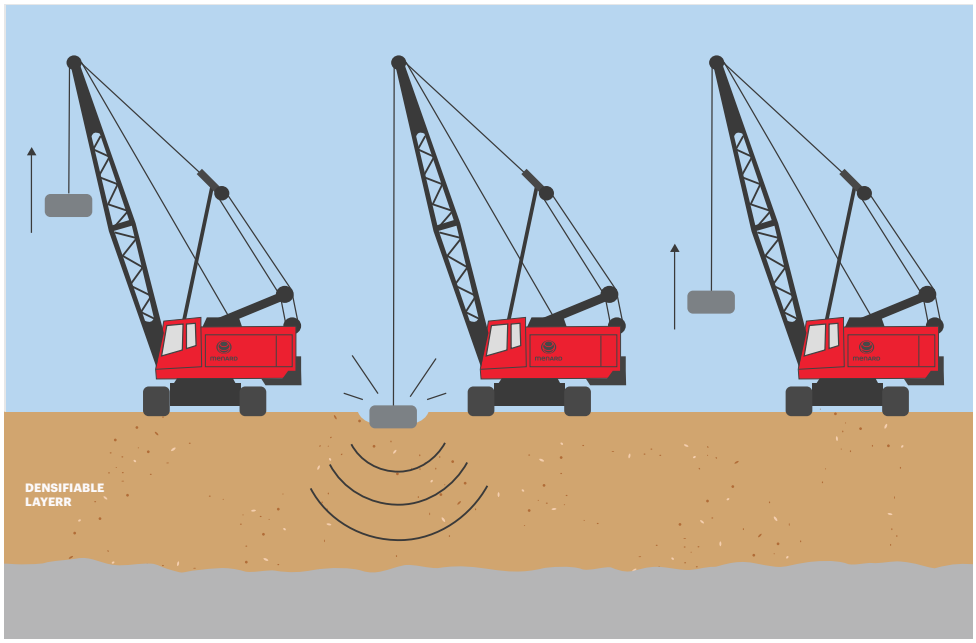
Dynamic Compaction

Dynamic compaction is a cost-effective technique used for deep ground densification. High energy waves created by the repeated impact of heavy weights compact areas of loose granular soils, uncontrolled fills, or waste materials to increase density and collapse voids. Dynamic compaction was introduced in the USA by Menard in 1978 after being developed by Menard's parent company in France, and has been used successfully on thousands of projects around the world.



Dynamic Compaction is performed by repeatedly dropping heavy weights on the ground in a predetermined grid pattern

Implementation

Dynamic compaction consists of repeatedly lifting and dropping heavy steel weights (also known as pounders) weighing 15 to 40 tons from heights of 30 to 120 feet. The weights are dropped from a crane in virtual free fall. The design of the dynamic compaction program is empirically 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 drop height, weight, number of drops per location, and grid spacing of impact points. The achievable depth of treatment depends on subsurface conditions, pounder weight, and drop height. On-site test trials are typically used to verify design assumptions and confirm program parameters.

Advantages and Applications

Because crane mobilization can be relatively costly, dynamic compaction is typically most economical for sites with relatively large footprints. The technique is most commonly used to densify granular soils, homogenize the bearing properties of variable fills, compressing and collapsing voids in landfills, and breaking/crushing karstic limestone layers. Dynamic compaction can efficiently reduce total and differential settlement, increase bearing capacity, and mitigate liquefaction.

With Dynamic Compaction, in-situ improvement occurs without the addition of materials such as stone or cement/grout into the ground making dynamic compaction one of the most environmentally sustainable ground improvement techniques. The technique relies on imparting energy into the ground, so special care must be taken when vibration- or settlement- sensitive structures are present at or near the site.

Advantages of Dynamic Compaction Include:

- Simple implementation – no materials are added to the ground
- Economical, particularly for large-footprint sites
- Eliminates removal and replacement or traditional foundations such as piling
- Very low carbon footprint as compared to other forms of ground improvement or traditional foundations
- Does not generate spoil