Northstone Product Specification

In-Situ Road Strengthening and Recycling

Description

In-situ road strengthening and recycling is an environmentally sustainable alternative to conventional hot laid bituminous strengthening of highways. The system provides a structurally sound road surface up to a depth of 300 mm using the existing road materials and adding foamed bitumen or emulsion with cement.

It provides an excellent base or binder course in preparation to take a surface course material.

Typical Applications

Is suitable for all classes of roads and is ideal for:

- New Construction and Design and Build Projects.
- Bog rampart roads where additional loading by conventional means will cause rapid failure.
- Roads and street-works where existing level constraints prevent raising the road by more than the surface course.
- Roads where existing utility equipment prevents excavation and full reconstruction.
- Roads where suitable quarry materials are not readily available.

Environmental Benefits

- Reduced traffic movements on public roads through a reduction in materials delivered to and from site resulting in a lower carbon footprint.
- Reduced CO₂ emissions and lower energy consumption through a reduction in the volume of hot material required.
- Weak materials which are strengthened and re-used on site don’t get sent to landfill, thus increasing environmental and economic benefits.
- Extending life of existing rock reserves through more sustainable extraction due to the recycling of existing pavement materials.

Preparation and Installation

The process involves the pulverisation of the existing road surface up to a maximum depth of 300 mm. Rock fines can be added at this stage if tests determine that the materials are too coarse. The pulverised material is then graded to the required levels and compacted. Stabilisation then takes place with cement being added to the new surface at a pre-determined rate of spread. The surface is then pulverised again with Foam Bitumen injected into the mix. The surface is then regraded and compacted in preparation for a regulating or surface course finish.
First use in Ireland: N15 Sligo–Bundoran Road

We have recently completed a major contract to strengthen the N15 Sligo to Bundoran Road at Castlegal, on behalf of Sligo County Council. Extensive testing of the existing weak carriageway showed that an overlay with hot material by traditional methods would require an average depth of 250mm to be laid to achieve the required pavement strength. However, this was not a feasible option as many of the adjacent properties were already lower than the existing road surface. Excavation and reconstruction was not a viable alternative due to the high traffic volumes using the road and the non-availability of a suitable and safe diversion route. This led the County Council and the National Roads Authority to decide to complete the works using an in-situ ground stabilisation process based on the principle of using and strengthening the existing pavement materials, rather than overlaying with additional material. Some 2km of carriageway was reconstructed.

The strengthening work was completed in the following stages:

- The first stage, known as pulverisation, involved cold milling the existing road surface to a depth of 300mm, with dust added. The pulverised material was then graded to the required levels and compacted.

- The second stabilisation stage involved mechanically distributing a layer of cement over the surface at a pre-determined rate of spread. The surface was then milled a second time with foam bitumen being simultaneously injected into the mix. The surface was then regraded and compacted.

- Finally, a 25mm thick layer of 10mm asphaltic concrete surface course was laid to provide a temporary running surface for traffic until the final hot rolled asphalt surface course was laid.

References

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