

Safety Bulletin			 Tesco Corporation 5616 – 80th Avenue SE Calgary, Alberta, Canada T2C 4N5 Tel: 1-877-TESCO-77 (North America) Tel: 1 (713) 359-7195 (AMSS 24-hour support) Tel: 1 (713) 359-7295 (International) Email: bulletins@tescocorp.com www.tescocorp.com www.tescoparts.com
No: SB064	Rev: 0	Date: March 12, 2012	
Shackle Failure on HCI Top Drives			 TESCO [®] www.tescocorp.com www.tescoparts.com

BACKGROUND INFORMATION:

Two separate incidents occurred in the field in which the shackle installed between the crown and the torque track section of two TESCO HCI Top Drives (units 957 and 735) broke during operation (Figure 1) and fell to the rig floor. No injuries to personnel and no damage to equipment were reported.

The 1 inch G-2130 8.5-ton shackles, manufactured by The Crosby Group, have since been replaced by new ones.



Figure 1: Broken shackle on HCI top drive unit 735 (left) and 957 (right)

Upon further investigation by Crosby’s laboratory and another independent laboratory, it was revealed that both shackles had broken by way of fatigue failure. Both shackles experienced fatigue that had progressed more than ¾ through the cross section (primary fracture) before the remaining section broke under the load (secondary fracture). Then after one column of the bow had broken, the other column became overloaded and broke also (tertiary fracture) at a second fatigue site. The first shackle (unit 735) broke in August 2011, while the second shackle (unit 957) broke in December 2011 and had been in operation for 46 days. According to the TESCO HCI top drive maintenance manual #880004, the torque track hanging sling is to be visually inspected every week and documented. Therefore the second broken shackle should have been inspected about six times prior to it breaking.

Version	Date (D/M/Y)	ECN	Description of Bulletin Changes
Rev 0	12/03/2012	141-0316	Initial release of document

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Fatigue failure could have been discovered by conducting the weekly scheduled visual inspection as required by the TESCO maintenance manual in accordance with Crosby's field inspection recommendations. Another method would have been to perform a wet fluorescent magnetic particle inspection (WFMPI) on the torque track hanging sling on a monthly basis, which was not covered by the TESCO maintenance manual.

Additionally, it was determined that the new style, telescoping top track segment (TESCO part number 1340104) was being set aside from the torque track set (TESCO part number 1340105) and replaced with the old style, non-telescoping top track segment (TESCO part number 3907) in order to permit use of the old style sling assembly (TESCO part number 4537). The new style sling assembly (TESCO part number 1340024) was also being set aside.

AFFECTED PRODUCT:

All sling assemblies used on TESCO Top Drives are affected.

TESCO PART NO.	DESCRIPTION
15898	Assembly,Sling,Hang,Rig-Up,1-1/2"
1340027	Sling,Assembly,Torque Track SWL 12-Ton,HMIS
4537	Sling,Hang,Rig-Up,7.75-Ton
4536	Sling,Hang,Assembly,Spare
1340024	Sling,Assembly,SWL 22.6-Ton
1030132	Sling,Assembly,Slip & Cut Support SWL 25-Ton
10281	Cable,Safety,Derrick,3/16x6',w/Snap Hooks,SWL 700 lbs

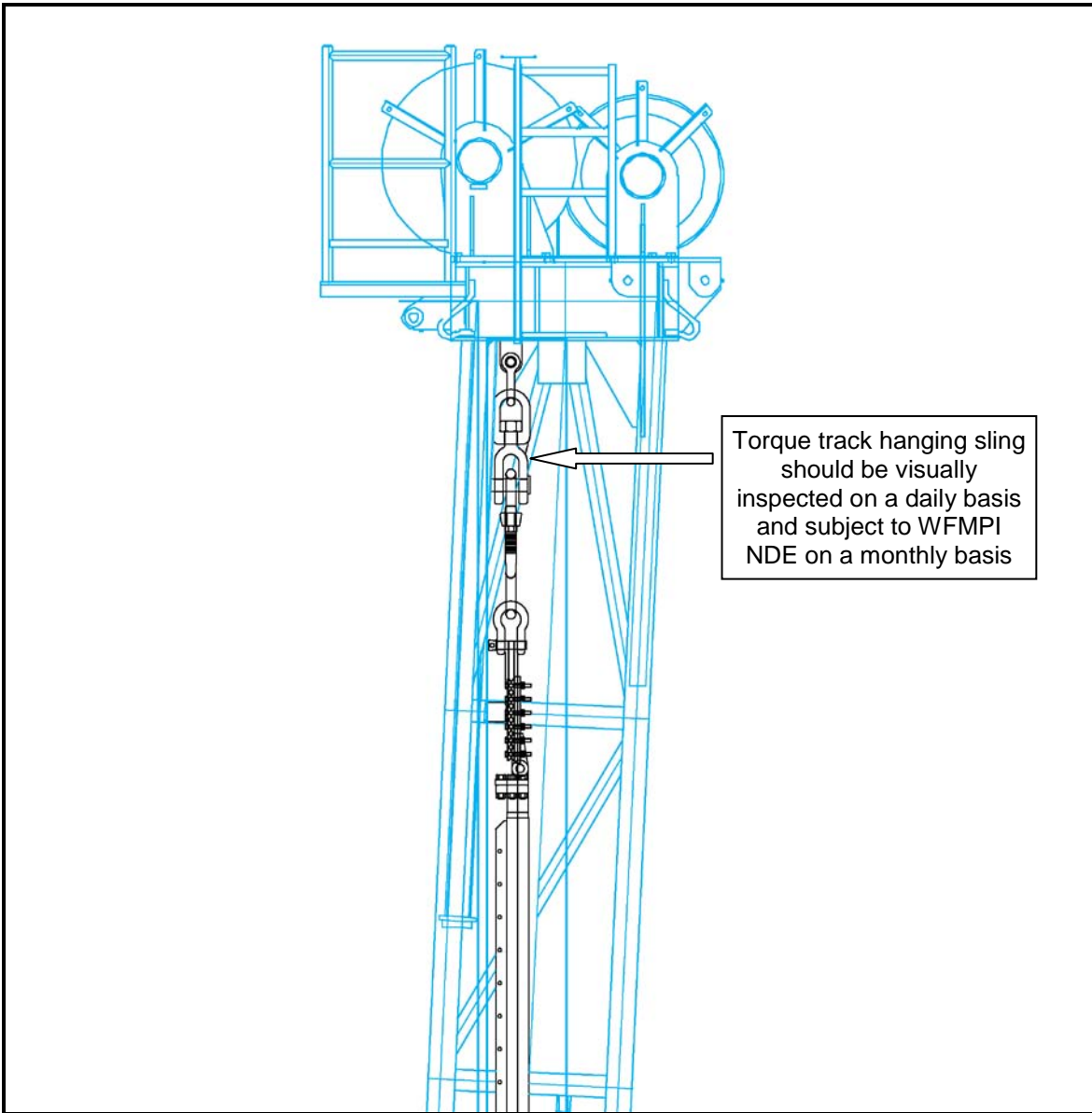
RECOMMENDED ACTION:

TESCO recommends that the old style torque track hanging sling (TESCO part number 4537) equipped on all top drive installations be immediately subject to visual and wet fluorescent magnetic particle inspection (WFMPI) in accordance with Crosby's field inspection guideline, see Appendix A.

ADDITIONAL ACTIONS:

- All top drive maintenance manuals are being updated to include Crosby's field inspection instructions.
- TESCO is changing the inspection frequency of the visual check of the torque track hanging sling to be 'daily'.
- TESCO is including a WFMPI non-destructive evaluation (NDE) requirement for the torque track hanging sling that will be 'monthly'.
- TESCO is adding a proof load test followed by WFMPI NDE requirement for the torque track hanging sling assembly to be completed prior to the parts leaving the factory and being delivered to the customer.

TESCO further recommends, for all top drive installations that had not been originally equipped with torque track hanging sling (TESCO part number 4537) and torque track hanging lug (TESCO part number 19025), that those customers replace this hanging equipment, and revert to the torque track hanging sling and torque track hanging lug that had been originally supplied with the top drive unit. Substituting this equipment back will improve the factor of safety of the torque track hanging sling.



Torque track hanging sling should be visually inspected on a daily basis and subject to WFMPI NDE on a monthly basis

APPENDIX A:

The Crosby Group, Inc.	Technical Data Sheet	06/19/1995
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Shackle Field Inspection

Following is a general field inspection guideline for Crosby Shackles to determine if a shackle is acceptable for continued use.

1. Examine shackles¹ for nicks, gouges, cracks and other defects by visual means and/or suitable crack-detecting processes (ie. Magnetic Particle, Dye Penetrant, etc....). Shackles containing cracks shall be removed from service. Shackles with severe nicks and gouges in critical areas should be repaired by grinding longitudinally following the contour of the shackle providing such reduction in the stock material does not exceed 10% of the cross-sectional dimension.
2. Examine shackles for excessive wear. Shackles showing a wear-reduction of greater than 10% in the diameter of the bow or pin should be removed from service.
3. In areas where both grinding and wear has occurred, the total accumulated material reduction should not exceed the grind allowance of 10%.
4. Examine shackles for deformation. Shackles which can be determined to have any measurable deformation should be removed from service. Any detectable bending or twisting out of the natural plane of the shackle is cause for removal from service.
5. Repair of shackles by means of welding is not recommended.
6. Inspect the integrity of the screw threads (where applicable).

<1> The word "shackle" in this case indicates all components of the shackle assembly.

Classification	Catalog No.	Document No.	Revision No.	File Name
SHACKLE	209/210/213/215/2130/2140/2150	SHA-4	I	tdssha4.doc