Soil stabilization at NTPC, Singrauli

The Super Thermal Power Corporation at U.P. has condenser unit adjoining the Turbine Generator (TG). The TG has a massive foundation approximately 20m x 20m in plan and the level of the bottom of the TG foundation is 9 m below the ground level. The adjoining condenser unit is about 20m x 5m in plan dimension and the foundation is 12 m below the ground level.

After the TG foundation was completed, excavation for the condenser unit was started. During the excavation, when the level reached was about 12 m below the ground level, sand blow occurred from below the TG foundation, leaving some gaping space below the foundation. Due to the movement of sand from the TG foundation bottom, the authorities required rectification measures to ensure contact between the bottom of the TG foundation concrete and the soil beneath it.

Plan

CICO group was informed about the problem by M/s Simplex Concrete Piles India Ltd., the main contractors and requested to evolve a suitable rectification measure for ensuring proper contact.

After carefully considering the various problems associated with the site, a solution involving cement and lime grouting was detailed out. The procedure consisted of driving 100 mm dia pipes 8 nos at 3 m spacing in the 1.5m wide space between the TG foundation and the condenser unit.

The grouting was made through 30 mm dia pipes which were inserted in the casting pipe and a high pressure seal was introduced between the 30 mm dia and the casting pipe. The initial grouting was at a pressure of 0.5 bar (Kg/cm2).

In order to ease the flow of cement-lime grout, alongwith suitable admixtures, dewatering systems was introduced on the other side of the TG foundation. Eight grouting points were utilised for the soil grouting and only one grouting was handled at a time. On refusal of grout intake the grouting pressure was gradually increased to 4 Kg/cm2, the same was maintained for about 15 minutes before terminating the grouting. The process of grouting was successfully completed in a week's time.