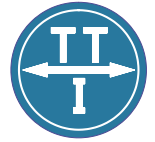
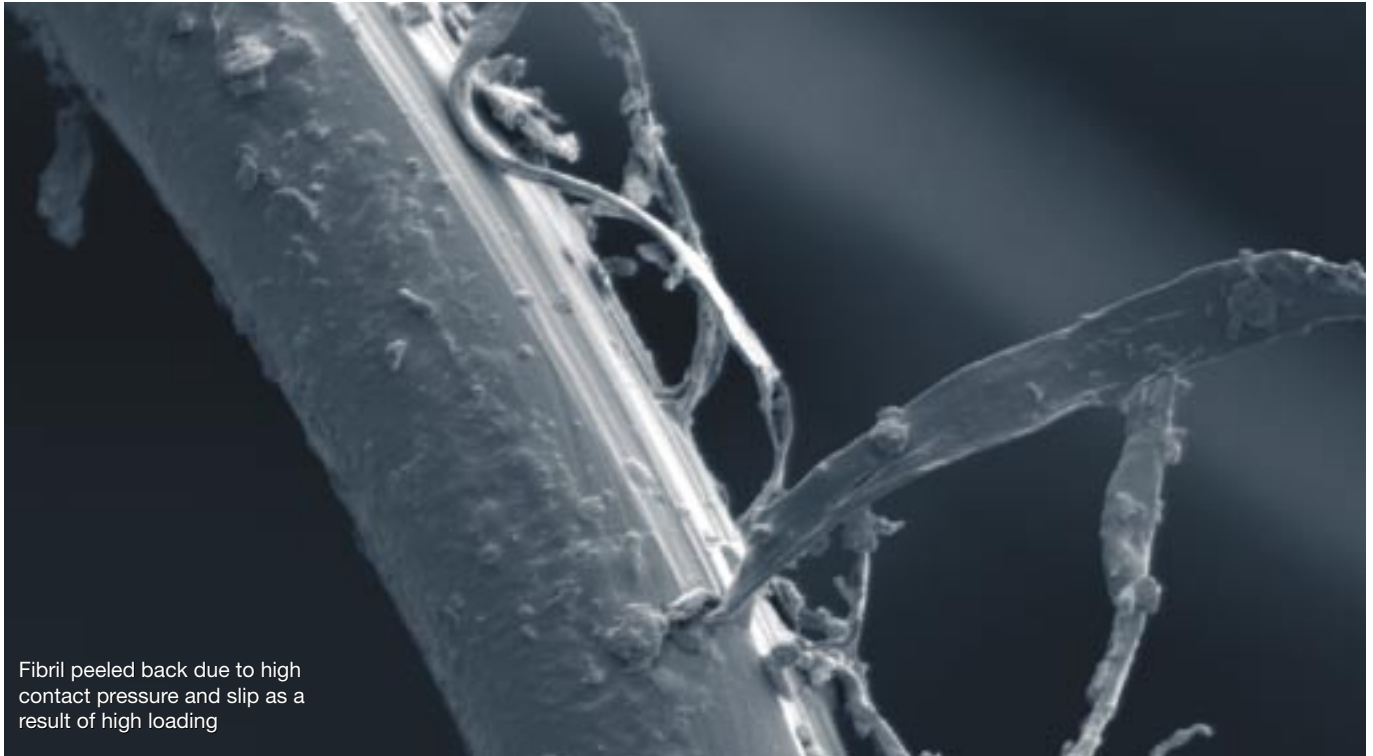


# SPM & TANKER MOORING HAWSER



Service Life Prediction,  
Replacement Criteria and Testing Services

Technical Notes 08, January 2005



Fibril peeled back due to high contact pressure and slip as a result of high loading

## SERVICE LIFE PREDICTION

**Hawser durability is a prime concern to the operator. If the hawser is retired too early there is unnecessary waste, but if the hawser is not replaced on time there could be a catastrophic accident.**

**TTI has a considerable independent database on factors affecting hawser life including:**

- SURFACE WEAR
- INTERNAL WEAR
- TENSION-TENSION FATIGUE
- FLEX FATIGUE
- AXIAL COMPRESSION FATIGUE
- CREEP
- HYSTERESIS HEATING

In particular TTI has state of the art in house programs for the prediction of hawser life, validated against both

laboratory and field data. These can be used to give guidance on material and construction optimisation to maximise durability and performance of the mooring system.

TTI has also conducted pioneering work on the effects of the terminations upon fatigue performance and on the dependency of fatigue upon hawser length.

## RETIREMENT CRITERIA

TTI is also experienced in the establishment of retirement criteria, backed by a considerable in house capability and extensive field experience. Hawser retirement criteria can be established in three ways:

- BY INSPECTION AND NDT ANALYSIS OF THE ROPE STRUCTURE

- FROM ANALYSIS OF LOADING SPECTRUM BY MINERS RULE AND EXPOSURE HISTORY
- BY RESIDUAL STRENGTH TESTING

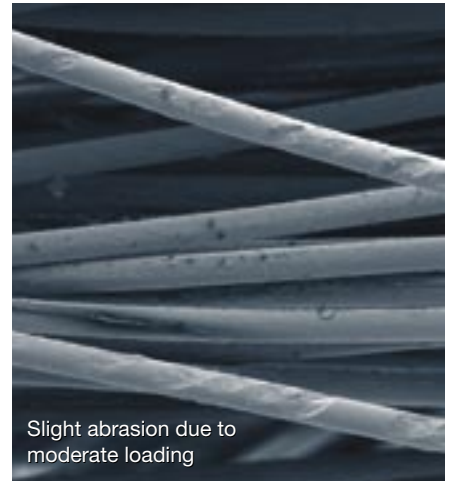
TTI personnel prepared the fibre rope inspection and replacement guidelines which appear in the U.S. Coast Guard Guidelines for Deepwater Port SPM Design and the Oil Companies International Marine Forum (OCIMF) Mooring Equipment Guidelines. A wide range of SPM and tanker mooring hawsers, including parallel strand, braid-on-braid and 8-strand, have been inspected and examined in detail by TTI personnel in accordance with OCIMF GUIDELINES. Effects of creep, axial compression, flex fatigue, hysteresis, internal and external abrasion can be assessed to provide guidance on rope life through use of our in-house Fibre Rope Modeller program, TN/06.



SPM hawser broke in service after 8 months



Axial compression damage in 20micron diameter filament



Slight abrasion due to moderate loading

Using an extensive in-house database of rope fatigue life and from provision of hawser loading spectrums by the operator, TTI can conduct a Miner's summation to predict remaining or new hawser life.

### TESTING SERVICES

TTI offers hawser residual strength testing and examination services. These include yarn residual strength/realization method in accordance with

British Standards and SEM/optical microscopy analysis of yarn wear and fatigue characteristics as shown below. Alternatively, all types of rope, whatever condition, can be spliced by TTI and hawser residual strength determined.

### For further information and a demonstration, contact:

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