

Portable ground tester

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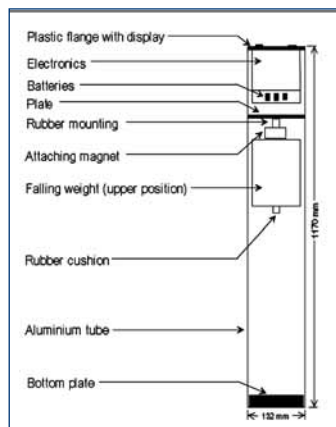
innovations

When we asked the Vertikal team to name the single new product that impressed them the most at this year's Bauma, at least one member immediately named one of the smallest exhibits at the show – the Bronto Loadman.

Given that most accidents with cranes, truck mounted aerial lifts and concrete pumps are caused by outrigger and ground failures, the need to assess ground conditions has always been a concern.

Until recently equipment for testing for underground voids or compaction qualities has been exceptionally expensive while filling a van or truck and largely reserved for specialist road, oil exploration and other geological-based companies.

Bronto - in partnership Al Engineering of Espoo Finland - has launched the Loadman, a portable handheld Falling Weight Deflectometer. Measuring 1.2 metres long by 132 mm in diameter and weighing just 16kg the cylindrical unit has a base plate at one end of the tube while the other houses an accelerometer, electronics, controls and digital read-out as well as the batteries that power the unit. Below these is an aluminium plate that supports an electro-magnet.



The internal details of the device (not to scale)

The internals

Inside the tube there is a 10kg free moving weight with a rubber buffer on one end. In order to use the device it must first be switched on and left 60 seconds to 'prime' itself. The tube is then turned upside down to allow the weight to slide



The device will measure the capability of surfaces - even concrete - to support loads

down to make contact and attach itself to the magnet. The base plate is then placed firmly over the point to be measured. It is important that the plate is in full contact with the ground and sand can be used to even out the surface. The button is then pressed to release the weight which drops to the base plate. The accelerometer records the deflection under the weight along with the length of loading impulse. It is usual to repeat the test in the same place in order to fully record the ground compaction.

The Loadman then gives the following outputs:

- Deflection in mm
- The modulus of elasticity (E or E-modulus)
- The length of loading impulse
- The percentage of rebound deflection compared to the maximum deflection
- The effectiveness of compaction (the ratio of the E-modulus of a second to the first tests)

The results are then compared to the charts that come with the device which indicate - depending on the type of surface - the maximum ground bearing pressure that the surface will support allowing the crane operator for example to decide what size of mat or other spreader structure may be

required. Larger-sized base plates are available for the device to cope with very soft ground. The standard base plate covers most ground conditions on which a crane or large lift might be set up including tarmac, concrete, gravel or other compacted surface.

In addition to checking the localised load bearing capability, the device can be used to check the quality of a compacted platform constructed



The Bronto Loadman and transport case

to support crawler cranes and other large tracked equipment. The device has been tested extensively by a number of research institutes in Europe, the USA and New Zealand since 1993. Most, if not all of the findings indicate that in most applications the Loadman was as effective as the large Falling Weight Deflectometer testing equipment that typically costs €250,000 and more.

The major downside of the Loadman at this stage is its price of more than €12,000. While it is very cheap in comparison to anything that has gone before the price will hopefully come down if and when volumes rise and the unit can go into serial production. Until now it has been produced on a one by one basis. The unit comes complete with an aluminium storage and transport case.



The controls and readout – The red button drops the weight while the green is the reset button used when switching measuring location

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