

Test Method

Determination of the Maximum Allowable Working Time for a Cementitious Binder

RC 330.02

1. Scope

This Method covers the laboratory procedure used for the determination of the maximum allowable working time for a cementitious binder used for the stabilisation of granular pavement materials.

2. Definitions

(a) Cementitious Binder

A cementing agent which binds the particles of a granular pavement material together to increase its strength. Cementitious binders include Portland cement Type GP or blended cement Type GB, hydrated lime, quicklime, or a blend of ground granulated blast furnace slag (GGBFS), hydrated lime, fly ash, alkali activated slag or other pozzolanic material.

(b) Maximum Allowable Working Time

The time available, to the nearest hour, for a crushed rock base material stabilised with a cementitious binder, to reach a value of 90% of the Unconfined Compressive Strength (UCS) determined for the stabilised material after storage for one hour at the specified temperature.

The specified temperature is:

May to September	10° to 15°C
October to April	0° to 25°C

3. Apparatus

- (a) For grading - as detailed in AS 1289.3.6.1.
- (b) For unconfined compressive strength - as detailed in AS 5101.4.
- (c) For maximum dry density and optimum moisture content as detailed in AS 289.5.2.1.

4. Material Selection

- (a) Obtain a sample of Class 1, 20 mm crushed rock base material complying with VicRoads Standard Specification Section 812.
- (b) Prepare and precondition the crushed rock in accordance with Clause 5.1 of AS 1289.1.1.

Note: Obtain sufficient material to determine the maximum dry density, optimum moisture content and for the preparation of 12 UCS moulded test samples.

5. Procedure

5.1. General

If maximum allowable working time is to be determined for construction being carried out from October to April inclusive, the test shall be performed between 20° to 25°C.

If maximum allowable working time is to be determined for construction being carried out from May to September inclusive, the test shall be performed between 10° to 15°C.

5.2. Maximum Allowable Working Time

- (a) Mix sufficient quantity of the crushed rock with 3% by mass of the cementitious binder for the determination of maximum dry density and optimum moisture content.
- (b) Place the mixed material in sealed plastic bags and allow to stand for one hour at the required temperature (see 5.1 above).
- (c) After 1 hour break up the cured material over a 10 mm screen and recombine material passing and retained on the screen.
- (d) Determine the maximum dry density and optimum moisture content of the recombined material in accordance with AS 1289.5.2.1.
- (e) Mix sufficient quantity of crushed rock with 3% by mass of the cementitious binder to carry out the Unconfined Compressive Strength (UCS) tests in accordance with AS 5101.4.
- (f) Place the mixed material in sealed plastic bags and allow to stand for one hour at the required temperature (see 5.1 above).
- (g) After the 1 hour standing time break up the cured material over a 10 mm screen and recombine material passing and retained on the screen.

- (h) Add water and mix the material to achieve a laboratory moisture ratio of 95% to 105%.
- (i) Determine the UCS of the material in accordance with AS 5101.4 and the following:
 - (i) Compact the specimens in accordance with AS 1289.5.2.1. Complete compaction of both specimens within 30 minutes of mixing in step (h);
 - (ii) Cure the compacted test specimens for 7 days at the required temperature; and
 - (iii) On completion of curing, immediately perform the procedure for compression testing as described in AS 5101.4 Clause 9.
- (j) Repeat steps 5 (e) to (i) for 2, 4 and 8 hours standing time after addition of the cementitious binder.
- (k) If the UCS values obtained are greater than 90% of the UCS determined after one hour standing time, repeat steps 5(e) to (i) at 12 and 24 hours.
- (l) Plot UCS versus standing time. Draw the line of best fit to the points and determine, to the nearest hour, the maximum allowable working time for the cementitious binder (see Figure 1 as an example).

6. Report

Report the following information:

- (a) the type of cementitious binder used;
- (b) the maximum allowable working time for the cementitious binder to the nearest hour;
- (c) the temperature range at which the value was determined.

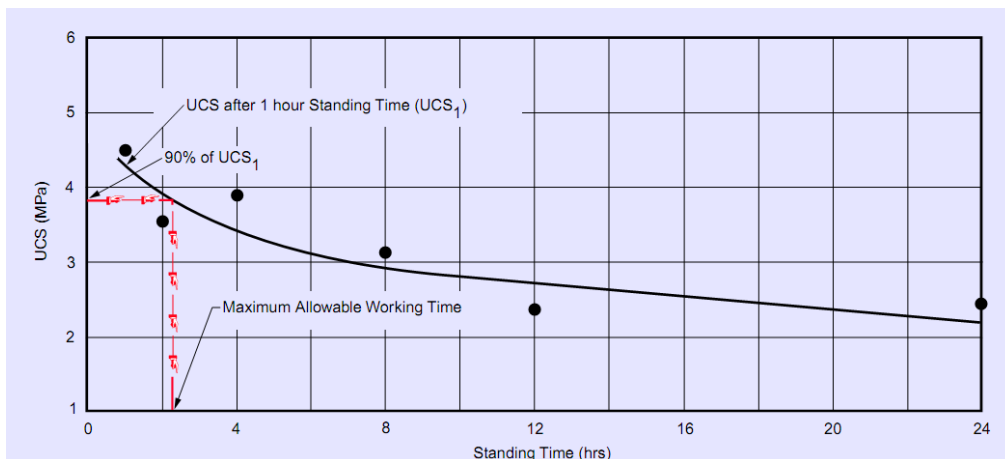


Figure 1 Unconfined Compressive Strength vs Standing Time

Test Method - Revision Summary

RC 330.02 Determination of the Maximum Allowable Working Time for a Cementitious Binder

Date	Clause Number	Description of Revision	Authorised by
March 2014	Cl 3(b) & others	AS 5101.4 replaced AS 1141.51	Manager – Construction Materials
June 2012	Full document	Re-styled with minor corrections made	Principal Advisor – Pavements & Materials