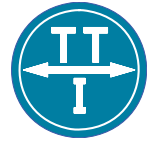
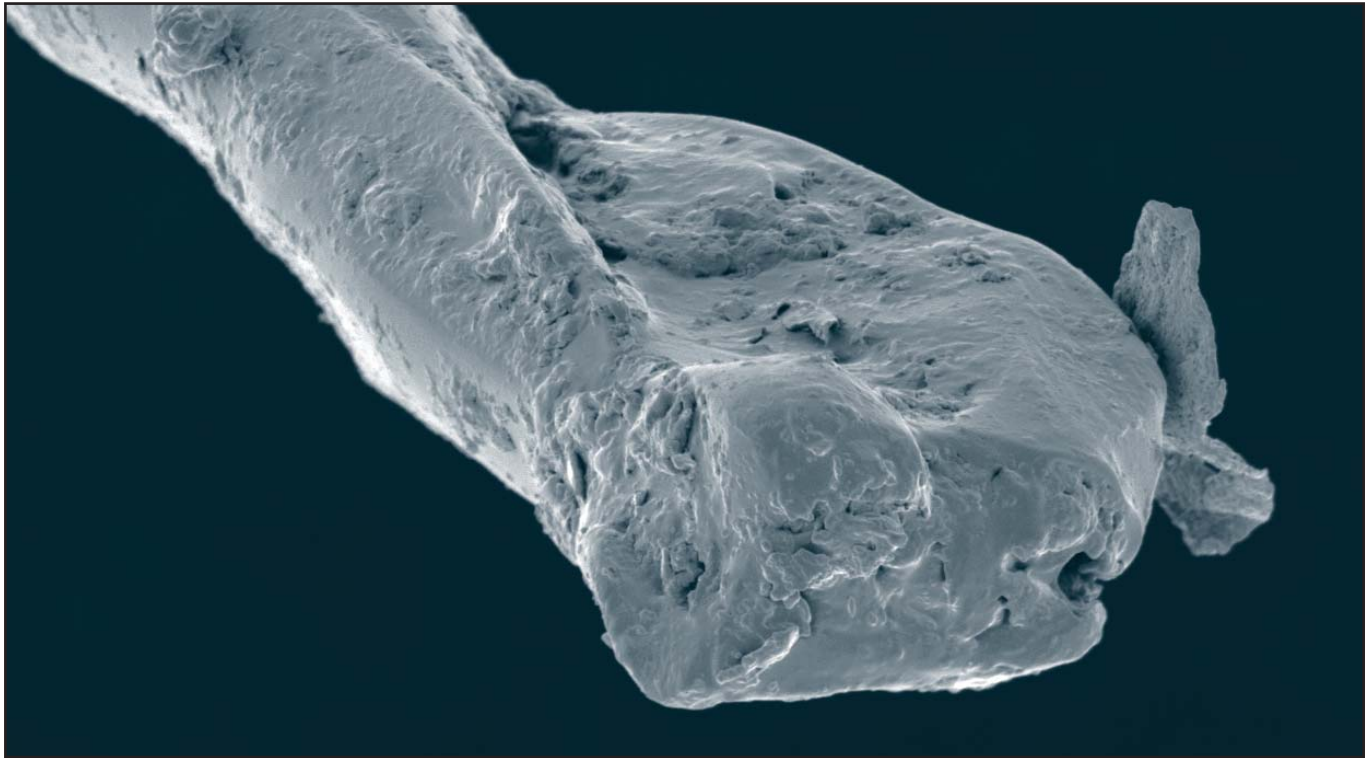


YARN ON YARN ABRASION TEST



Quantitative Measure of Yarn Durability

Technical Notes 09, April 2016



Tension Technology International has extensive experience with the Yarn-on-Yarn (YoY) abrasion test and is prepared to perform this testing at its laboratories in the UK and the US.

Interyarn abrasion has been determined to be a principal cause of failure and of short service life of large synthetic fibre ropes during tension and bend cycling. The YoY abrasion test is used to determine the quality of finish applied on yarns to enhance abrasion resistance, especially in wet conditions. It is also used to compare the relative abrasion resistance of various yarns.

The test measures abrasion cycles to failure on interwrapped yarn at various applied tensions. The yarn is interwrapped in contact with itself between three pulleys, as shown in Figure 1. For wet testing the interwrapped yarn is immersed in water. The yarn is then drawn back and forth under tension until it fails. A number of tests

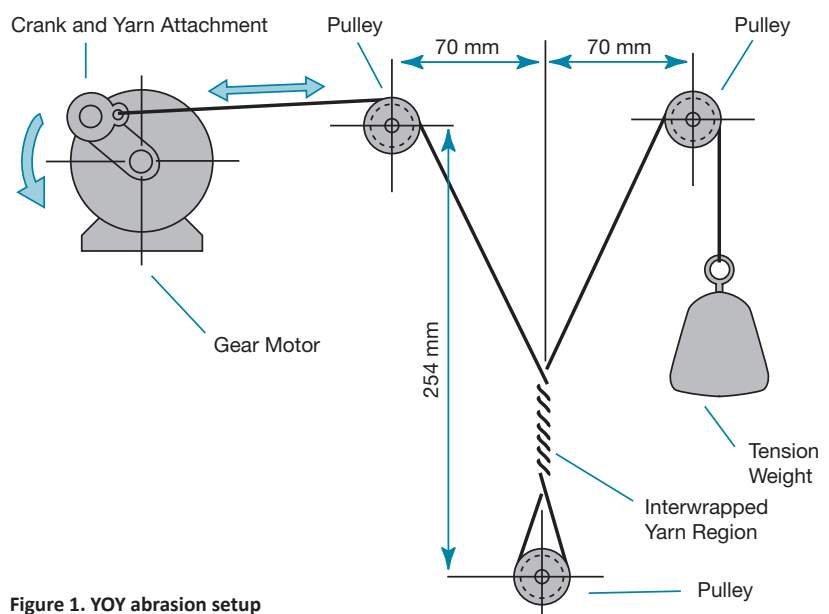


Figure 1. YOY abrasion setup

are conducted at each of several applied tensions.

The cycles to failure for the tests at each applied tension are then statistically analysed. These statistical results are then

plotted on a log-normal basis for the purpose of comparing with a standard or the performance of another yarn. An example YoY abrasion plot is shown in Figure 2.

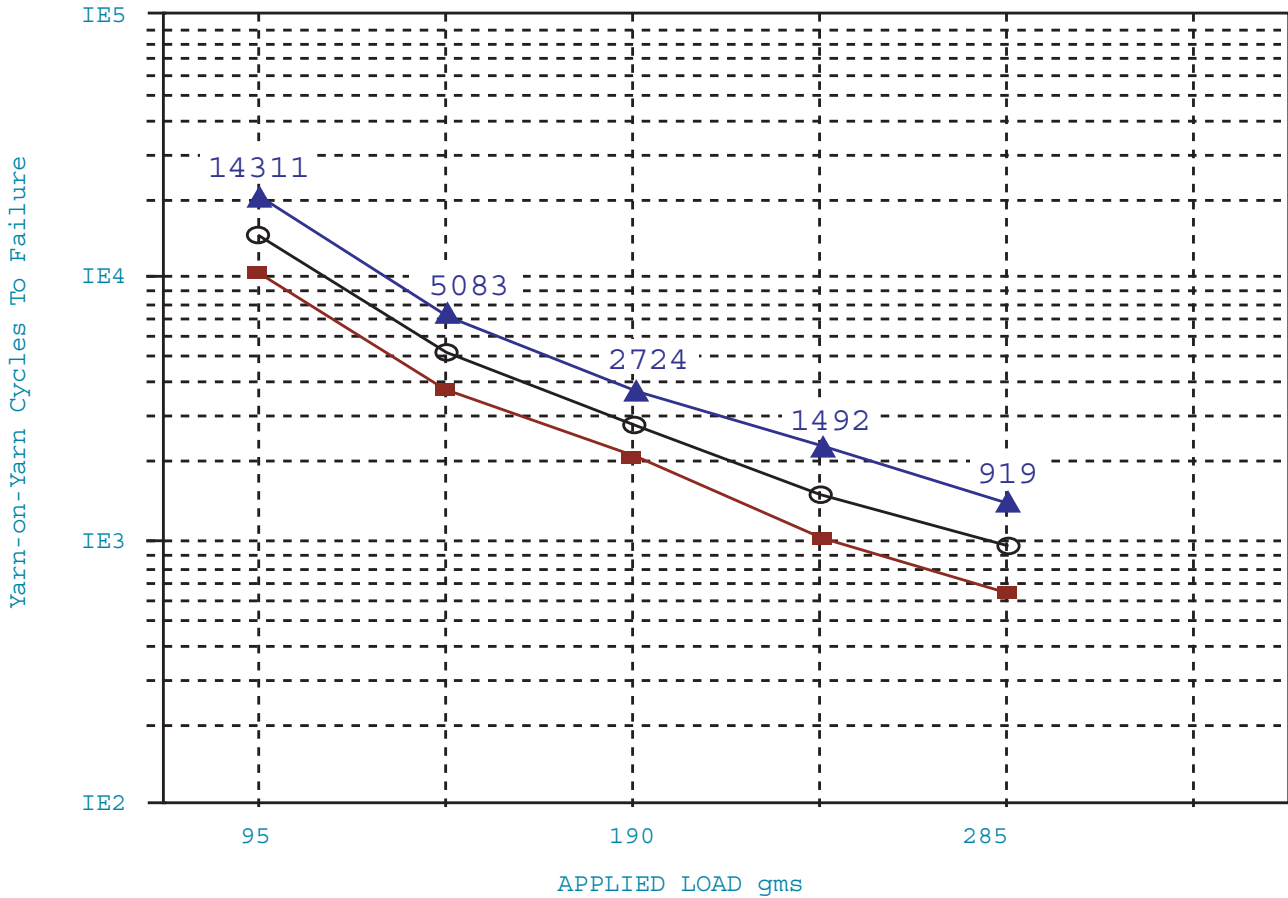


Figure 2. Mean and +/- 2 standard deviations cycles to failure example results

The YoY abrasion test was conceived and developed by two founders of TTI during research for the Oil Companies International Marine Forum (OCIMF), prior to the formation of TTI. The test is now used as a quality assurance procedure in the OCIMF "Guidelines for the Purchase and Testing of SPM Hawsers" (2000).

The YoY abrasion test is now described in ASTM D-6611, "Standard Test Method for Wet and Dry Yarn-on-Yarn Abrasion

Resistance" and in Cordage Institute (CI) 1503 "Test Method for Yarn-on-Yarn Abrasion, Wet and Dry". It is the basis for CI 2009P "Performance Requirements for Marine Grade Polyester Yarn for Fiber Rope".

TTI conducted extensive testing of polyester, aramid, HMPE and LCAP yarns as part of the Tethers 2000 Research Program. TTI has conducted many other such tests, including tests for yarn producers and rope makers

during the evaluation of new yarn products and new yarn finishes.

For further information on TTI's experience in Yarn Testing and its interpretation contact:

Tension Technology International Ltd
 www.tensiontech.com
 Tel: +44(0)1323 50 41 67
 Fax: +44(0)1323 50 97 70
 banfield@tensiontech.com

Tension Technology International LLC
 Tel: +1 (973) 267 08 71
 flory@tensiontech.com

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