

Case study

Intermodal Rail Depot, Widnes

Synopsis

Accelerated Carbonation Technology (ACT) was successfully utilised to solve ground stability and contamination problems at the site resulting from 'Galligu' deposits, and its performance was compared with standard solidification/stabilisation (S/S) techniques.

The problem

Galligu is a calcium sulphide waste, produced by the Le Blanc process used in the manufacture of sodium carbonate. The deposits at Widnes are up to 4 metres deep and variable in both chemical and physical properties, with a 'toothpaste-like' consistency at depth and a hard fused granular, oxidised material near the surface. This results in the ground being unstable, and unsuitable for development, as well as being contaminated.

The solution

ACT and conventional hydration based S/S were both applied, and their performance was compared based on geotechnical and leaching characteristic tests.

A number of representative samples were taken and bench scale trials were carried out to determine the range of additives required for the field trials. A total of 20m³, homogenised from the various trial pits, was treated in three batches of 4m³ using ACT and different binder combinations; an additional 4m³ was treated using conventional hydration based S/S and

the remaining 4m³ was left un-treated for comparison. The materials were tested in accordance with BS 1377 for a variety of geotechnical parameters and for leachability in accordance with the NRA leach test.

Materials analysis of the untreated waste indicated contamination by a range of heavy metals. ACT showed a superior reduction in leachability of these heavy metals. ACT also caused a significant improvement in load bearing, handling and durability characteristics of the material, compared with both standard S/S and the untreated waste.

The key advantages of ACT

ACT outperformed traditional S/S techniques by providing:

- Superior geotechnical characteristics
- Superior leachate reduction

In addition, ACT provided additional benefits:

- Rapid treatment time: 20 minute process time allowed immediate re-use of the treated waste as safe engineering fill on-site
- Low cost treatment with increased value

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Shell Springboard
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