The Safety Level of Concrete Pile Foundations under Industrial Monuments

S. Pasterkamp*

* Delft University of Technology
Faculty of Civil Engineering
Stevinweg 1, Delft, The Netherlands
e-mail: s.pasterkamp@tudelft.nl, web page: http://www.tudelft.nl

ABSTRACT

Prefabricated concrete piles have been used for the foundation of bigger buildings for about a century. Some of these buildings have now become industrial monuments, which has as a consequence that their life span will go beyond their original economic life span. This often requires a change in function, an addition (also vertically) or another type of alteration in order to maintain economic viability (use it or lose it), resulting in different loads on the foundation. The question is then whether or not the old piles can carry the new load with sufficient safety.

There are several complicating factors that return regularly in these assessments. The first one is a lack of data. Often drawings are missing or incomplete, e.g. showing only pile head dimensions or maximum calculated load but not the pile length, pile tip shape or material properties. Inspection is hard and only possible for the part directly under the pile head. And a third complication is that in The Netherlands there have only been official codes for piles since 1992. Before then pile foundations were designed using technical manuals with a much lower status.

This study presents an investigation in de developments in designing, calculating and building prefab concrete pile foundations in the Netherlands during the last 100 years. Findings from several projects are used as examples of the way pile foundations were designed over time. The development in geotechnical codes is shown, and numerical conclusions are drawn about actual load bearing capacity and the reusability of historic concrete pile foundations.

Figure 1 Steam pile driver in Amsterdam, 1958 (source: Stadsarchief gemeente Amsterdam)