



MDM 25 - 1

Accuracy Testing of Volumetric Dimensioning Devices

Prepared for:

111th NCWM Annual Meeting

LOADSCAN[®]
accurate payload measurement



Background - Loadscan

Loadscan is the original developer of volume dimensioning devices using LIDAR scanning technology for the measurement of bulk material loads in truck and trailer units.

In brief we have:

- Installations in over 50 countries
- Type approval in NZ (since 1999)
- Type approval in Australia (since 2010)
- Provisional type approval in the USA (since 2024)
- Active type approval applications in other jurisdictions



Purpose of this presentation

MDM 25-1 is about introducing language to the MDMD section of HB44 to cover volumetric dimensioning devices.

- If this item is not voted for inclusion in in HB44 this year, it will happen eventually...
- State weights & measures officials may have concerns about the logistics of testing such devices.
- Loadscan has 27 years of experience performing accuracy testing of our devices.
- This presentation provides an overview of what this accuracy testing can look like and some options available.



Method 1 – Bin Loading

The MDMD working group has prepared a draft test procedure for inclusion in Publication 14.

The procedure has been used for NTEP type approval testing of at least three volume dimensioning devices, including the Loadscan Load Volume Scanner.

The procedure uses the bin loading method. This method requires:

- Loading a rigid bin (test standard) of known capacity with load material
- Transferring the material from the loaded and levelled bin onto the truck bed
- Transferring multiple bin loads to generate larger test volumes



Method 1 – Bin Loading (continued)

The following is from this draft procedure:

Volume test standard

A ridged steel box size dependent on dmin of the instrument. The standard shall have a means of dumping the aggregate from the standard into the truck and the standard will be verified with a traceable steel tape for correct volume.

Testing material

Will be low or non-compactable material (such as number 9 or pea gravel) depending on the testing location. Testing material should have minimum compaction when placed into the different classes of trucks and be 3/8 approximate in diameter and smooth rounded edges.





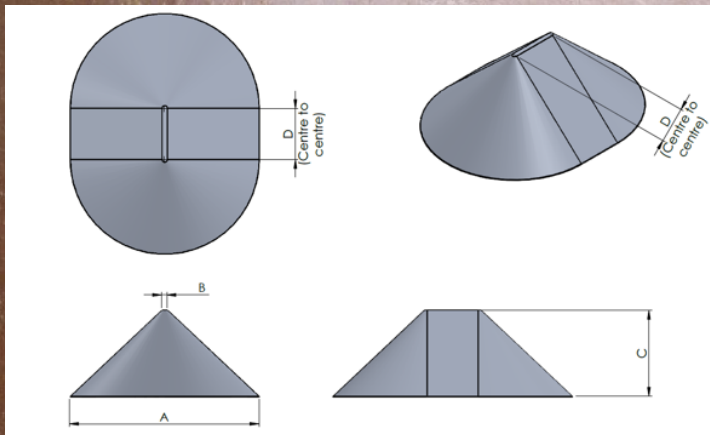
Method 1 – Bin Loading (continued)

Pros:

- Real loads using real load material.
- Loading method is analogous to real-world loading using front-end loaders or excavators.

Cons:

- Requires considerable resources such as suitable test material and materials-handling equipment.
- Sourcing of required resources is very site dependent.
- Time consuming, expensive.
- Certainty of the test volume is dependent on the compactability of the test material



Method 2 - Geometric Solids

- Solid cuboid test standards are used to test general MDMD devices as used for baggage and freight dimensioning. NTEP maintains such cuboid standards.
- The same principle applies to testing of volume dimensioning devices that measure bulk solid loads in trucks or other open-bin conveyance types.
- The difference is that the shapes must represent heaps of material with surfaces visible from above, rather than boxes or packages.
- Pyramid type shapes that can readily be verified with a tape measure are suitable for this.
- Loadscan uses geometric solid test standards for verification testing in New Zealand and Australia.



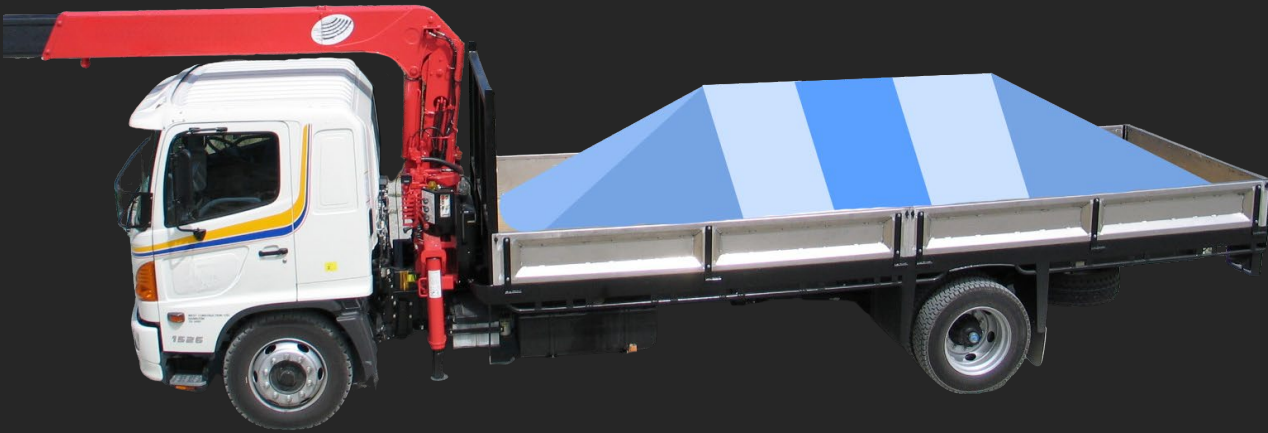
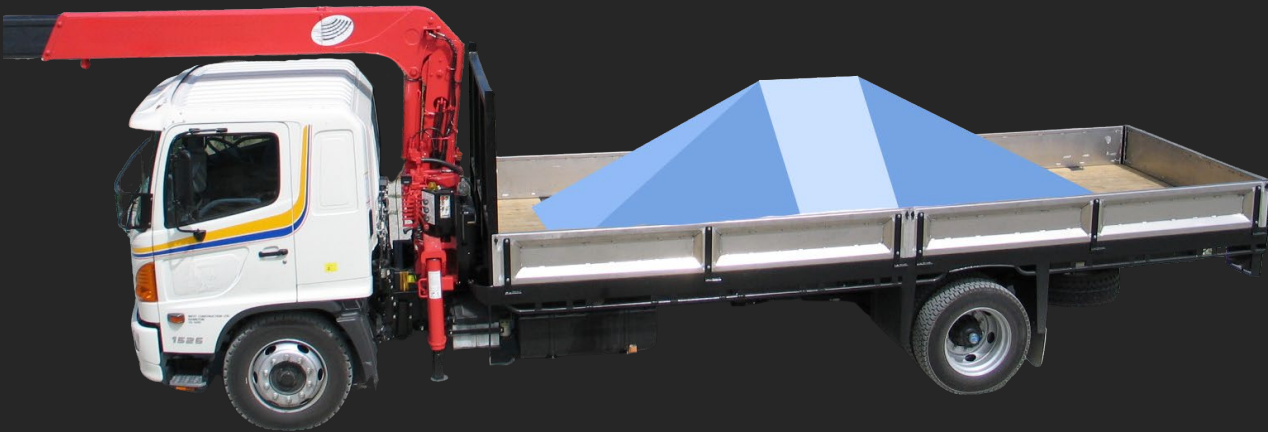
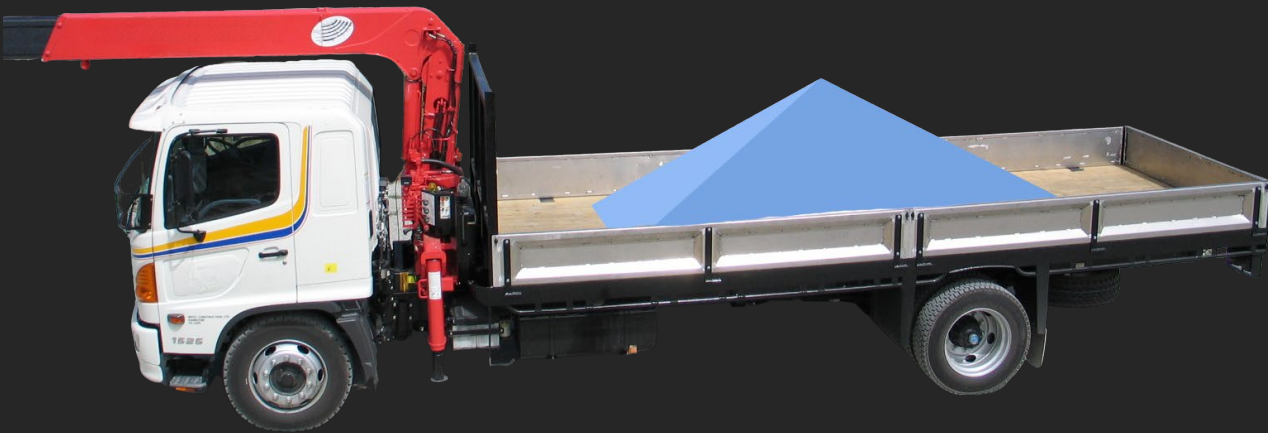
Method 2 - Geometric Solids (continued)

Pros:

- Test volume can be determined to a very high level of certainty using a certified tape measure or other method.
- Test standards can be light and comparatively easy to handle.
- Other resources such as heavy machinery are not required.

Cons:

- Test loads do not adapt to the shape of the truck bed so the floor must be flat and maximum test volume is limited.



Method 2 - Geometric Solids (continued)

Loadscan is currently designed a **modular** pyramidal test load that can be extended to make different volumes.

- Initially we will use this design for BEV, the metrological body in Austria.
- BEV want to do type approval testing with both the bin loading method and geometric solids.
- For verification testing in the field, they want to use geometric test standards only, in line with general MDMD device testing in Europe and as done in both New Zealand and Australia for our devices.



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