

Australian Standard®

Methods of test for fibre ropes

Method 3: Sheath slippage

PREFACE

This Standard was prepared by the Standards Australia Committee on Ropes and Cordage. The Standard is based on the method used by the International Union of Alpinist Associations (UIAA) for testing ropes for mountaineering.

METHOD

1 SCOPE This Standard sets out a method for measuring the sheath slippage of man-made fibre rope. The method is only applicable to ropes constructed with more than one layer, i.e. ropes with a sheath and a core.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

4142 Fibre ropes

4142.1 Part 1: Care and safe usage

4142.2 Part 2: Three-strand hawser-laid and eight-strand plaited

4142.3 Part 3: Man-made fibre rope for static life rescue lines

3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 4142.1, AS 4142.2 and AS 4142.3 apply.

4 PRINCIPLE Sheath slippage is obtained by pulling a test specimen through a testing apparatus in which movement of the test specimen is restricted by the radial forces applied by loaded movable plates. The resulting friction on the sheath may produce an axial movement of the sheath along the core. Any such slippage is measured.

5 APPARATUS The following apparatus is required:

- (a) A testing apparatus, as shown in Figures 1 to 4, comprising a casing in which four steel plates are fixed with their planes at 90° to the axis of the rope being tested. These fixed plates are separated by three spacing pieces which provide slots into which three moving plates are fitted and can slide freely. These moving plates are arranged so that their planes are also at 90° to the axis of the rope and their axes are at 120° to each other. Each plate is of steel 10 mm thick and has a hole in it through which the rope is passed. At rest position, when the moving plates are at their innermost end of their movement,

the holes in the plates are aligned. The surface finish of the holes in all the plates is smooth, having an average roughness of $0.4\ \mu\text{m}$, and maximum roughness of $4\ \mu\text{m}$. The moving plates are able to be loaded so that they exert a radial force of $50 \pm 0.5\ \text{N}$ on the rope.

NOTE: Detailed drawings for the apparatus are available from the Textile Department, Leeds University, Leeds LS2 9JT, UK and the Institute for Fordertechnik, Holzgartenstr 15 B, D-7000 Stuttgart.

- (b) A conditioning facility for providing and maintaining a standard atmosphere of $20 \pm 2^\circ\text{C}$ and relative humidity of $65 \pm 2\%$.

6 SAMPLES AND TEST SPECIMENS

6.1 Sample A test sample shall be taken from one end of a coil selected for testing. It shall be representative of the balance of the coil.

6.2 Conditioning Condition the sample for 24 h in the atmosphere specified in Clause 5(b). Preparation of the test specimen and subsequent testing shall, if possible, be conducted without removal from the standard atmosphere, otherwise within 30 min after removal from that atmosphere.

6.3 Test specimens The test specimen shall be 2.25 m in length.

7 PROCEDURE The procedure shall be as follows:

- (a) Apply sufficient heat to fuse together the sheath and core of one end of the test specimen.
- (b) Place a wrap of tape at the opposite end of the test specimen and cut through both tape and rope close to the end of the sample. Ensure that the cut is at an angle of 90° to the longitudinal axis of the rope. Measure the length of the test specimen to the nearest millimetre.
- (c) With the moving plates at rest position insert the fused end of the test specimen through the tester until 200 mm of rope (at the fused end) projects from the tester. The remaining rope must lie straight and horizontal on the inlet side of the tester (see Figure 5(a)).
- (d) Load the moving plates each with $50 \pm 0.5\ \text{N}$ and pull the specimen by the fused end so that it passes through a distance of 1930 mm at a speed of approximately 0.5 m/s (see Figure 5(b)).
- (e) Remove the load from the moving plates, return them to rest position and pull the test specimen back through the tester to its original position, i.e. with 200 mm at the fused end projecting.
- (f) Repeat Steps (d) and (e) four times.
- (g) After the fifth time, remove the test specimen from the tester and measure the slippage of the sheath along the core by—
 - (i) inserting a rod of appropriate diameter, calibrated in millimetres, inside the sheath of the rope until it just touches the core and reading the distance that the rod is inserted, in millimetres; or
 - (ii) measuring the length of the sheath of the test specimen and calculating the difference in length from that measured in Step (b) in millimetres.

8 TEST REPORT The following information shall be reported:

- (a) Reference to this Australian Standard, i.e. AS 4143.3.
- (b) Sheath slippage, in millimetres.

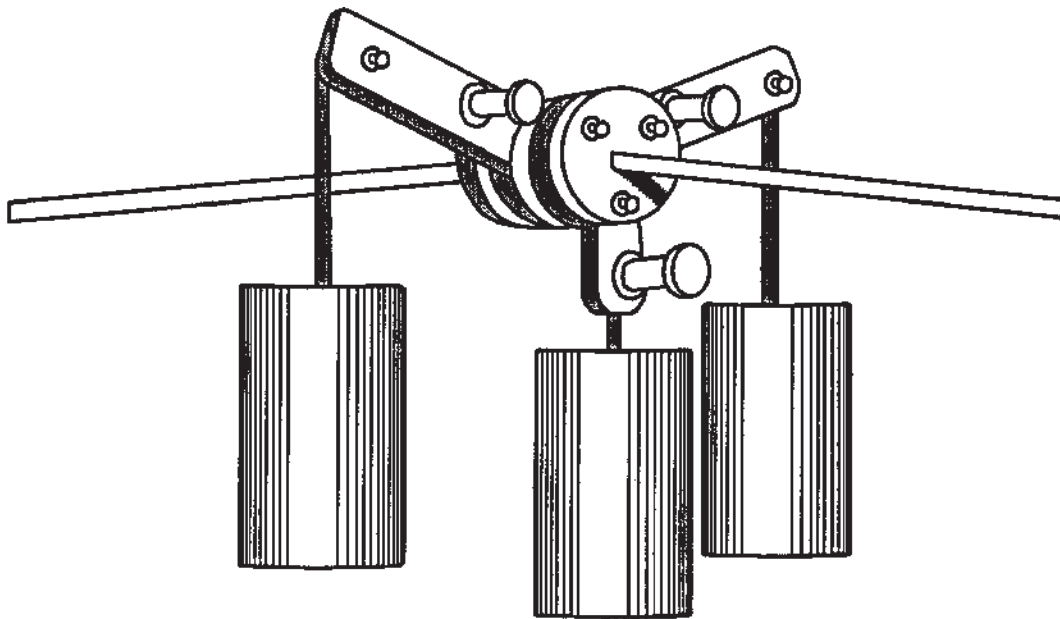
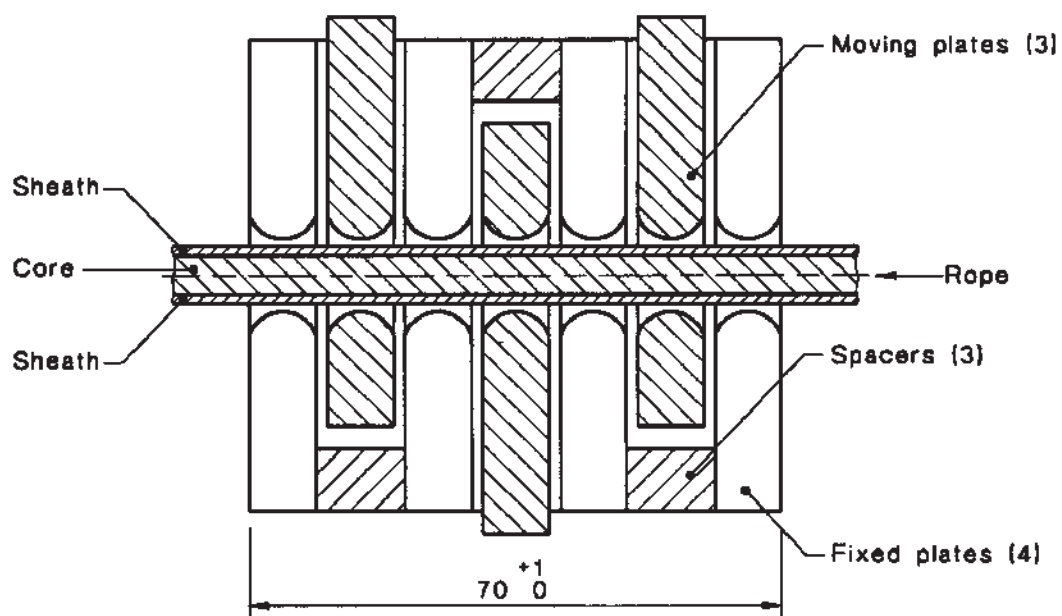


FIGURE 1 TYPICAL SHEATH SLIPPAGE TESTER



DIMENSIONS IN MILLIMETRES

FIGURE 2 SHEATH SLIPPAGE TESTER (LONGITUDINAL CROSS-SECTION)