

Performance as its best.

Characteristic data. Operating Principle.

Choosing the right equipment.

Choosing the right equipment is key to the economic and technical success of any vibration driving job. Parameters such as the size and drive output of the vibrator must be matched to the length and weight of the pile and the soil conditions.

Key vibration technology data.

Eccentric moment M [kgm]

$$M \text{ [kgm]} \quad M = G \cdot r$$



The eccentric moment is the measure of unbalance. As a determining factor for amplitude it is a key parameter for driving operations.

Speed (frequency) n [rpm]

The speed dictates the vibration frequency of the system. The vibrations are transferred via the pile to the surrounding soil, significantly reducing the surface friction between pile and soil. High frequencies counter the unwanted spread of vibrations in the soil.

Centrifugal force F [kN]

$$F = M \cdot \omega^2$$

$$F \text{ [N]} \quad F = M \left(\pi \cdot \frac{n}{30} \right)^2$$

The centrifugal force must be high enough to overcome surface friction between pile and soil. Centrifugal force plays a major part in reducing surface friction and provides impact force to overcome tip resistance.

Total amplitude S [m]

$$S = 2 s = \frac{n \cdot M \text{ [kgm]}}{G_{\text{dyn}} \text{ [kg]}}$$

$$G_{\text{dyn}} = G_{\text{VIB}} + G_{\text{pile}} + G_{\text{soil}}$$

Together with centrifugal force, amplitude is a measure of driving performance. A large “stroke” and high “impact force” ensure good driving progress. When driving and extracting in cohesive soils, the elastic connection between pile and soil can only be broken if the amplitude is high enough.

Acceleration a [m/sec²]

$$a = s \cdot \omega^2 \quad \text{mit} \quad \omega = \pi \cdot \frac{n}{30}$$

Transmission of the pile acceleration to the surrounding soil causes the displacement of the particle structure and reduces particle friction and soil resistance. Acceleration is indicated as the ratio of acceleration to gravity:

$$\omega = \frac{a}{g} \quad \text{This ratio corresponds to:} \quad \eta = \frac{F \cdot 10^{-1}}{G_{\text{dyn}}}$$

The value can lie between 10 and 30.

Drive output P [kW]

The drive unit must be powerful enough to generate the moment needed to maintain the centrifugal force of the vibrator, even in difficult ground. The drive output should be 2 kW per 10 kN centrifugal force.