

STABILISED and Modified Roadbase Materials

ROADBASES, WHY ARE THEY STABILISED, OR MODIFIED?

Roadbases consist of granular materials which when correctly placed and compacted form a stiff pavement layer used in road construction.

To ensure adequate stiffness, binding agents are added. A 'modified' roadbase will typically incorporate a small amount of a binding agent such as lime; a 'stabilised' roadbase will incorporate a larger amount of binding agents such as cement, fly ash or slag, alone or in combination.

HOW ARE STABILISED ROADBASES MADE?

When roadbase materials are required to be stabilised, they are almost always fed through a dedicated stabilisation mixing plant (pug mill).

Within these plants the granular material is fed into a mixing chamber where water and binders are added in a set sequence to allow uniform dispersion of moisture and binding additives.

The even mixing and distribution of the stabilising binders is very important to the roadbase performance; for this reason the plant is calibrated regularly to ensure that the amount of binders added is within allowable tolerance.

The amount of stabilising binders added can be based on either the percentage by weight or volume, depending on the batching equipment used, eg 3% cement stabilised roadbase.



ROADBASES may be *modified* by adding lime etc to achieve between 0.7 to 1.5 MPa, or *stabilised* with cementitious binders to achieve >1.5 MPa as measured by the Unconfined Compressive Strength Test (UCS).

HOW IS SPECIFICATION COMPLIANCE DETERMINED?

The design performance of modified, or stabilised, roadbase is not measured by the percentage of binder added to the material, but rather by separate testing of the material to determine its Unconfined Compressive Strength (UCS).

The UCS involves the compaction of the stabilised roadbase at the correct moisture content, curing and crushing under controlled conditions, to provide a repeatable measure of the compressive strength of the material.

Specification compliance often requires a modified or stabilised roadbase to achieve a minimum UCS value. As roadbase materials can be produced from many geological types from various sources, the required UCS may be achievable with a low percentage of binder for one material, but only with a significantly higher percentage for another.

For this reason, compliance is normally measured not on the percentage of binder added but by the achievement of the UCS.

UCS is usually expressed in terms of a percentage stabilisation for a given roadbase material and binding agent(s) combination. This is often determined from material history, previous experience and supported by laboratory testing.

Variations in UCS may occur within a given roadbase due to variations in materials and construction practices. It is common to err on the side of caution by specifying slightly higher than required UCS values based on risk.

For example, a specified UCS value of 3.2 MPa, may equate to a minimum of 3.2% cementitious addition, for a given binder combination, and therefore it may be ordered to be supplied as 3.5 to 4.0% stabilised roadbase.



RULE OF THUMB:

1% lime addition to gain 0.5 MPa

OR

1% cementitious addition to gain 1 MPa.



IN *modified* or *stabilised* roadbase projects from the time cementitious binders touch water in the mixing chamber of the quarry plant, the clock is ticking.

WHO IS RESPONSIBLE WHEN SUPPLYING STABILISED ROADBASE MATERIAL?

The customer

It is the responsibility of the person ordering the roadbase material to ensure the percentage stabilisation requested of the supplier is adequate for the pavement design.

The person taking receipt of the stabilised material is responsible for the final percentage stabilisation of the roadbase at the time of placement.

The supplier

The quarry supplier producing and delivering the roadbase should provide, to site, a material as close as possible to the percentage stabilisation specified by the customer.

Whilst the success of any roadbase construction is dependent on a sound contribution and communication by all parties, it is even more important in modified or stabilised pavements where working time of roadbase and binder setting time is critical.

FURTHER INFORMATION

Further information on good concreting practices can be downloaded from the Cement Concrete and Aggregates Australia website at www.ccaa.com.au.