# RESIDENTIAL SPECIFICATION (5.00)

# MONOLITHIC STABILISED EARTH WALLING

## 1. GENERAL

Monolithic stabilised earth walls are to be constructed by a member of the Affiliated Stabilised Earth Group using the "Stabilform" formwork system.

## 2. MATERIALS

Gravels, laterite soils and soil blends

Soil used shall have:

| | |
|---|---|
| Organic Content | Less than 2% |
| Clay & Silt Content | Material below 0.075mm to be below 20% |
| Sand Content | Material between 0.075mm and 4.750mm to be not less than 50%. |
| Gravel Content | Material between 4.750mm and 75mm to be above 30%.<br>Not more than 5% to be kept on 37.5mm screen size. |

Gravel, laterite soils and soil blends:

Cement content by volume shall be 6% minimum to 10% maximum determined by Mix Design and Strength Evaluation test.

or

Limestone and Sandstone:

Crushed limestone/sandstone ex nominated quarry to supplier's standard.

Cement content by volume shall be no less than 7%. Proportion to be determined by Mix Design and Strength Evaluation test.

*or*

Recycled Crushed Building Rubble:

Crushed Building Rubble ex nominated supplier to suppliers standard.

Cement content by volume shall be no less than 7%. Proportion to be determined by Mix Design and Strength Evaluation test.

A minimum of 7% cement by volume shall be used in reinforced earth walls.

## 3. TESTING

Soil shall be tested by a Laboratory registered by the National Association of Testing Authorities, Australia and carried out in accordance with its terms of registration.

Tests to include:

1. Soil Tests

   Consistency Limits (Atterberg Limits)

| | |
|---|---|
| Liquid Limit: | AS 1289.3.1.1 |
| Plastic Limit: | AS 1289.3.2.1 |
| Plasticity Index: | AS 1289.3.3.1 |
| Linear Shrinkage: | AS 1289.3.4.1 |
| Particle Size Distribution: | AS 1289.3.6.1 |

2. Mix Design and Strength Evaluation

Method 5.2.1: Soil compaction and density determination of the dry density/moisture content relation of a soil using modified compactive effort: To AS 1289.5.2.1-1993
Test report to include:

(a) Cement content by volume
(b) Elapsed time between addition of cement and compaction
(c) Date moulded
(d) The dry density corresponding to the maximum point on the moisture content/dry density curve as the 'modified maximum dry density' in tonnes per cubic metre to the nearest 0.01.
(e) The percentage moisture content corresponding to the maximum dry density on the moisture content/dry density curve, as the 'modified optimum moisture content' to the nearest 0.5.
(f) The percentage of oversize material retained on the 19.0 mm sieve or the 37.5 mm sieve and the sieve on which the material is retained, whichever is applicable, to the nearest 1.
(g) When required, the plot of dry density against moisture content.

Method 51:
Unconfined compressive strength of compacted materials to AS 1141.51-1996
Samples to be retained in the mould for 12 hours and air cured in an open environment for 7 days.
Test results on the specimens to include:

(a) Material retained on the 19.0 mm sieve as a percentage of the moist mass in the original sample.
(b) Details of replacement of course material, if applicable.
(c) When a binder is used elapsed time between addition of the binder and compaction.
(d) Moisture content at which specimens were compacted.
(e) Details of curing.
(f) Moisture content of specimens on completion of testing.
(g) Compactive effort applied, method of compaction and number of layers.
(h) Dry density of specimens as compacted, to the nearest 0.01 t/m3 and if required the percentage of maximum dry density of each specimen.
(i) If required, the laboratory moisture ratio of the material prior to compaction.
(j) The nominal height and diameter of the specimens, in millimetres.
(k) Unconfined compressive strength, as the average of the strength of two test specimens to the followiong precision:

(i) For UCS less than 1.0 MPa, report to the nearest 0.02 Mpa.
(ii) For UCS between 1.0 MPa and 2.0 MPa, report to the nearest 0.1 MPa.
(iii) For UCS greater than 2.0 MPa, report to the nearest 0.2 MPa.

(l) When a binder is used, the method of preparation of the test sample.

(m) Reference to this Australian Standard, ie AS1141.51.

3. Conformance Tests

Characteristic adjusted compressive strength test: to CSIRO Bulletin 5 Fourth Edition, Appendix E - Method For Determining Compressive Strength.

Samples to be taken from batch being placed on construction site. Three specimens shall be compacted for each test. Specimens shall be compacted in a 150mm diameter by 110mm high cylinder or 150mm square mould. Samples to be retained in mould for 12 hours and air cured in an open environment for 7 days.

Report to include:

(a) Identification of project and the manufacturer of the specimens.
(b) Date and location of sampling if applicable.
(c) Date of test
(d) Cement content by volume.
(e) The compressive strength, in megapascals, of each specimen.
(f) Aspect ratio for each specimen
(g) The adjusted compressive strength of each specimen.
(h) The characteristic compressive strength.

Soil evaluation criteria: To CSIRO Bulletin 5 Table 2.2.

4. COMPRESSIVE STRENGTH

Minimum characteristic adjusted compressive strength (Cca) of 2.5MPa.

5. PLACEMENT AND FINISH

Place blended material in forms in 200mm (maximum) layers and compact within two (2) hours of blending.

Forms to remain in position for 12 hours before stripping.

Surface finish shall be generally consistent throughout to the colour and texture of an approved sample.

6. DAMP PROOF COURSE

Form a damp proof course (DPC) between the footings and stabilised earth walls with a cement slurry with 'Silasec' or other approved water barrier admixture or; 'Pabco Malthoid' or similar product to suit thickness of wall.

Protect the face of stabilised earth walls below finished ground level, by application of a cement slurry with 'Silasec' admixture or similar. Ground surface to be graded away from the stabilised earth walls to prevent water ponding or running against them.

7. CONSTRUCTION JOINTS

Construction joints to be located as shown on drawings. Form mechanical keys at each construction joint and fix 25mm x 25mm acrylic adhesive impregnated poly foam strip to full height of wall. Foam strip to extend 100mm along floor slab to ensure a complete seal at the bottom of the construction joint. Form 12mm V joint on both wall faces.

8. CHAMFERS

Form 19mm chamfer at ends of wall panels or exposed surfaces (eg. balustrades).

9. CONSTRUCTION TOLERANCE

Finished work shall be true and free from bulging in the wall surface. The maximum allowable deviation from true position shall be 10mm horizontally and 3mm vertically per 600mm formwork lift. Trueness of surface and joints shall be in accordance with AS 3610, Class 3.

10. ELECTRICAL AND OTHER SERVICES

Electrical components to be cast in wall shall be shall be suitably sealed to prevent penetration of soil during compaction. Boxes to be located at heights specified. A minimum of 100mm cover should be allowed for cast in conduit, pipes, etc.

11. WATERPROOFING ADMIX

Tech-Dry PLASTICURE

To be added at a rate of between 600ml and 800ml per m3 of dry mix. Rate will be determined by specific mix designs.

12. INTERNAL SEALING OF STABILISED EARTH WALLS

Internal walls: Allow a provisional sum for sealing with a PVA polymer emulsion or water born acrylic sealer diluted sufficiently with water to allow deep penetration and clear low sheen finish.

External walls exposed to extreme wind-driven rain: A solvent-born silane-siloxane system applied at recommended application rate.

Type: Tech-Dry Stabilised Earth Water Repellent (SB)

13. PROTECTION OF STABILISED EARTH WALLS

It is the builders responsibility to emphasise to other subcontractors that the stabilised earth walls are off-form finished. It will be the builders responsibility to remove any markings or stains made on the walls by other trades subsequent to the wall completion.

Plastic sheeting is to be draped over stabilised earth walls during plastering and other adjacent wet trade works. Forming for suspended slabs to provide similar protection.

14. ANCHORS AND FIXING

To engineers, designers and/or manufacturers specifications.

1. STRUCTURAL FIXINGS

Hilti HIT HY 150 or Ramset Chem Set or Reid Epoxy Injection System. Structural fixing should be located no less than

150mm from top or edge of the stabilised earth wall. Holes should be drilled a minimum of 3mm larger than anchor diameter and be thoroughly blown out before injecting epoxy resin. Any overspill in visible areas will need to be removed immediately.

2. SECURING WALL FRAMES, WINDOW FRAMES, DOOR FRAMES.

Secure by one of the following means;
Hilti HRD-H Plastic Frame Anchors
Hilti HRD-V Plastic Frame Anchors
Ramset Ramplug Nylon Plug Fasteners
Avdel Excalibur Screw Bolts

3. FASTENING ALUMINIUM WINDOWS, PIPES AND CABLES, TIMBER BATTENS AND COMPONENTS FOR ELECTRICAL AND PLUMBING INSTALLATIONS

Secure by one of the following means;
Hilti HPS-1 Impact Anchors
Hilti HGN Gas Concrete Anchors
Hilti HUD Universal Anchors
Ramset Nylon Anchors
Ramset Masonry Anchors