

ROAD TECH 2000 - Road Stabilisation

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Introduction

Traditional methods of road pavement and subgrade stabilisation include lime and cement applications as well as chemical-based additives, which can be expensive and have adverse environmental effects. Other methods include importing good quality aggregates to form the pavement structure, which can be expensive due to long transportation distances and does nothing to limit the use of valuable limited resources.

A new product has since entered the market of stabilisation and dust suppression of subgrades and pavements. ROAD TECH 2000 (RT2000) is a natural biological product which is environmentally friendly and was developed in response to the need for an easy to use construction and maintenance, stabilisation product.

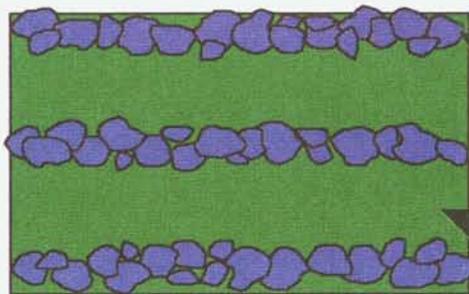
TECHNICAL NOTE

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microbes feed on nutrients in the clays secreting a polymer which binds the clays and fills voids between the clay platelets left after compaction, thus eliminating areas where water can accumulate (Figure 1).

RT2000 can be used to prepare insitu subgrade for bitumen sealed or unsealed roads by stabilising clay material to a strength which is suitable to lay gravel, bitumen, asphalt or concrete, or can be used to make use of nearby sources of low grade aggregate for pavement construction. RT2000 has also successfully been used to treat road shoulders, resulting in a stable and firm extension of the traffic surface.

Cross Section of Clay Soil Particle without RT 2000



Individual Soil Units
or Crystals

Microbial Polymer Displaces
Air & Water

Variable Space (Water/Air)

Cross Section of Clay Soil Particle with RT 2000

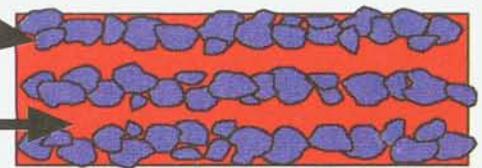


Figure 1 - Cross-section of clay soil particles before and after treatment with RT2000.

The Product

RT2000 is non-pathogenic towards plants or animals and is a biodegradable emulsion used as a stabiliser in the construction of clay-based roads. The emulsion contains a microbe-based product that treat the clay particles to reduce their water retention ability and increases the compactability of the clay.

The completely naturally-occurring microbes have two modes of action. Firstly, it makes electro-chemical changes to the clay particles which helps to repel, rather than attract water, and secondly, the

An unique benefit of this microbial interaction is the microbe's capacity to move down through the profile, strengthening the lower profiles of the subgrade or pavement. The strengthening process continues for up to three months, the process is then complete.



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The length of time required from application of RT2000 to traffic usage can be as little as one day. Traffic movement helps to maintain compaction as shrinkage occurs.

Suitable Material

Most gravels and calcareous clay-based materials with the following properties are suitable for treatment with RT2000.

- A Plastic Index (PI) ≥ 7
- The percentage of fines (ie: that portion passing a 0.425 sieve) of at least 20%
- The clay fraction of these fines of 30% or more
- A pH of eight or less

Application

Tests to determine, PI, Optimum Moisture Content (OMC) and pH, are carried out to determine the geological make-up of the soil.

The optimum rate of application of RT2000 (usually between 1l to 2.5 m³, to 1l to 4 m³, of material to be treated) is determined by the clay types, (as determined from the above tests), prevailing weather conditions, and anticipated traffic volumes.

No specialised equipment is required. The road surface or subgrade is ripped to an average of 100 mm to 150 mm using a grader with multiple tooth scarifiers and rolled, if required, with a multi-tyred pneumatic roller to break any large lumps, until a workable texture develops. RT2000 is then added to a water truck and applied during the normal watering process to bring the material to OMC. The material is then blade mixed and compacted.

Cost

RT2000 retails at \$4000 per 200 litre drum which will, depending on the application rate, usually treat 300 m³ of material. Additional costs incurred due to the use of a grader, water truck, roller and personal are standard construction requirements and therefore do not impose any extra expense.

Limitations

- Obtaining correct OMC is critical to RT2000 strength.
- Clay profiles of 30 % with a PI of ≥ 7 are required for RT2000 to give effective results.
- Percentage of fines should not be less than 20%.

Advantages

- Totally natural and biodegradable, therefore restricting any contamination of the environment.
- Easy to apply with no extra personnel or special machinery required.

Conclusion

Using RT2000 for the stabilisation of low grade aggregates for pavement construction, and stabilisation of subgrade materials, eliminates or reduces the costly transportation of good quality aggregate to the roading site. This reduction of aggregate use helps to conserve our valuable good quality resources. RT2000 is totally natural and therefore environmentally friendly. However, this product does require correct soil properties and construction techniques to enable it to work correctly and produce a strong long lasting pavement.

References

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