MODERN TECHNOLOGIES OF SOIL IMPROVEMENT -
CASE STUDY OF A MAJOR CONSTRUCTION PROJECT

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Full paper on enclosed CD-ROM

Keywords
Geotechnical investigations, soil improvement, foundations

These days investors that are planning the construction of a new industrial plant are primarily interested in good accessibility of the potential site, on which the future construction will take place. The site, chosen for future investment should be localized as close as possible to the buyers market or to transportation routes that will allow quick and cheap delivery of raw materials for production, and transport of ready goods produced in the factory. Industrial sites, assigned for production purposes in regional master plans, are often localized in areas with relatively complex geology and ground conditions. Investors planning major enterprises, having found a well localized industrial site are often forced to carry out their construction project on land with very complex ground and water conditions. Planning construction of industrial plants on such sites requires very detailed geotechnical investigation giving information on soil and ground water conditions. Results of geotechnical investigations presented in the form of report or documentation are later on used as a basis for soil improvement projects and successful construction of future buildings.

This paper presents a case study of a large scale construction project at a site that has a very favorable location but relatively poor ground conditions. In order to carry out the construction project it was necessary to implement several soil improvement treatments and special foundation solutions. The following actions were undertaken:

- A topsoil layer of humus and man-made soil of approximately 0,80 m was striped and taken away from an area of 60,000 m².
- Uncovered layer of sandy soil was densified by several; passes of a 12 ton vibrating tamping roller.
• Vibroflotation and vibro exchange techniques to the depth of 8 m were implemented on an area of approximately 8,000 m². Improvement of loose soil layers by the vibro method was necessary for foundation of the paper machine. Loose sands with an index of density in the range of 0.15 to 0.25 was successfully densified to levels of \( I_D \) exceeding 0.70.

• Construction of concrete diaphragm slurry walls was required for proper foundation of the paper machine securing a 6 m deep technological basement under the machine.

• A layer of 40 cm of cobble stones was built in on the whole area of 60,000 m²; the stones were placed in 20 cm layers and densified by the 12 ton vibrating tamping roller.

• On top of the cobble stones a 60 cm layer of gravel was constructed. The gravel was placed in 20-30 cm layers and densified to the Proctor density index exceeding 0.98 (98%).

• Construction of footings for the production, storage and administration buildings.

• Construction of a slab raft foundation, integrated with the concrete slurry walls, for the paper machine.

• Construction of reinforced concrete floors in factory buildings and construction of surface layers of roads and parking areas.

Detailed description of the construction project, site geology, and soil improvement methods are given in full text.