



The Importance of Data Recording and Analysis

Why piling work is not just about driving a pile into the ground

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Can you tell the load-bearing capacity of a driven pile by just looking at the top of it? Is there any way of seeing what energy was needed to drive it into the ground? Can you see if a pile has been damaged by impact energy, just by looking at the surface? Is there any way of reading the exact position and inclination data?

All these questions probably have the same answer: precise statements about the load-bearing capacity of an impact driven pile cannot be made without appropriate data recording and analysis.

The aim of qualitative pile driving is always the same: every impact driven pile must achieve a certain driving depth and a certain load-bearing capacity in order to bear the calculated loads

for a construction project. For this purpose, either a load-bearing layer is achieved through using an adequately long pile, or sufficient resistance is generated through skin friction combined with toe resistance.

Accordingly, it is all about the resistance, i.e., the load-bearing capacity of a pile, and therefore how these values can be calculated and verified. As deep foundation experts, Liebherr has come up with a combination of the most diverse machines, attachments and assistance systems.

It all begins with the correct planning. The dimensions, number and exact position of the driven piles are calculated based on the object to be built and its load-bearing requirements. Liebherr offers the right equipment for the most diverse requirements in

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pile driving. Various carrier machines from LRH 100 to LRH 600, but also the complete LRB series are available. Due to the special leader kinematics, very large radii and continuous inclinations can be achieved. Liebherr also has the right tools at the ready with various sizes of hydraulic hammer.

After selecting the right equipment for the respective job site, it is then time to get to work. First, the exact GPS position of each individual pile is digitally transferred to the Liebherr machine. With the aid of the LIPOS positioning system it is now possible to approach every pile position with centimetre precision. Ground markings are no longer required. On an additional monitor, the operator can constantly see where he is positioned on the job site and which piles have still to be inserted. The leader's automatic alignment system and storage of certain leader inclinations make it possible for the operator to find the precise position of the driven pile. The new joystick enables leader movement at all times and simultaneously with all other machine movements. Once the exact positioning has been completed, the pile can be installed and recorded concurrently. All relevant data for each driven pile is automatically recorded using the PDE, while the intelligent hammer control facilitates operation for the driver. Impact energy, impact height, impact frequency per minute, the total number of impacts, the penetration of the pile per impact and the exact impacting time are recorded for each pile. Using the PDE data, a

pile driving protocol can be created as proof of quality only seconds after the last impact is made. The impact energy, impact height and the weight of the hydraulic hammer are known. The measurement of the pile's penetration per impact makes it possible to make a statement about the load-bearing capacity at all times during the pile driving process.

At the end of the day, it is important to keep track of everything. Data are continuously generated: about the Liebherr machine, about the driven piles, about the progress of the job site, about the positioning and about the weather. It is imperative that these data are professionally prepared, analyzed and stored. With the software MyJobsite, Liebherr puts a tool in its deep foundation customers' hands, which makes child's play of the preparation and analysis of all data relevant to the job site. The created pile driving protocols can be retrieved at all times and, therefore, prove the load-bearing capacity of each individual pile. Standard-compliant reports about the whole job site can be created in no time at all with MyJobsite.

Therefore, it is possible to read all information about a driven pile when using a Liebherr machine for piling work. The load-bearing capacity, the energy required to drive the pile into the ground, whether the pile is damaged, the exact position and inclination data, etc. Everything can be done digitally without any manual recordings. ▼