Transport Roads & Maritime Services

NSW GOVERNMENT

Test method T1110

Shear stiffness of large elastomeric bearings

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D. Dash	June 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	November 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T1110 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1110

Shear stiffness of large elastomeric bearings

1. Scope

This method sets out the procedure for determining the shear stiffness of large elastomeric bearings in accordance with Australian Standard AS 1523. The procedure is different to that described in T1108 "Shear stiffness of small Elastomeric Bearings and Strip".

2. Apparatus

(a) A compression testing machine calibrated in technical units of force in accordance with AS 2193. The vertical force (compression) and the side loading facility (shear) to be maintained to Grade A standard.

(b) The size of the test frame should be sufficient to test all the bearings covered by AS 1523.

(c) Dial gauges, potentiometers and LVDT's (linear voltage displacement transducers) shall all be calibrated to the appropriate Standard and maintained within 0.1% accuracy.

(d) A shear plate of sufficient dimensions to be greater in size than the bearings being tested and be able to resist the applied force without distortion.

3. Procedure

(a) Place one bearing centrally on the loading/test bed on top of which is placed the shear plate which must be at least 25 mm greater in size than the bearing. On top of the shear plate is placed a second bearing, again in a central position.

(b) The loading table, if retractable, is moved into the test frame and the side ram is adjusted up/down to ensure alignment with the shear plate.

(c) Insert shear bar through shear plate and side ram. Tighten up this assembly and adjust the side ram to close up any gaps in the assembly.

Note: If the equipment does not have a shear bar facility arrange spacers to link the side ram to the shear plate, thus enabling the ram to push the shear plate.

(d) Select load cell, pressure transducer or pressure gauge (whichever is available) for side force measurement. Then switch on 'auto level' if the machine has this facility.

(e) Apply the design compressive load applicable to the bearings being tested and hold.

(f) Apply side load, increasing this until the shear movement reaches 1.25 × the design shear movement, and hold for 1 minute. Reduce this load to zero and then reduce vertical load to zero.

(g) Increase vertical (compressive) load to the design value and hold.

(h) Increase the side load slowly noting the shear force at 25% and 100% of the specified shear movement.

(i) Remove the shear load, reduce the vertical load to zero.

Note: If the test facility is equipped with a shear bar go through the following procedure:

(i) Lower platen to zero position.

(ii) Switch off 'auto level'.

(iii) Remove shear load from side ram and shear plate.

4. Calculation

$$K_0 = K_{20} + \frac{K_{20} - K_{100}}{4} in \text{ kN/m}$$

Where K_0 = effective shear stiffness at zero displacement.
K_{20} = shear stiffness at 20% shear deflection
K_{100} = shear stiffness at 100% shear deflection

NB. Shear stiffness = $\frac{Shear\ load\ at\ indicated\ deflection}{2 \times indicated\ deflection}$