Case Study

The information in this case study is reprinted from the American Cyanamid AM-9 technical manual. AM-9 was American Cyanamid's acrylamide grout product. Avanti's AV-100 Chemical Grout matches the chemical formulation, usage and performance of AM-9.

Title: Stabilizing Soil for Construction of Tunnels

Location: Bergen Generating Station, Bergen, New Jersey, USA
Owner: Public Service Electric Gas Company of New Jersey
Grouting Contractor: Thomas Adair Contracting Company

PROBLEM:

In this project, two 12-foot diameter by 270-foot long tunnels were to be driven beneath thirteen sets of live railroad tracks on the property of the New York Central, New York, Susquehanna, and Western Railroads. These tunnels would carry cooling water to and from the new 580,000-kW Bergen Generating Station and the Hackensack River. Grade specifications required that these tunnels be driven with an overburden ranging from 1 ½ to 5 feet, through a heavily watered soil consisting of railroad embankment fill, meadow mat, fine sand, and silt over a clay bottom. The project had to be completed without disturbing the roadbed or traffic.

SOLUTION:

Grouting with AM-9 was selected for this project over other possible methods because of the speed and ease of application, and non-interference with railroad operations.

APPLICATION:

The AM-9 solution was applied through a grid pattern of injection points driven from the surface to the clay belt below the spring line of the tunnel. Open ended pipes plugged with a rivet were placed by jack-hammer. Slight withdrawal, plus application of pressure, blew out the rivet at the start of grouting. Grout volumes were based on the assumption that grout would completely fill the voids in the treated area. A predetermined volume of grout was pumped into each injection point, using gel times of 3 to 5 minutes and pumping rates of 5 to 10 gpm. Pressure seldom exceeded 40 psi.

RESULTS:

Application footage rates ranged up to 40 lineal feet of soil stabilized per eight-hour day. The use of AM-9 proved completely satisfactory. It enabled the contractor to tunnel an average of 12 feet per 24-hour day, and complete the tunnels in about 50 working days.