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Extraction of Contaminated Soil Using High Pressure Jet Grouting

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EXTRACTION OF CONTAMINATED SOILS USING HIGH PRESSURE JET GROUTING

THE NEED

Removal of contaminated soil underneath existing structures causes settlement. There is a need for a remediation technology that eliminates this problem.

THE TECHNOLOGY

The jet grouting by the triple rod system can be combined with an on site remediation technology (e.g., soil washing). Jet grouting was developed primarily for underpinning and/or excavation support. It is a ground modification system used to create in-situ cemented geometries of soil (soilcrete). The triple rod system utilizes high pressure water (5,000 to 6,000 psi) shielded in a cone of air to cut and displace the soil to the surface. Simultaneously, as the soil gets dislodged, tremie is discharged to fill the disturbed area with a pre-engineered cement slurry. The water jet is surrounded by a concentric collar of compressed air which concentrates the jet, particularly below the water table. This high pressure water and air steam is designed to erode the surrounding soil. This washes certain contaminants from the coarser grained soils. This medium also serves as the source of the air lift system which displaces the spoil to the surface where it would be collected at the top of the drill hole. The contaminated material (water and soil) that comes out through the work pad is fed directly into a decontamination system.

THE BENEFITS

The benefits of this technology lie in the future reduction of structural settlement, and site access flexibility. The triple rod system method can be done with small jet grouting rigs, if necessary, to access very restrictive locations. In addition, very little contact of contaminated materials with the surrounding environment occurs. Also, no initial lowering of possible high groundwater table is necessary. This technology has the potential of targeting pockets of contamination in otherwise deep inaccessible locations (such as under existing structures).

STATUS

This technology has been recently commercialized.



BARRIERS

This technology has yet to prove that it is cost effective and time efficient i.e. productive. There might be a need for skilled labor on site to oversee or supervise proper implementation.

POINT OF CONTACT

This technology is being jointly used in Germany as an in-situ soil extraction and treatment pilot program by the following companies: Keller Grundbau GmbH, S & I Schlammmentwässerung GmbH & Company KG, WUE Umwelt - Engineers GmbH.

REFERENCES

1. Grisham and Sondermann: 'Extraction and Washing Contaminated Soils Using High Pressure Jet Grouting Techniques', Superfund '90, Proceedings the of 11th Annual National Conference & Exhibition, 1990.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

Purdue University does not endorse this technology or represents that the information presented can be relied upon without further investigation.

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