SEALS Brisbane Pty Ltd

Adding value, reducing construction costs and ensuring longevity

PO Box 525, Beaudesert, Qld, 4285, Australia
Phone: 07 5543 1053
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www.sealsgroup.com
info@sealsgroup.com

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
SEALS Brisbane Pty Ltd

SEALS Brisbane is the Queensland distributor for PolyCom Stabilising Aid and DustChek dust control for local government, civil construction and mining and gas sectors.

With a strong emphasis on the utilisation of in-situ materials and locally available clays and gravels, SEALS has the experience and the solutions to deliver sustainable alternatives for the construction and maintenance of road infrastructure projects.

SEALS Brisbane works closely with local councils and shires, mine site and gas field operators, and other road makers to transform their road maintenance problems into a more efficient and cost effective solution.

PolyCom Stabilising Aid

“It’s all about improving and preserving the dry strength of the available material”

PolyCom Stabilising Aid is an Australian-made soil stabiliser, used to strengthen almost any material commonly found in road construction and earthworks projects.

From naturally occurring sub grade, to applications in crushed rock prior to sealing works, PolyCom is used for the construction and maintenance of sealed and unsealed roads, hardstands, mine site haul roads, access roads, shoulders, airstrips and other pavements where material requires improvement.

PolyCom delivers a stronger, more resilient pavement, improving the flexibility and workability of the materials to create a tighter, water resistant surface.
Benefits of PolyCom Stabilisation

1. **Increased strength** - Increased layer density results in higher CBR values. In addition, the process delivers a higher resilient modulus to the treated material as evidenced in the triaxial load results attached.

2. **Increased flexibility** - Cementitious binders produce a fully bound layer (rigid layer) which is prone to fatigue and shrinkage cracking as well as vibrational problems. Stabilisation using PolyCom produces a modified layer, delivering increased strength through improvement to the natural mechanical interlock of the host material, plus polymer bonding of particles. This strengthening method delivers an enhancement to the materials' natural flexibility.

3. **Water resistance** - Higher density and less void spaces reduces the chance of water ingress into the stabilised layer (refer to soaked CBR results and compaction example pictures). Additionally, exposed surfaces of the stabilised layer 'fatten' on contact with moisture, preventing the passage of this moisture through the outer barrier.

4. **Remediation of dispersive soils** - Dispersive soil properties are remediated through flocculation of fine particles and the increased density and cohesiveness of the polymer bound layer, reducing the chance of fines migration through the layer.

5. **Re-workability** - PolyCom stabilisation can be re-worked at any time, enabling ease of any future repairs. Because PolyCom does not have any set curing time, it will not “go off” and materials can be stockpiled indefinitely and re-mixed as required.

6. **Transportation** - PolyCom is packed in highly concentrated 2kg bottles, and each bottle will stabilise 50 cubic metres of material. PolyCom is applied at 0.002% or 20 parts per million. A 2kg bottle of PolyCom stabilising aid can be the equivalent of 2 tonnes of lime or cement, resulting in huge savings in the transportation of product to site.

7. **Ease of application** - PolyCom is spread dry with purpose-built spreading units which are attached to the rear of a site vehicles and only take a few minutes. It will not disrupt normal construction practices. Once spread, all you need is the usual road construction plant, i.e. grader, rollers and a water truck. PolyCom is then mixed through the material by simple blade mixing. For remote areas, this is a simple and inexpensive method of obtaining an enhanced pavement with greatly reduced maintenance and cost.
8. **Water savings** - During construction and maintenance, moisture evaporation rates of treated material are reduced considerably, coupled with the fact that PolyCom will reduce OMC of most materials to the order of 30%. Moisture loss during construction is critical, especially in remote and arid regions where temperatures are high and water is scarce. Roads treated with PolyCom Stabilising Aid require less maintenance, resulting in significant water savings as well as providing water resistant qualities to the treated pavement.

9. **Environmental impact** - PolyCom is non-toxic and OH&S compliant. It has been approved for use in water catchment areas (W.A Health Dept.) and is listed with ‘ECOBuy’ and Sustainable Choice NSW.

In 2013, PolyCom Stabilising Aid featured at an IPWEA conference (Institute of Public Works Engineering Australasia), revealing:

- Close to 90% reduction in greenhouse gas emissions
- 80% reduction in water usage
- 70% / year financial savings on the maintenance of the road

See the full report at: [http://www.ipwea.org/Resources/ViewDocument/?DocumentKey=eb0a7cd1-602f-44e1-92c1-19af8c979b24](http://www.ipwea.org/Resources/ViewDocument/?DocumentKey=eb0a7cd1-602f-44e1-92c1-19af8c979b24)

Recently our distribution partners Earthco Projects were awarded the 2014 Banksia “Product Sustainability - through design, manufacture and use” award for their work with PolyCom Stabilising Aid on unsealed roads, as well as the 2014 Victorian Premier’s Regional Recognition Award, proving PolyCom to be a cost-effective and sustainable alternative to traditional soil stabilisation.
Field Performance

Validation of the above product benefits can be confirmed by standard tests on in-situ soils. Empirical test results are also attached.

Suggested tests for verification of suitability in the in-situ soils - CBR, triaxial load, vertical saturation, 28 day UCS and capillary rise.

Attached Test Results

Attached are triaxial load test results as well as CBR examples, slug test and compaction examples.

Whilst this test results cover variations of soil and gravels that do not pertain to the in-situ ground at the proposed work site they do give a good indication of the usefulness of the PolyCom product over a range of material.

Triaxial load results indicate an increase in material resilient modulus and consistency in the strain and pore pressure readings.

It should be noted that both the soaked and un soaked the CBR results indicate strength increases.

Note the increase in compacted densities and a reduction in OMC figures.

Attached CBR test results cover a range of materials.

1. Cooyar Road: Local ridge gravel - Clayey gravel
2. Wondai-Proston Road: Local bush gravel - Gravelly clay
3. Mundubbera Road: Local ridge gravel - Sandy clay gravel
4. Curragh access road: Manufactured road base - 2.3
5. Plenty Highway: Local pit - Clayey sand
# PERMANENT DEFORMATION TEST REPORT

FOR GRANULAR UNBOUND PAVEMENT MATERIALS

**TEST METHOD: AS1289.6.8.1**

<table>
<thead>
<tr>
<th>Project:</th>
<th>Rosewood - Marburg Rd Polycorn Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Details:</td>
<td>DPIR, Metropolitan Region, 183 Wharf St, Spring Hill, Qld, 4006</td>
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<tr>
<td>Project No:</td>
<td>FGS903</td>
</tr>
<tr>
<td>Sample No:</td>
<td>S10-325.B1R</td>
</tr>
<tr>
<td>Test Date:</td>
<td>28-Oct-2010</td>
</tr>
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</table>

**Sample Details**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Base</th>
<th>Material Source</th>
<th>Rosewood-Marburg Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Location</td>
<td>1P1.3, 4 &amp; 5 combined</td>
<td>Sample Details</td>
<td>NA</td>
</tr>
<tr>
<td>Sampled By</td>
<td>Client</td>
<td>Date Sampled</td>
<td>18-May-2010</td>
</tr>
<tr>
<td>Sample OMC (%)</td>
<td>12.5</td>
<td>Sample MDD (t/m³)</td>
<td>2.043</td>
</tr>
</tbody>
</table>

**Placement Data**

| Specified Degree of Saturation (%) | 70 | Specified Density Ratio (%) | 100.0 |
| As compacted Degree of Saturation (%) | 71 | As compacted Density Ratio (%) | 99.9 |
| Specified Moisture Ratio (%) | 72.3 | As compacted Dry Density (t/m³) | 2.041 |
| As compacted Moisture Ratio (%) | 73.2 | As compacted Moisture Content (%) | 9.53 |

**Compaction Method**

Q110E

% Sample >11mm

NII

**Number of Layers**

6

**Testing Apparatus**

UTM 14P

**Nominal Stress Levels**

Total Vertical Stress (kPa) | 750

Confining Stress (kPa) | 125

**Sample Loading**

<table>
<thead>
<tr>
<th>Cycle No.</th>
<th>Resilient Modulus (MPa)</th>
<th>Permanent Strain (%)</th>
<th>Resilient Strain (%)</th>
<th>Pore Pressure (kPa)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>150</td>
<td>0.41</td>
<td>0.4</td>
<td>10</td>
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<tr>
<td>97</td>
<td>190</td>
<td>1.05</td>
<td>0.33</td>
<td>15</td>
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<tr>
<td>1009</td>
<td>220</td>
<td>1.42</td>
<td>0.29</td>
<td>17</td>
</tr>
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<td>18</td>
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<td>2041</td>
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<td>17</td>
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<tr>
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<td>220</td>
<td>1.79</td>
<td>0.28</td>
<td>1</td>
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</tbody>
</table>

**Variations to Test Procedure:**

Specimen remoulded at 70% DOS with no Polycorn added and no curing time.

**Remarks:**

Specimen remoulded at 70% DOS with no Polycorn added and no curing time.

After test Moisture Content - 9.7%, After test DOS - 72%.

Test performed undrained with pore pressure measured at the base of the specimen. Initial ρ value = 0.06.

Total no. of cycles = 100000.

**Report Number:** FGS903/S10-325.B1R/AS1289.6.8.1

**Date Reported:** 2-Nov-2010

**Checked By:**

**Authorising Officer:**

P. Svensen - Senior Technologist

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Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
DEPARTMENT OF TRANSPORT AND MAIN ROADS
GEOTECHNICAL BRANCH LABORATORY
Materials Services - Brisbane
35 Butterfield Street, Herston, Qld 4006
Phone: +61 7 3115 3035 Fax: +61 7 3115 3011

Queensland Government

PERMANENT DEFORMATION TEST REPORT
FOR GRANULAR UNBOUND PAVEMENT MATERIALS
TEST METHOD: AS1289.6.8.1

Project: Rosewood - Marburg Rd Polycom Trials

Client Details: DTMR, Metropolitan Region, 183 Wharf St, Spring Hill, Qld, 4006

Project No: FG5903  Sample No: S10-325.B1R  Test Date: 28-Oct-2010

BEFORE TEST

AFTER TEST

Remarks: -

Date Reported: 2-Nov-2010
Report Number: FG5903/S10-325.B1R/AS1289.6.8.1
Checked By: [Signature]
Authorising Officer: [Signature]

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Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
**REPORT on Laboratory Compaction to Nominated Levels of Dry Density and Moisture Content**

**Client:** Main Roads Department – Geotechnical Laboratory.

**Address:** Floor 1, 35 Butterfield Street Herston, Qld 4006.

**Job No.:** 50-007044.E  
**Project:** Polycom Trials

**Sampling Method:** -  
**Sampled By:** Client

**Material Source:** Rosewood – Marburg Rd  
**Nature of Sample:** Combined Base Material

**Sample Location:** Trench 1, 3, 4, & 5  
**Date Sampled:** 18/05/2010

**Test Methods:** Q110E – 1991 Laboratory compaction to nominated levels of Dry Density and Moisture Content

### TEST RESULTS

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>S10/325 (B1R)</th>
<th>Target D.O.S. (%)</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominated Moisture Content (%)</strong></td>
<td>9.41</td>
<td>Nominated (%) of OMC</td>
<td>75.3</td>
</tr>
<tr>
<td><strong>Achieved Moisture Content (%)</strong></td>
<td>9.53</td>
<td>Achieved (%) of OMC</td>
<td>76.2</td>
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<tr>
<td><strong>Nominated Dry Density (t/m³)</strong></td>
<td>2.043</td>
<td>Nominated (%) of MDD</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Achieved Dry Density (t/m³)</strong></td>
<td>2.041</td>
<td>Achieved (%) of MDD</td>
<td>99.9</td>
</tr>
</tbody>
</table>

**Variation(s) to Test Method:** -

**Remark(s):** - Curing: Uncured & Untreated

*SI0/325 MDD: 2.043t/m³, OMC: 12.5%*

---

**Checked By:**  
Anthony Neary

**Signatory:**  
Anthony Neary  
(Senior Materials Technician Soils & Aggregate)

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Report No.: 27285  
Date: 29/10/2010

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Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
PERMANENT DEFORMATION TEST REPORT
FOR GRANULAR UNBOUND PAVEMENT MATERIALS
TEST METHOD: AS1289.6.8.1

<table>
<thead>
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<th>Project No.</th>
<th>Sample No.</th>
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<td>FG5903</td>
<td>S10-325.02</td>
<td>18-Oct-2010</td>
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Sample Details

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Base</th>
<th>Material Source</th>
<th>Rosewood- Marburg Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Location</td>
<td>TP1,30,4 &amp; 5 combined</td>
<td>Sample Details</td>
<td>NA</td>
</tr>
</tbody>
</table>

Sample OMC (%)

- Sampled By: Client
- Date Sampled: 18-May-2010
- Sample OMC (%): 12.5
- Sample MDD (t/m³): 2.043

Placement Data

- Specified Degree of Saturation (%): 75
- Specified Density Ratio (%): 100.0
- As compacted Degree of Saturation (%): 76
- As compacted Density Ratio (%): 99.8
- Specified Moisture Ratio (%): 80.6
- As compacted Moisture Ratio (%): 2.039
- As compacted Moisture Content (%): 10.3
- Compaction Method: Q110F
- % Sample >19mm: NIL
- Number of Layers: 6
- Testing Apparatus: UTM 14P

Nominal Stress Levels

- Total Vertical Stress (kPa): 750
- Confining Stress (kPa): 125

Sample Loading

<table>
<thead>
<tr>
<th>Cycle No.</th>
<th>Resilient Modulus (kPa)</th>
<th>Permanent Strain (%)</th>
<th>Resilient Strain (%)</th>
<th>Pore Pressure (kPa)</th>
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<td>1</td>
<td>320</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
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<tr>
<td>97</td>
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<td>0.18</td>
</tr>
<tr>
<td>1009</td>
<td>360</td>
<td>0.14</td>
<td>0.17</td>
<td>0.17</td>
</tr>
<tr>
<td>2017</td>
<td>360</td>
<td>0.15</td>
<td>0.17</td>
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</tr>
<tr>
<td>5041</td>
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<td>25009</td>
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<td>360</td>
<td>0.24</td>
<td>0.17</td>
<td>0.17</td>
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</tbody>
</table>

Sample Loading

Varied to Test Procedure:

Specimen tested with two membranes for the test

Remarks:

- Specimen remoulded at 75% DOS with Polycorn added and allowed to cure at 23°C and 50%RH for 7 days prior to testing.
- After test Moisture Content = 5.1%. After test DOS = 38%.
- Test performed undrained with pore pressure measured at the base of the specimen. Initial b value = 0.03.
- Target no. of cycles = 100000. Test discontinued at 90337cycles due to loss of axial load caused by air pressure failure.

Report Number: FG5903/S10-325.02/AS1289.6.8.1
Date Reported: 26-Oct-2010
Checked By: 
Authorising Officer: P. Stroun - Senior Technologist

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
PERMANENT DEFORMATION TEST REPORT
FOR GRANULAR UNBOUND PAVEMENT MATERIALS
TEST METHOD: AS 1289.6.8.1

PROJECT: Polycom Trials, Rosewood - Marburg Rd
SAMPLE No: S10-325.D2

Resilient Modulus vs No. of Cycles

Permanent Strain vs No. of Cycles

Resilient Strain (%) vs No. of Cycles

Pore Pressure (kPa) vs No. of Cycles

Checked By: [Signature]
Authorising Officer: [Signature]
Report No: FG5903/S10-325.D2/AS1289.6.8.1
Date Reported: 28/10/2010

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Permanent Deformation Test Report
For Granular Unbound Pavement Materials
Test Method: AS1289.6.8.1

<table>
<thead>
<tr>
<th>Project:</th>
<th>Polycom Trials, Rosewood - Marburg Rd</th>
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<tr>
<td>Client Details:</td>
<td>DTMR, Metropolitan Region, 183 Wharf St, Spring Hill, Qld, 4006</td>
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<td>Project No:</td>
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<td>Sample No:</td>
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<tr>
<td>Test Date:</td>
<td>18-Oct-2010</td>
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Not Available

BEFORE TEST

AFTER TEST

Remarks: -

Date Reported: 26-Oct-2010
Report Number: FG5903/S10-325.D2/AS1289.6.8.1
Checked By: 
Authorising Officer: P. Simson - Senior Technologist
REPORT on Laboratory Compaction to Nominated Levels of Dry Density and Moisture Content

Client: Main Roads Department – Geotechnical Laboratory.
Address: Floor 1, 35 Butterfield Street Herston, Qld 4006.
Job No. 50-007044.E  Project: Polycom Trials
Sampling Method: -  Senders No.: -
Sampled By: Client  Lot No.: -
Material Source: Rosewood – Marburg Rd  Nature of Sample: Combined Base Material
Sample Location: Trench 1, 3, 4, & 5  Date Sampled: 18/05/2010
Test Methods: Q110E – 1991 Laboratory compaction to nominated levels of Dry Density and Moisture Content

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>S10/325 (D2)</th>
<th>Target D.O.S. (%)</th>
<th>75</th>
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</thead>
<tbody>
<tr>
<td>Nominated Moisture Content (%) 10.08</td>
<td>Nominated (%) of OMC 80.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achieved Moisture Content (%) 10.30</td>
<td>Achieved (%) of OMC 82.4</td>
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</tr>
<tr>
<td>Nominated Dry Density (t/m³) 2.043</td>
<td>Nominated (%) of MDD 100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achieved Dry Density (t/m³) 2.039</td>
<td>Achieved (%) of MDD 99.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variation(s) to Test Method: -
Remark(s): - Curing: 7 Day air cure & Polycom Additive

S10/325 MDD: 2.043t/m³, OMC: 12.5%e

Checked By: Anthony Neary
Signatory: Anthony Neary (Senior Materials Technician Soils & Aggregate)

Report No.: 27286  Date: 29/10/2010
<table>
<thead>
<tr>
<th>Initial Moisture Content (%)</th>
<th>Calculated Dry Density (t/m³)</th>
<th>Bearing Ratio 2.5 mm</th>
<th>Bearing Ratio 5.0 mm</th>
<th>Swell (%)</th>
<th>MC After Pene. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>1.931</td>
<td>39.0</td>
<td>36.0</td>
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**Test Condition**

Soaked

**Compactive Effort**

180% STD

+ CBR 2.5mm

○ CBR 5.0mm

**Test Method** Q113A

<table>
<thead>
<tr>
<th>CBR OMC (t)</th>
<th>9.8</th>
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<tbody>
<tr>
<td>CBR MDD (t/m³)</td>
<td>1.99</td>
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<tr>
<td>CBR 2.5mm</td>
<td>7.0</td>
</tr>
<tr>
<td>CBR 5.0mm</td>
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</tbody>
</table>

**Material CBR Value** 17

**Remarks**

Kingaroy Shire Council PS Box 336 Kingaroy 46

Checked By: M.R. Davies

Signatory: J.R. Blackburn

Page: 1 of 1 Report No: 4663 Date: 05/06/07 CF/0892/836

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
## Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure

### Soil Laboratory Report

**Queensland**

**KINGAROY SHIRE COUNCIL**

**SOIL LABORATORY**

**TIVINS STREET KINGAROY**

**NATA ACCREDITED: 11362**

**REPORT ON CALIFORNIA BEARING RATIO**

<table>
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<th>Lab Number</th>
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<tr>
<td>Job Si No</td>
<td>1285-3403-214</td>
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<tr>
<td>Sample Loc</td>
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<tr>
<td>Sampled By</td>
<td>E. DUGDALE</td>
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<tr>
<td>Date Sampled</td>
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<td>Item Desc</td>
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<td>Type</td>
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<tr>
<th>Initial Moisture Content (%)</th>
<th>Calculated Dry Density (t/m³)</th>
<th>Bearing Ratio 2.5 mm</th>
<th>Bearing Ratio 5.0 mm</th>
<th>Swell (%)</th>
<th>MC After Pensi (%)</th>
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<td>40.0</td>
<td>40.0</td>
<td>32.0</td>
<td>31.7</td>
</tr>
<tr>
<td>12.1</td>
<td>1.962</td>
<td>2.0</td>
<td>3.0</td>
<td>3.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>

### Test Condition

- **Soaked**
- **Comparative Effort**
  - 100% STD
  - **CBR 2.5mm**
  - **CBR 5.0mm**

### Test Method

- **Q113A**

**CBR OMC (%)** 8.8
**CBR MDD (t/m³)** 2.88
**CBR 2.5mm** 28
**CBR 5.0mm** 38
**Material CBR Value** 38

---

With Additive

**Remarks**: Kingaroy Shire Council PO Box 336 Kingaroy 46

**Checked By**: M.R. Davies

**Signatory**: P.J. Blackburn

**Page**: 1 of 1

**Report No**: 4664

**Date**: 05/06/07

**CF/0593/536**
Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
### Soil Laboratory Report

**Wondai Shire Eng**

**KINGAROY SHIRE COUNCIL**

**IVINS STREET KINGAROY**

**NATA ACCREDITED 11362**

<table>
<thead>
<tr>
<th>Lab Number</th>
<th>K507/134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item number</td>
<td>01-000-3409</td>
</tr>
<tr>
<td>Submitted by</td>
<td>Wondai Shire</td>
</tr>
<tr>
<td>Sampled by</td>
<td>Wondai Shire</td>
</tr>
<tr>
<td>Date sampled</td>
<td>02/06/07</td>
</tr>
<tr>
<td>Date tested</td>
<td>02/06/07</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initial Moisture Content (%)</th>
<th>Calculated Dry Density (t/m³)</th>
<th>Bearing Ratio</th>
<th>Bearing Ratio</th>
<th>Swell (%)</th>
<th>MC After Penetration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>2.039</td>
<td>11.6</td>
<td>11.6</td>
<td>2.0</td>
<td>7.1</td>
</tr>
<tr>
<td>2.9</td>
<td>2.072</td>
<td>11.1</td>
<td>11.1</td>
<td>2.0</td>
<td>7.1</td>
</tr>
<tr>
<td>2.5</td>
<td>2.016</td>
<td>11.1</td>
<td>11.1</td>
<td>2.0</td>
<td>7.1</td>
</tr>
<tr>
<td>2.0</td>
<td>2.071</td>
<td>3.7</td>
<td>3.7</td>
<td>1.0</td>
<td>7.1</td>
</tr>
</tbody>
</table>

**Test Condition**

**Soaked**

**Compactive Effort**

100% STD

- CBR 2.5 mm
- CBR 5.0 mm

**Test Method** Q113A

- CBR OMC (x) 6.2
- CBR MDD (t/m³) 2.17
- CBR 2.5 mm 50
- CBR 5.0 mm 66

**Material CBR Value** 66

**Remarks:** with additive Wondai Shire Council PO Box 12 Wondai

**Checked By:** Don Coyle (O.I.C.)

**Signatory:** D. Blackburn (O.I.C.)

Page: 1 of 1 | Report No: 4552 | Date: 02/04/07 | CF/0852/0136

---

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
## California Bearing Ratio (5 Point) Report

**Client:** Curragh Qld Mining Pty Ltd  
**Job Number:** BR0732  
**Project:** Curragh Access Road Intersection  
**Location:**  

**Report Number:** 732/02A  
**Report Date:** 19/04/2010  
**Order Number:**  
**Test Method:** Q113A  
**Sample Location:**  
**Lot Number:**  
**Item Number:**  

<table>
<thead>
<tr>
<th>Wet MC (%)</th>
<th>Dry Density (g/cm³)</th>
<th>Bearing Ratio 2.5mm (%)</th>
<th>Bearing Ratio 5.5mm (%)</th>
<th>Swell (%)</th>
<th>Final MC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>2.105</td>
<td>26.7</td>
<td>27.6</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>7.6</td>
<td>2.167</td>
<td>44.4</td>
<td>52.9</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>9.8</td>
<td>2.204</td>
<td>6.6</td>
<td>14.9</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>11.8</td>
<td>2.132</td>
<td>2.3</td>
<td>3.5</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Compressible Effort Standard**  
**Test Condition:** Soaked  
**CBR MOD (mm²)**: 2.20  
**CBR OMC (%):** 8.6  
**CBR 2.5mm (%):** 10.0  
**CBR 5.0mm (%):** 19.0  
**CBR Value (%):** 19.0  
**Min Specified CBR (%):**  

---

**NATA**  
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**APPROVED SIGNATURE**

Les Thorne  
Nata Accred. No: 14076

---

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
California Bearing Ratio (5 Point) Report

Client: Curragh Qld Mining Pty Ltd
Job Number: BR0732
Project: Curragh Access Road Intersection

Lab No: R4489
Date Sampled/Submitted: 15/03/2010
Date Tested: 18/03/2010
Sampled By: AB
Sample Method: AG 1441.3.1
Material Source: On Site
For Use As: T2.3 Roadbase Polycom
Remarks: *This report replaces 732/03

Report Number: 732/03A
Report Date: 19/04/2010
Order Number: Q113A

<table>
<thead>
<tr>
<th>Test</th>
<th>MC (%)</th>
<th>Dry Density (g/cc)</th>
<th>2.5mm (%)</th>
<th>5.0mm (%)</th>
<th>Swell (%)</th>
<th>Final MC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6</td>
<td>2.152</td>
<td>28.5</td>
<td>34.8</td>
<td>0.0</td>
<td>0.0</td>
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</tr>
<tr>
<td>7.7</td>
<td>2.217</td>
<td>24.5</td>
<td>41.3</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>9.8</td>
<td>2.200</td>
<td>3.7</td>
<td>7.5</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>11.4</td>
<td>2.138</td>
<td>1.7</td>
<td>3.1</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

Compactive Effort

Test Condition: Soaked
CBR MOD (kN/m²): 2.22
CBR OMC (%): 8.0
CBR 2.5mm (%): 21.0
CBR 5.0mm (%): 36.0
Min Specified CBR (%): 36.0

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### California Bearing Ratio Test Report

**Client:** Mine & Quarry Service Co. Pty Ltd  
**Project:** Polycom Trial Testing  
**Location:** Plenty Highway Pit Ch: 265km

<table>
<thead>
<tr>
<th>Test Procedure</th>
<th>Compaction Method</th>
<th>Moisture Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory No.</td>
<td>19/08</td>
<td></td>
</tr>
<tr>
<td>Graph</td>
<td>Stockpile</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Ch: 265km</td>
<td></td>
</tr>
<tr>
<td>Date and Time Tested</td>
<td>29/01/05 9.00 am</td>
<td></td>
</tr>
<tr>
<td>Date and Time Sampling</td>
<td>29/01/05 12.05 pm</td>
<td></td>
</tr>
<tr>
<td>Description of Sample</td>
<td>Red/brown clay</td>
<td>SAND with traces of Calcrete Gravel. No Polycom</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>Field</td>
<td>3.7</td>
</tr>
<tr>
<td>Material Retained on 10mm A.S. sieve</td>
<td>%</td>
<td>10.9</td>
</tr>
<tr>
<td>Graph Correction</td>
<td>Yes/No</td>
<td>No</td>
</tr>
<tr>
<td>Dry Density</td>
<td>2.14</td>
<td></td>
</tr>
<tr>
<td>Optimum Moisture Content</td>
<td>%</td>
<td>8.5</td>
</tr>
<tr>
<td>Field Moisture Content</td>
<td>%</td>
<td>3.7</td>
</tr>
<tr>
<td>Graph Correction</td>
<td>Yes/No</td>
<td>No</td>
</tr>
</tbody>
</table>
| Density Ratio | 2.04 | After Sealing:
| Moisture Content | % | 95 |
| Brine After Sealing | % | 8.8 |
| Laboratory Moisture Ratio | % | 98 |

**Results:**
- **C.B.R. Value:** 40*30 = **1200**

**Remarks:***
- **No Aditive**
- **Sampled by:** M/Frd / B. Bloom 
- **Approved Signatory:** B. Colombet

---

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
## California Bearing Ratio Test Report

**Client:** Mine & Quarry Service Co. Pty Ltd  
**Project:** Polycem Trial Testing  
**Location:** Plenty Highway Pit Ch: 285km

<table>
<thead>
<tr>
<th>Test Procedure:</th>
<th>Compaction Method:</th>
<th>Moisture Content:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 1289 6.1.1</td>
<td>AS 1289 5.2.1 (Modified Contraction)</td>
<td>AS 1289 2.1.1</td>
</tr>
</tbody>
</table>

**Laboratory Number:** 19769  
**Depth:** Stockpile  
**Location:** Ch: 286km 200m South of Plenty Highway

**Date and Time Tested:** 01/02/05 10:00 am  
**Date and Time Sampled:** 19/01/05 12:05 pm

**Description of Sample:** Red / brown clay  
**Additive added:**

<table>
<thead>
<tr>
<th>Sample Condition</th>
<th>Moisture Content</th>
<th>Field Moisture Content</th>
<th>Material Retained on 10mm A.S. sieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soaked</td>
<td>5.2</td>
<td>3.8</td>
<td>5.9</td>
</tr>
<tr>
<td>Wet</td>
<td>2.15</td>
<td>9.2</td>
<td>9.9</td>
</tr>
</tbody>
</table>

**Graph Correlation:**

<table>
<thead>
<tr>
<th>Sample Condition</th>
<th>Density</th>
<th>After Soaking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Soaking</td>
<td>2.05</td>
<td>2.04</td>
</tr>
<tr>
<td>After Soaking</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

**Laboratory Moisture Ratio:**

<table>
<thead>
<tr>
<th>Samples</th>
<th>Days Soaked</th>
<th>Moisture Content</th>
<th>After Test %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.5</td>
<td>9.5</td>
<td>9.6</td>
</tr>
</tbody>
</table>

**C.B.R. Value:** 70 / 80

**ADOPTED:** N/A

---

**SEALS Brisbane Pty Ltd**  
ABN 96 100 890 524 - ACN 100 890 524  
PO Box 525, Beaudesert, Qld, 4285, Australia  
T: 61 7 5543 1053 - Ops Manager: 61 422 020 385  
www.sealsgroup.com  
info@sealsgroup.com

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Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
Slug test and compaction example

Ground Improvement and Pavement Stabilisation: Civil - Mining & Energy - Infrastructure
For more information, please contact:
Shane Donovan: Ops Manager
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shane@sealsgroup.com
www.sealsgroup.com