



Dynamic Compaction

Dynamic compaction is an age-old technology & is successfully being used for many infrastructure projects (ports, airports, heavy storages, buildings, landfills etc) under different soil conditions to densify soils, to as deep as 12 to 15 m.

Applications

Dynamic Compaction targets densification of the ground to significant depths in order to increase its bearing capacity, decrease post construction settlements, and mitigate liquefaction risks in case of seismic events. It is well adapted to sandy soils (above and below water), non-saturated cohesive soils (silts, clay and collapsible soils limited to particular fines content) and even manmade landfills.

Implementation and Methods

Pounders weighing 10 to 35 tonnes are released in free or quasi-free fall, from a height of 10 to 30 meters. The arrangement of the impact points and the other parameters of the treatment (unit energy, phasing etc.) depend on the characteristics of the soils as well as the extend of the improvement required, which in turn depends on the bearing capacity and settlement tolerances of the structure to support.



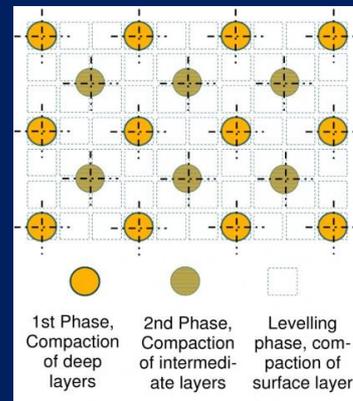
An immediate effect and a deferred phenomenon can usually be distinguished during Dynamic Compaction:

- 1) The immediate effect, predominant in most cases, result in an instantaneous reduction of void ratio of the soil which is directly measured on site by the global settlement after impact.
- 2) A slower deferred phenomenon can occur in certain type of saturated soils. The high energy impact can result in a sudden increase in the pore water pressure that can create partial

temporary liquefaction of the soil. This pressure build up is rapidly followed by a dissipation or rest period during which the grains of the soil structure are reorganized into a denser state.

Calibration area

The treatment parameters such as spacing between impact points, number of drops per location, number of compaction phases, etc. are confirmed on site during the calibration period which includes in-situ testing, poulder penetration tests and records of induced settlements.



Quality control

Dynamic Compaction is a fully controlled process which relies on the systematic assessment of the achieved soil characteristics by standard penetration tests or cone penetration tests, pressuremeter tests. The results of each phases are analysed and additional phases are carried out until the design parameters are achieved.

To ensure that the energy applied is consistent and in line with the design the production parameters (drop height, penetration of poulder) are recorded and these are also analysed alongside the soil parameters throughout the process.

Code & References

- *Guidelines for the design of high Embankments (IRC: 75-2015)*
- *U.S. Department of Transportation-Federal highway Administration (FHWA) Publication No: FHWA-SA-95-037*
- *Geotechnical Engineering books for calculating bearing capacity, settlement & liquefaction mitigations.*

SAS Ground Engineers

Laboratory & Operations Office
Plot No. 83, Block E, VIP City, Roza Zalal pur
Noida Extension, Uttar Pradesh -201301
+918750700091

Reg Off: D-197, Harihar Nagar
Indra Nagar, Lucknow
Uttar Pradesh -226028
+918750700091