Master of Science Project

WWW Design of Reinforced Concrete Pile Caps

In The Netherlands many foundations are on piles, which are often over 15 m long at distances of 1 to 4 m. These piles are driven into the soil at the positions of walls and columns of a building. However, it regularly occurs that the soil of the construction site already contains piles of a previous building. These old piles cannot be removed because this would create holes in deep clay layers trough which saline ground water would penetrate into the upper soil. Moreover, the old piles cannot be reused because their quality cannot be guaranteed. Therefore, the position of a new pile cannot be designed freely and is restricted to some distance from the old piles.

As a consequence, pile caps often need to cover piles that are not positioned in a regular pattern. This posses a challenge for the structural designer because he or she needs to calculate the pile loads, the required cap thickness and the cap reinforcement.

The objective of this project is developing a design method for calculating the pile loading and reinforcement stresses for pile caps on irregularly positioned foundation piles. The design model will involve struts, ties and shear panels. The method will be implemented in a Java applet and made available at the WWW.

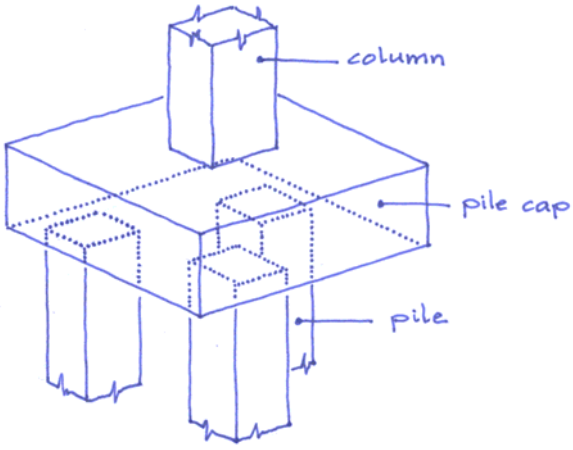

Figure 1. Pile Cap

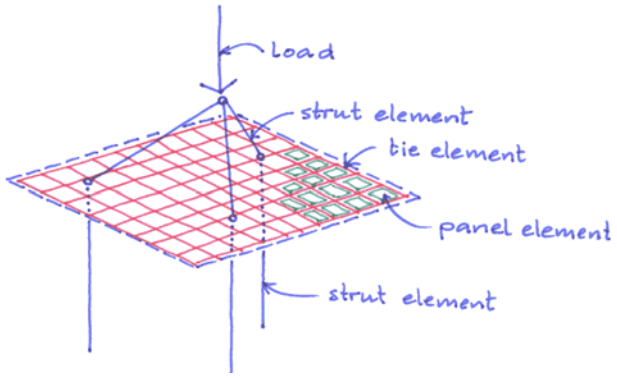

Figure 2. Pile Cap Design Model

Key words; Pile Caps, Strut-and-Tie, Shear Panel, Matrix Analysis, Computer Program, Java, WWW.

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