

PROJECT PROFILE

GROUND IMPROVEMENT USING DYNAMIC CONSOLIDATION

Dynamic consolidation involves soil compaction by means of multiple drops of a heavy weight from a large height. This technique is particularly applicable to loose granular soils located near the ground surface. D'Appolonia was retained by a client seeking to build a 90-MW cogeneration plant near Yuma, Arizona. The proposed plant site was characterized by loose to medium dense, well-rounded sands to a depth of 20 below the ground surface. Ground water was located about eight feet below the ground surface. The surficial soils needed to be compacted sufficiently to support a boiler, turbine generator, and fuel storage tanks.



Crane lifting 13-ton weight prior to drop. SPT tests being performed on compacted area.



Craters at node points resulting from 5 drops of 13-ton weight.

D'Appolonia developed and implemented a dynamic consolidation program that involved dropping a 13-ton weight from a height of 82 feet using a large crane. A grid system for the drops

was established over an area of approximately 30,000 feet. The nodes of the grid were on 8.8-foot centers. The 13-ton weight was dropped 5 times on each node.

D'Appolonia provided full-time construction monitoring services for the work. The monitoring services included pre- and post-compaction Standard Penetration Tests (SPTs) and vibration monitoring for structures located within a distance of 1,200 feet.

Following the dynamic consolidation, the site was regraded and final SPT

testing was performed. As can be seen from the plot of SPT N values versus depth, there was a substantial improvement in the density of the soil to a depth of 20 feet.

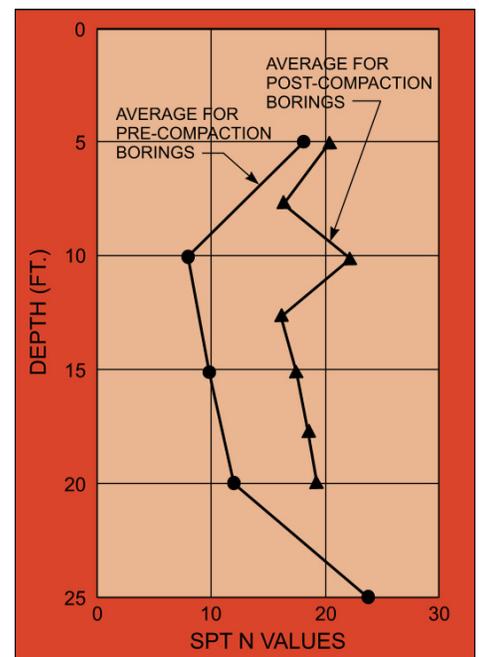
The vibration monitoring program verified the nearby structures were not affected by the dynamic consolidation program.

The work was completed in 10 days for substantially less than quoted prices for comparable ground improvement through grouting or vibrocompaction.

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Typical depression of 42 inches deep by 6 feet across after 5 drops of the 13-ton weight.



Plot of average N value versus depth.