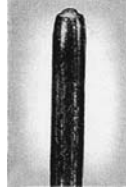




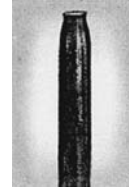
Troubleshooting Checklist

TENSION BREAK

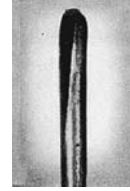
Wire break shows one end of broken wire coned, the other cupped. Necking down of the broken ends is typical of this type break. Where tension breaks are found, the rope has been subjected to overloading, either for its original strength (new rope) or for its remaining strength in the case of a used rope. Tension breaks are frequently caused by the sudden application of a load to a slack rope, thereby setting up incalculable impact stress.



Tension (Cone)



Tension (Cup)



Tension & Wear

ABRASION BREAK

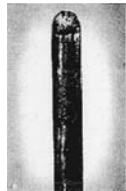
Wire break shows broken ends worn to a knife-edge thinness. Abrasive wear is obviously concentrated at points where the rope contacts an abrasive medium, such as the grooves of sheaves and drums or other objects with which the rope comes into contact. Unwarranted abrasive wear indicates improperly grooved sheaves and drums, incorrect fleet angle, or other localized abrasive conditions.



Abrasion

FATIGUE BREAK

Wire breaks are usually transverse or square showing granular structure. Often these breaks will develop a shattered or jagged fracture, depending on the type of operation. Where fatigue breaks occur, the rope has repeatedly been bent around too small a radius. Whipping, vibration, slapping, and torsional stresses will also cause fatigue. Fatigue breaks are accelerated by abrasion and nicking.



Fatigue

Fatigue
(Jagged Type)

Fatigue & Wear



Fatigue & Nicking

CORROSION BREAK

Easily noted by the wire's pitted surface, wire breaks usually show evidence of tension, abrasion, and/or fatigue. Corrosion usually indicates improper lubrication. The extent of the damage to the interior of the rope is extremely difficult to determine; consequently corrosion is one of the most dangerous causes of rope deterioration.



Corrosion

CUT OR SHEAR

Wire will be pinched down and cut at broken ends or will show evidence of shear-like cut. This condition is evidence of mechanical abuse caused by agents outside the installation, or by something abnormal on the installation itself, such as a broken flange.



Cut or Shear



ABRASION

- Frozen Sheaves or Rollers
- Tight Grooves
- Excessive Fleet Angle
- Misaligned Sheaves
- Corrugated Sheave or Drum
- Sheave Overspin
- Rope Jumping the Sheave
- Poor Spooling
- Oversized or Undersized Rope



Abrasion

CORE PROTRUSION & SLIPPAGE

- Shock-loading
- Poor Installation Techniques



Core Protrusion (Shockloading)

CORROSION

- Lack of Lubrication
- Fume Exposure
- Environmental Damage (e.g., acidic)



Corrosion

CRUSHING

- Poor Installation Techniques
- Cross-winding
- Poor Spooling
- Incorrect WR Construction
- Poor Break-in Procedure
- Excessive Fleet Angle

DIAMETER REDUCTION

- Lack of Lubrication (fiber core)
- Excessive Abrasion
- Corrosion (internal and/or external)

FATIGUE

- Out of Round Sheaves
- Tight Grooves
- Misaligned Sheaves
- Undersized Sheaves
- Worn Bearings
- Vibration
- Slapping
- Whipping



Crushing

HIGH STRANDING

- Poor Seizing Techniques
- Tight Grooves
- Undersized Sheaves

JUMPING THE SHEAVE

- Poor Spooling
- Excessive Rope Length

KINKING

- Poor Unreeling Procedures
- Poor Installation Techniques
- Undersized Sheaves



Fatigue (Reverse Bend)

LAY LENGTHENING & TIGHTENING

- Poor Installation Techniques
- Poor Unreeling Procedures
- Corrosion

LOOPED WIRES

- Poor Installation Techniques

UNBALANCED ROPE

- Oversized Sheaves



Fatigue (Undersized Sheave)