

### Technical Bulletin 33: Strength Retention of Used Twin-Path® Slings

Twin-Path slings have many features to ensure they can be inspected, repaired, and placed back in service. These include warning indicators such as the red inner cover, Check-Fast® inspection system and fiber optics. Testing and analysis were performed to determine how often Twin-Path slings can be returned to service and how much strength is retained after use.

#### Cycle Testing

Cycle testing was performed in 1997 on both a wire rope sling and a Twin-Path sling to determine their strength retention over time. The wire rope sling withstood slightly over 26,000 cycles at proof load before the sling ultimately failed. The Twin-Path sling achieved 50,000 cycles at twice the rated capacity. It was then taken to break to determine its residual strength. The Twin-Path sling not only maintained its required breaking strength but exceeded it – with a 5.2:1 Design Factor after this grueling test.

	Cycles	Retained Strength
Wire Rope Sling	26,407	0%
Twin-Path Sling	50,000	105%

Table 1 – Cycle Testing

#### Used Slings

A study was performed on about 500 returned Twin-Path slings to determine the reparability of used Twin-Path slings. It was found that 84% of Twin-Path Slings were able to be repaired and/or recertified. In fact, on average Twin-Path Slings were repaired 3 to 4 times. Many repaired slings were in service for over 10 years.

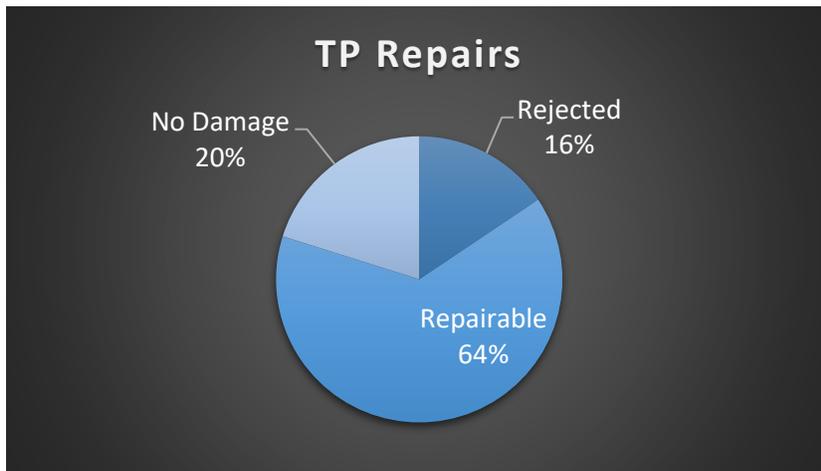


Table 2 – TP Repairs

Break tests were performed on slings that were rejected due to damaged core yarns. On average they maintained a 4.4:1 Design Factor. Even slings that were severely damaged maintained a minimum of a 3:1 Design Factor.

	Breaking Strength (lbf)	Design Factor
TPXC 1,000	29,730	3.0:1
TPXC 2,000	92,890	4.6:1
TPXC 2,000	61,240	3.0:1
TPXC 2,000	104,970	5.2:1
TPXC 1,000	56,080	5.6:1
TPXC 1,000	41,630	4.0:1
TPXC 1,000	50,290	5.0:1
TPXC 1,000	47,170	4.7:1

Table 3 – Used Sling Break Tests

### Age

Age can play an important factor in the decision to retire a sling. Over time technologies change and this is true with the fiber composition of K-Spec® Core Yarn. As new fiber technologies have been introduced, they have been integrated into the K-Spec formula. Therefore, Slingmax® Rigging Solutions advises that slings 20 years or older should be retired from service. However, testing was performed to determine the residual strength of a 20-year-old Twin-Path sling. A Twin-Path sling rated for 60,000 lb was taken out of service and loaded to failure. This sling achieved a design factor of over 4:1.

	Breaking Strength (lbf)	Design Factor
TUFX 6,000	249,700	4.2:1

Table 4 – 20-year-old Twin-Path Sling

### Summary

Numerous and repeated testing has shown that Twin-Path Slings are the longest lasting slings available. Even when Twin-Path Slings are damaged beyond repair they may still maintain a significant design factor.