

# Dynamic Replacement

### Introduction

Dynamic Replacement is an extension of Dynamic Compaction to highly compressible, organic and weak soils. In this application, the tamping energy drives granular fill material down into the compressible soils to form a large diameter soil reinforcement column, with a diameter of 2-3.5m. Columns are formed by placing a blanket of granular fill material over the area to be improved, and the driven into the soil below by repeated tamping.

Additional ground improvement can also be delivered to the underlying layers through the transmission of the compactive energy of the drop weight. This method combines the advantages of both Dynamic Compaction and Stone Columns, by creating large diameter Dynamic Replacement Inclusions with high internal shear resistance.

Dynamic Replacement columns are formed by dropping a 10-35 tonnes weight from a height of 10-30m. This technique can deliver replacement ratios of up to 25% and each column can support loads of up to 150 tonnes.



*Dynamic Replacement*



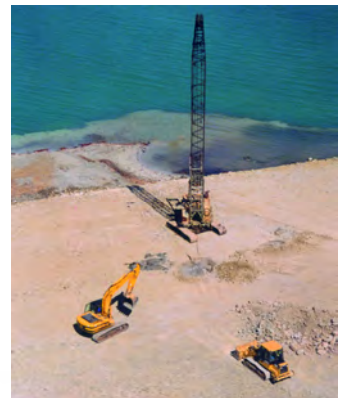
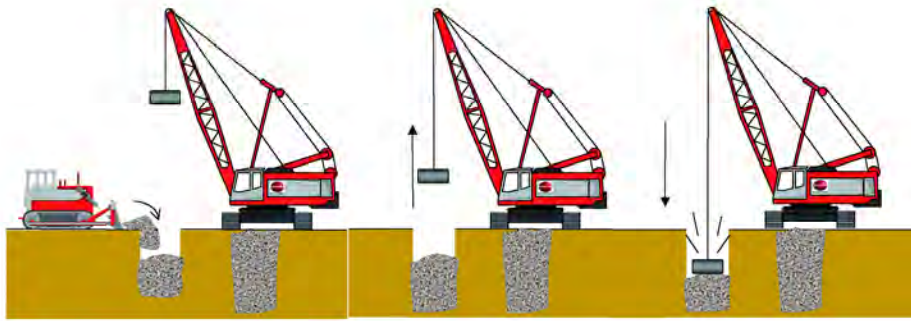
### Advantages :

- Improves soft ground to take high loads
- Suitable for use with organic soft soils including peat, due to the low height over diameter ratio
- Increase the rate of consolidation of fine soils
- Reduced post construction settlements
- High production rates can be achieved

### Applications:

- Road and rail embankments
- Commercial and Industrial buildings
- Stabilisation of landfills

# Dynamic Replacement



## Dynamic Replacement Method :

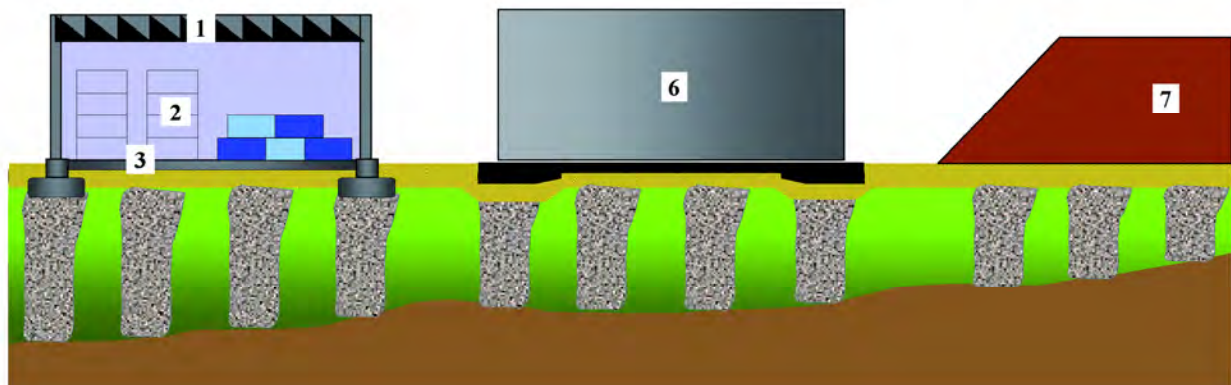
Dynamic Replacement Columns are formed through a succession of tamping and back-filling sequences. This process uses heavier drop weights than Dynamic Compaction to improve the penetration and punching of the weight through the insitu, soft soils.

Dynamic Replacement can be pre-excavated, and then partially backfilled with granular fill material, which is then driven into the soft layer by the drop weight to the designed depth of improvement. The created hole is regularly backfilled with additional granular fill material between each tamping phase. This is carried out if :

- Dense or compacted layers are on the surface
- Soft soils at depth need to be improved
- There is a need to minimize heave in the surrounding soils

This granular backfill material can be placed over the whole treatment area, doubling up as a tracked plant platform or deposited at regular intervals across the site for later tamping. Upon completion the site can be levelled to create the load transfer platform.

Dynamic replacement columns can be formed using a variety of granular fills up to a nominal size of 400mm, with a fines content of less than 15%, and free from organic matter. Many locally available granular fill materials can be utilised, including recycled demolition waste, without wood, metal or plaster.



**Applications :** 1. Steel or concrete structures. 2. Warehouse and lorry parks. 3. Base slabs  
4. shallow, spread & strip foundations. 5. Heavy Storage and tanks. 6. Embankments.