Bench Test Instructions non plastic material

DURAMENT RS

Updated: September, 2014

OBJECTIVE

- The chief objective is to create a controlled environment that mimics as close as possible the conditions expected in the field in order to verify the soundness of **DURA**MENT RS for practical use.
- The practice of performing bench tests in general is to cultivate habits of accurate observation and clear description of the results. It must be noted however, that uniform and satisfactory results can be acquired only after considerable practice.

A TEST BENCH HAS FOUR COMPONENTS

1. **Input:** The entrance criteria or deliverables needed to perform work.
2. **Procedures to do:** The tasks or processes that will transform the input into the output.
3. **Procedures to check:** The processes that determine that the output meets the standards.
4. **Output:** The exit criteria or deliverables produced from the workbench.

INPUTS

Material Listing:

1. One (1) **DURA**MENT **RS** Sample (contains 27.5 grams **DURA**MENT **RS** and 110 grams water)
2. General Purpose Portland Cement - 832 grams
3. Earth material (non-plastic soil) - 20 kilograms
4. Fresh water

EQUIPMENT LISTING

1. Electric Cement Mixer
2. Steel cylinder - 4” W x 12” L (10cm x 30cm) cut thru centre line (one side only)
   - 4 x Adjustable Band Brackets (see picture)
   - 1 x 1’4” round steel plate that is 1/8” in diameter larger than the 4” cylinder (attached to bottom)
   - 1 x 1’4” round steel plate is 1/8” in diameter smaller that the 4” cylinder (to fit inside compress)
3. Compressive Device: Hydraulic Shop Press (>+12 tonne)
4. Digital bench scale (with zero function)
5. Digital Hydrometer
6. Sieve (to desired aggregate minus; i.e.: 1/4” minus)
7. 20 litre plastic bucket (5 gallon plastic bucket)
8. small glass container - .5 litre volume
9. 1 x plastic container - 1 litre volume

SAFETY

1.See MSDS for **DURA**MENT **RS** and General Purpose Portland Cement

PROCEDURE

Material Preparations:

1. Ensure work area is safe and clear of debris.
2. Prepare materials

- **DURA**MENT **RS**
  - agitate **DURA**MENT Sample to ensure that no solids have settled to bottom of sample container
  - set aside for later use

- Portland Cement
  - place the empty 1 litre plastic container on the digital scale and press the “zero” function
  - add to plastic container by weight 832 grams of General Purpose Portland Cement
  - set aside for later use

- Earth Material
  - It is preferable that soils used be in their natural or moist state. This will ensure that test results closely resemble what can be expected in the field.
  - place the empty 20 litre bucket on the digital scale and press the “zero” function
  - add to the bucket 20 kilograms of the earth material to be stabilized. Sieve to desired size 1/4” to 1/2” minus is preferred for bench test as large stones impede compaction within cylinder at 5% OMC
  - set aside for later use

- Water
  - add fresh water to the 1 litre plastic container
  - set aside for later use

Equipment Preparations:

- Electric Cement Mixer
  - observe all safety requirements when using cement mixer
  - ensure drum is clean, and lightly moist to minimize material from sticking

- Steel Cylinder
  - the cylinder is cut thru the centre line down the length to allow the test sample to release
  - using duct tape, attach to bottom of cylinder a round steel plate that is 1/8” in diameter larger than the 4” cylinder to hold material inside and to keep it from falling out the bottom
  - band the cylinder with 4 x stainless steel (or equivalent) bands and tighten
  - lightly moisten the interior to aid the ensure the mixture does not stick to walls

- Compressive Device: Hydraulic Shop Press (>+12 tonne)
  - have the press standing ready to accept the cylinder by;
    - ensuring it is level and plumb
    - heights are adjusted to receive the cylinder

Mixing Procedures:

- pour the 20 kg bucket of soil into the cement mixer
- apply electrical power to the mixer
- add the Portland cement
- check moisture content periodically
  - add fresh water as needed until moisture content reaches 5% (OMC)
  - hand test - mixture should form to hand and hold shape when squeezed, feel cool but not leave hand wet
- empty the entire **DURA**MENT Sample into the mixture
- allow to mix for 1 minute

Compression Procedures:

- observe all safety requirements when working with items under extreme pressure
- turn mixer off and un-plug from electrical outlet
- reach into drum and fill the cylinder with the mixture
- place cylinder into the compressive device
- place the smaller round steel plate on top of the cylinder
- lower compressive device to centre of the steel plate
- begin to apply compressive pressure
- compaction marks the sign of success - apply as much compression as possible to simulate 20 tonne pad foot roller and 20 tonne pneumatic roller
- once maximum pressure is reached, release pressure, fill cylinder to top with more of the mixture and re-apply pressure
- after full compression is reached, release pressure, remove cylinder from compression device and remove bottom plate to expose bottom
- allow cylinder to set for 24hrs - then remove sample from cylinder

- place excess mixture that is remaining in cement mixture into the 20 litre plastic bucket and allow to set as is (un-compressed) for 24 hrs. Next day, flip bucket onto ground and tap out and observe difference between compacted sample and non-compacted sample

CONTACT **US**

DURAMENT
here to stay

MANUFACTURED IN CANADA

NOTICE: Durament International Inc. (“DURAMENT”) has made all reasonable efforts to ensure that the herein information is accurate; however, it is the responsibility and obligation of the user to verify the accuracy of this information to determine its fitness for actual use and to further verify the appropriate testing standards required to meets its particular needs, standards and specifications. It is the responsibility and obligation of the user to comply with all laws and procedures relevant to the safe installation, handling, storage, and use of the product, and to determine the suitability of the product for its intended use. To the extent permitted by law, DURAMENT makes no warranty or representation, express or implied, concerning the product or the merchantability or fitness of the product for any purpose, or concerning the accuracy of any information provided by DURAMENT, except that the product shall conform to the specifications as set out by DURAMENT. This does not constitute an offer