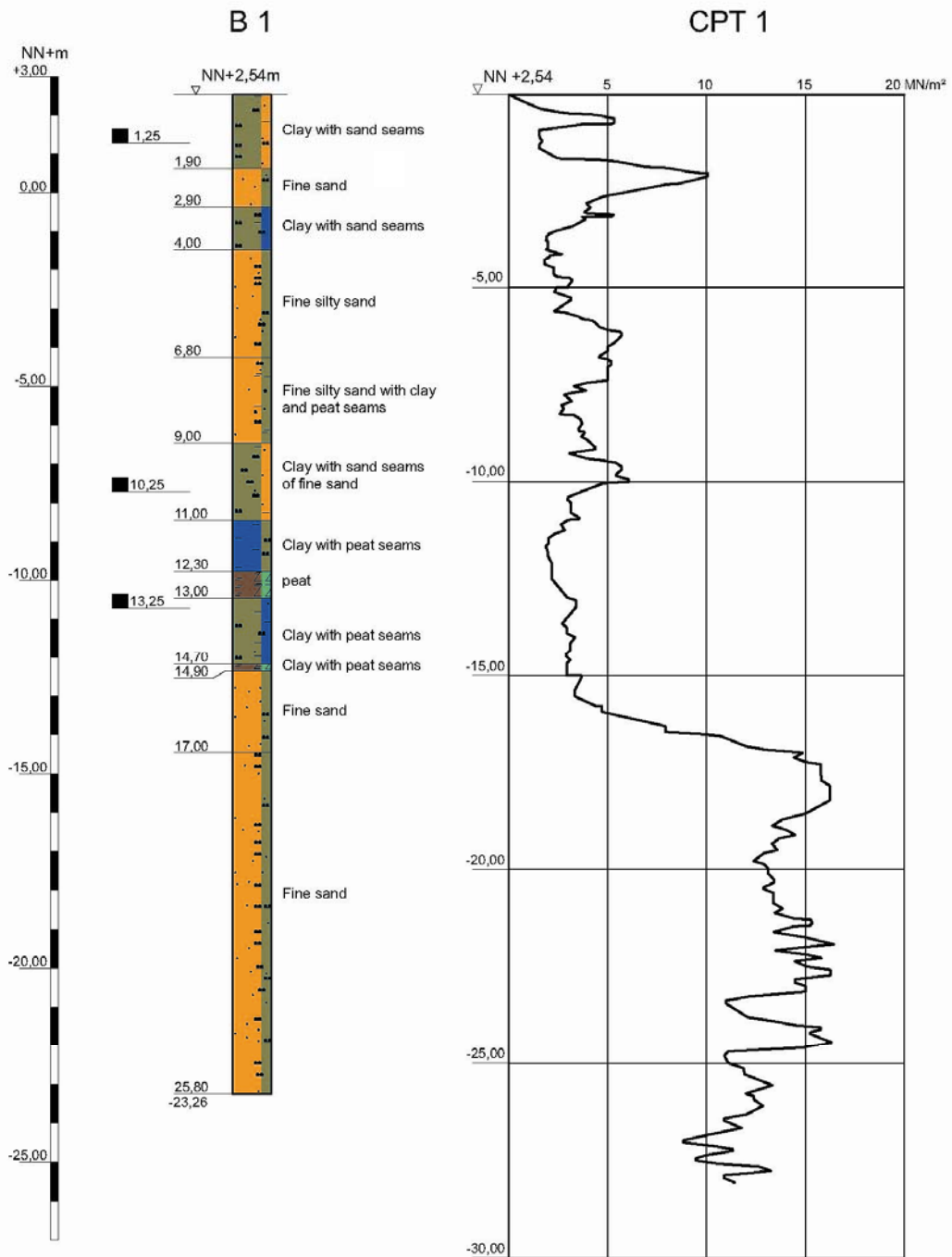


Figure 2.6b: Cone penetration resistance from CPT test