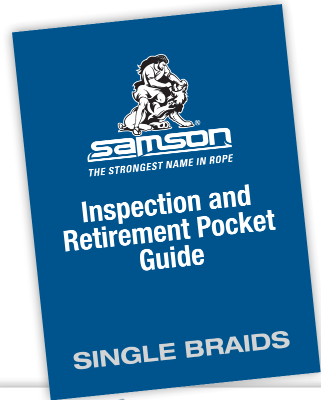
SAMSON TECHNICAL BULLETIN

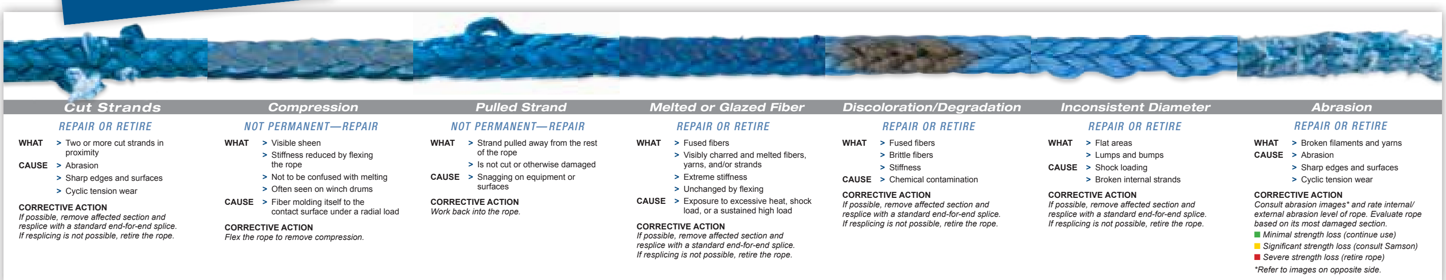
Published Date: August 2013

Inspection & Retirement Pocket Guide



A NEW WAY TO TALK ABOUT SYNTHETIC ROPES

The visual inspection of synthetic ropes before use is critical in most industrial applications. The residual strength of a rope, the prime indicator of its useful and safe remaining working life, must be assessed before committing the rope to continued use. With high-performance synthetics like HMPE replacing steel-wire ropes in many applications, the need for a method to determine the state of a rope is more critical than ever before. The problem is that there is no common, standardized language or reference scale to describe the state of a rope. To date, judgment on the state of the rope has required a synthetic rope expert to complete an inspection on-site. The alternative is removing the rope from service and testing the rope to destruction in order to evaluate residual strength.



The Pocket Guide includes information on proper rope inspection techniques and corrective action steps.

The Samson Inspection and Retirement Pocket Guide is designed to alleviate this problem by establishing a common language and a reference scale to describe the current state of a rope. The Pocket Guide is based on a statistical analysis of several years of lab testing reports of ropes used in a variety of different applications and tested to destruction in the Samson R&D labs. All testing in the Samson labs is well documented with photos of the samples tested and pre-test assessments of the general state of the rope. The type of damage, its extent, and any mitigating conditions (like chafe gear) are all properly noted. The rope is then tested to destruction to determine the actual residual strength of the sample.

The resulting guide provides a means of estimating the state of the rope and whether it should be repaired or retired from use. The Inspection and Retirement Checklist section of the Guide describes the seven common forms of damage: cut strands, compression, pulled strands, melted or glazed fiber, discoloration/degradation, inconsistent diameter, and abrasion. It provides a visual reference for each and a determination of the cause and possible corrective action that can be taken.

ABRASION

Of all the forms of damage that a rope is subjected to, the most commonly observed are abrasion and cutting. Both result in broken filaments in the rope and in a potential reduction in strength.

Cutting is characterized as a highly concentrated density of broken filaments localized in one or several strands at one particular position on the rope. Cutting is generally easier to assess than abrasion in terms of the volume of broken filaments in relation to the size of the rope.

Abrasion is characterized as a low density of broken filaments distributed across a larger volume of rope, both along the length of the rope as well as among the various strands at any position along the rope. Abrasion can be both external—along the surface of the rope, and internal, within the structure of the rope itself.

It is easy to visualize how external abrasion occurs—ropes dragged across rough surfaces can easily break surface fiber filaments. Internal abrasion is caused by fiber filaments rubbing against one another, or by the ingress of grit or gravel into the braid of the rope. In ropes that are dragged against rough surfaces without proper chafe protection, or experience repeated bending over sheaves and across fairleads, the surface fibers are slowed in relation to the internal fibers, causing fiber-on-fiber abrasion.

The effect of abrasion on the residual strength of the rope is more difficult to assess than cutting or other forms of physical damage. To help assessment in the field, the second side of the Pocket Guide is devoted to a visual comparator of the various states of both internal and external abrasion.

THE STRONGEST NAME IN ROPE

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Samson's R&D department conducted extensive testing and years of field service visit data to develop these inspection guidelines.

SHOWN AT ACTUAL SIZE: The detailed photos make comparison quick and accurate.

THE ABRASION COMPARATOR

The Abrasion Comparator shows a 12-strand HMPE rope — AmSteel®-Blue—in a range of abrasion states from new rope to rope ready for retirement. The images represent a scale numbered from 1 through 7 that ranges from minimal strength loss (steps 1 and 2), significant strength loss (steps 3 through 5), to severe strength loss (steps 6 and 7). Each is further tagged with an action—for ropes with significant strength loss, consult Samson; for severe strength loss, retire the rope. Images are provided for both external abrasion and internal abrasion. When consulting your Samson dealer or representative you now have a ready reference to accurately describe the state of the rope in question.

The comparator is an easy reference that can be used in the field to help assess the state of a rope. Small and easily held in the hand while performing an inspection, it helps establish a guideline and a common language when discussing the state of a rope. It is printed on extremely durable synthetic paper that is resistant to tearing and comes packaged in a vinyl sleeve to make it 'pocket friendly.'

For a complete description of the methodology used in preparing Samson's *"Inspection and Retirement Pocket Guide,"* see the technical paper *"Inspection Criteria for HMPE Rope"* available in the Resources and Literature section of ***SamsonRope.com***

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THE STRONGEST NAME IN ROPE