

Dynamic Compaction/Vibro Techniques

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Abstract

Dynamic compaction and vibro densification systems are both recognized and accepted techniques for stabilization of loose soil conditions. Both of these methods have been used in Texas soils to improve bearing capacity and reduce settlements. Each technique will be explored independently to examine the particular benefits derived from the systems as well as soil-type applicability and limitations.

Vibro-systems employ depth vibrators to strengthen and reinforce the soil. Vibrators can be used independently in clean sands to densify the sand directly. In silty and clayey soils, stone can be added through tubes connected to the vibrator to create stone columns. Stone columns act to reinforce the soft soil mass. The stone columns also create pathways for drainage to occur. This can be beneficial in draining off excess pore water. Stone columns have been used to strengthen and reinforce soft soils to allow for construction of earthen embankments, buildings, water treatment structures and storage tanks.

More recently, vibrators have been used in conjunction with cement to create vibro concrete columns (VCC's). VCC's act like structural members which transmit load to competent bearing strata. During construction of a VCC, the vibrator is inserted in the ground to the proper depth and concrete is pumped through a tube connected to the vibrator as the vibrator is extracted. At the base of the VCC a concrete bulb can be created which results in more end-bearing. This can allow for shorter columns to be constructed. Additionally, steel cages can be vibrated into the column to increase tensile strength. VCC's are often used in conjunction with reinforcing grids to transmit load evenly to the columns.

Dynamic Compaction is another technique which can occasionally be used to stabilize soft soils provided that the soft soils are not saturated, cohesive soils. Dynamic Compaction involves dropping weights (10 to 30 tons) from cranes at heights of (50 to 100 feet). The purpose of dropping the weight is to transmit compactive energy to the soil mass for densification. Dynamic Compaction works best in loose sands, fills, rubble, and landfills.

Both Vibro-systems and Dynamic Compaction have been used in Texas for the purpose of improving soft soil conditions. These techniques have often proven to be faster and more economical than conventional techniques for solving problems associated with soft soils.

If you have any questions, please contact [Dr. C.Vipulanandan](#)
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