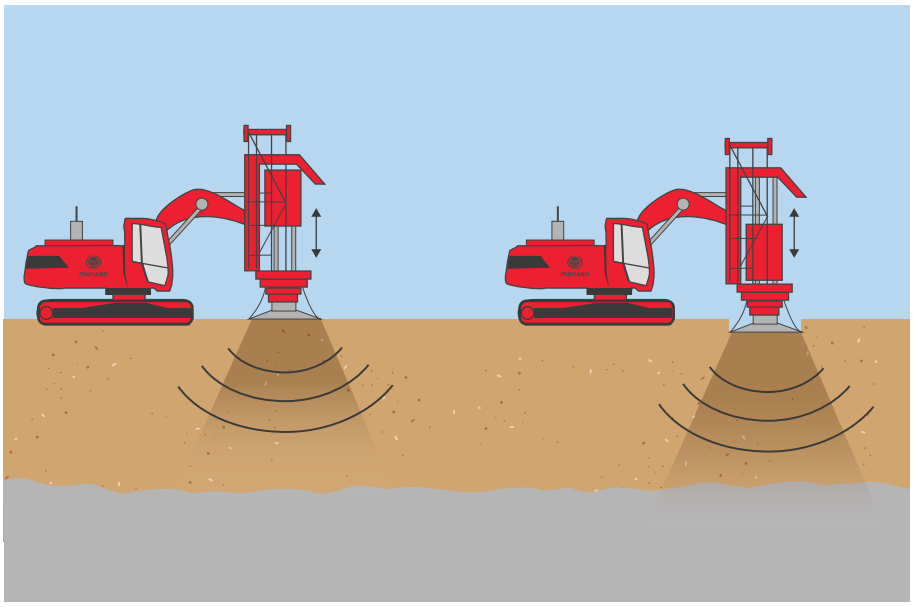
Rapid Impact Compaction



Rapid Impact Compaction (RIC) is performed by repeatedly driving a steel plate into the ground in a predetermined grid pattern.

Advantages of RIC include:

- Simple implementation – no materials are added to the ground
- Performed with smaller excavator-mounted unit – a crane is not required
- More protective of existing structures than dynamic compaction
- Economical, particularly for small-footprint sites
- Eliminates removal and replacement of traditional foundations such as piling
- Very low carbon footprint as compared to other forms of ground improvement or traditional foundations
- Does not generate spoil

Rapid impact compaction (RIC) is a cost-effective technique used for shallow to intermediate ground densification. The energy delivered to the ground by RIC is of higher frequency and produces less vibration than its more robust counterpart dynamic compaction (DC). As compared to DC, RIC is used at sites where shallower or lighter densification is required, at sites where space or access limitations would make mobilization of a large crane impractical, for small footprint projects, and where working near settlement- or vibration-sensitive structures.

Implementation

RIC is performed by repeatedly driving a circular steel plate (also known as a foot) into the ground. A hydraulic piling hammer supported by an excavator base unit is used to drive a 7- to 10- ton weight into the ground from a height of approximately 3.5 feet. The foot is typically 4- to 5- feet in diameter. The design of the RIC programs is analytically based and considers the target improvement, ground conditions, groundwater elevation, and site configuration. The required design energy is delivered to the ground through the most efficient combination of the number of drops per location, grid spacing of impact points, and phasing and rest periods. On-site test trials are typically used to verify design expectations and confirm program parameters.

Applications

RIC is commonly used to densify granular soils, normalize the bearing properties of variable fills, and compress and collapse voids in landfills. RIC can efficiently reduce total and differential settlement, increase bearing capacity, and mitigate liquefaction. Treatment depths can extend to 10 to 12 feet in most cases, and with ideal conditions (limited amount of fines, and deep groundwater), improvement can be achieved to depths up to 18 feet.

As improvement occurs without the addition of materials such as stone or cement/grout into the ground, RIC is one of the most environmentally sustainable ground improvement techniques.