



Rigging Workshop

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Incident

Thursday August 8th

A crew was tasked with reinstalling 15 R-blocks over the NuMI target pile. In the process of performing the move it was discovered that one of the safety pins had broken off from one of the lifting eyes. This failure was noted before lifting the next block, but the broken lifting eye was still used for the majority of the R-block moves.

Friday August 9th

The crew was again to move the remaining R-blocks, but a additional rigger joined the crew. Before the first block of the day was moved, it was noticed by the new member of the crew that the lifting eye was damaged. At this point the lifting eye was removed from service and a new lifting eye was used for future lifts.

Issues noted

- Even though the crew appropriately stop the task, they failed to remove the lifting eye from service.
- The following day when a similar lifting operation was being conducted the crane operator failed to inspect the lifting fixtures. The crane operator depended on the riggers to perform this operation.
- This decision to proceed violated OSHA/ANSI standard for crane operation.

Damaged lifting eye



Lifting eye with broken pin



Lifting eye without the pin

INL Mill Event



ASME Below-the-Hook Lifting Devices

ASME B30.20-2013
(Revision of ASME B30.20-2010)

Below-the-Hook Lifting Devices

**Safety Standard for Cableways,
Cranes, Derricks, Hoist, Hooks,
Jacks, and Slings**

AN AMERICAN NATIONAL STANDARD



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ASME STANDARD

- 20-1.3 Inspection, Testing, and Maintenance
- 20-1.3.3 Frequent Inspection
 - Items such as the following shall be inspected for damage at intervals as defined in para. 20-1.3.1 (b)(2), including observations during operation for any indications of damage that might appear between inspections.
- 20-1.3.7 Repairs
 - Any indications of damage disclosed by the inspection requirements of Section 20-1.3 shall be corrected according to the procedures outlined in para. 20-1.3.9 before operation of the lifter is resumed.

Safety

- Everyone involved in lab operation is responsible for the compliance of safety regulations regardless of your seniority. If there is any doubt about the job you should stop the job and clarification should be obtained.
- It is incumbent on all of us to ensure that we follow all safety standards to avoid person injury and damage to the systems we are responsible to maintain.

Daily Overhead Crane & Hoist Checklist

Report Hazards to Supervisor Before operating

Remove unsafe equipment from service **IMMEDIATELY**

- Warning Tags & Signs
- Controls Identified
- Pendant Strain Relief
- Warning Indicators
- Check support Structure
- Inspect Wire Rope/Chain
- Hook Wear & Throat Opening
- Hook Latches Functioning
- Block & Sheaves
- Bridge/Trolley stops
- Fluid Leaks
- Area Obstruction
- Collectors/Conductors
- Festoon/Power Cable
- Electrical Enclosures
- Loose Wires
- Exposed Electrical Hazard
- Disconnect Access
- Pendant Button Operation
- Emergency Stop Button
- Upper Hoist Limit Switch
- Lower Hoist Limit Switch
- Hoist Function
- Trolley Function
- Bridge Function
- Holding Brake
- Load Control Break
- Excessive Hoist Noise
- Excessive Load Drift (Vertical)
- Excessive Load Drift (Horizontal)

Sling Inspection & Fall Protection

- You must inspect each sling before use.
- Any sling that does not pass inspection must be taken out of service and destroyed.
- All fall protection must be inspected once a year/must have that years appropriate colored tag.
 - This includes
 - Harness
 - Retractable lanyard
 - Beam clamps
 - Ect...
- Fall protection must also be inspected prior to each use.

Sling inspection

Tuflex / Keyflex Roundslings



INSPECTION CRITERIA FOR TUFLEX / KEYFLEX

The following photos illustrate some of the common damage that occurs and indicates that the sling must be taken out of service. For inspection frequency requirements, see page 7.

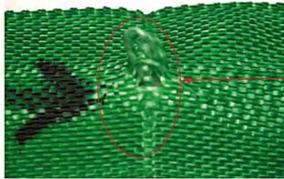
THE DAMAGE: Cuts to the cover exposing internal core yarns – When internal core yarns are visible, the amount of damage done to the core yarns and the sling strength can not be determined without breaking the sling. Therefore, the sling must be taken out of service.

WHAT TO LOOK FOR: Broken fibers of equal length indicate that the sling has been cut by an edge.

TO PREVENT: Always protect synthetic slings from being cut by corners and edges by using wear pads or other devices



Tuflex



THE DAMAGE: Holes/Snags/Pulls exposing internal core yarns.

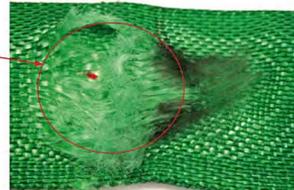
WHAT TO LOOK FOR: Punctures or areas where fibers stand out from the rest of the sling surface.

TO PREVENT: Avoid sling contact with protrusions, both during lifts and while transporting or storing.

THE DAMAGE: Abrasion exposing internal core yarns.

WHAT TO LOOK FOR: Areas of the sling that look and feel fuzzy indicate that the fibers have been broken by being subject to contact and movement against a rough surface. Affected areas are usually discolored.

TO PREVENT: Never drag slings along the ground. Never pull slings from under loads that are resting on the sling. Use wear pads between slings and rough surface loads.



Tuflex / Keyflex Roundslings

INSPECTION CRITERIA FOR TUFLEX / KEYFLEX

THE DAMAGE: Heat/Chemical

WHAT TO LOOK FOR: Melted or charred fibers anywhere along the sling. Heat and chemical damage can look similar and they both have the effect of damaging sling fibers and compromising the sling's strength. Look for discoloration and/or fibers that have been fused together and often feel hard or crunchy.

TO PREVENT: Never use Tuflex where they can be exposed to temperatures in excess of 200°F. Never use Tuflex in or around chemicals without confirming that the sling material is compatible with the chemicals being used. For elevated temperatures up to 350°F, ask about our KeyFlex roundslings.



THE DAMAGE: Illegible or Missing Tags –The information provided by the sling tag is important for knowing what sling to use and how it will function.

WHAT TO LOOK FOR: If you cannot find or read all of the information on a sling tag, the sling shall be taken out of service.

TO PREVENT: Never set loads down on top of slings or pull slings from beneath loads if there is any resistance. Load edges should never contact sling tags during the lift. Avoid paint or chemical contact with tags.



THE DAMAGE: Knots compromise the strength of all slings by not allowing all fibers to contribute to the lift as designed.

WHAT TO LOOK FOR: Knots are rather obvious problems as shown here.

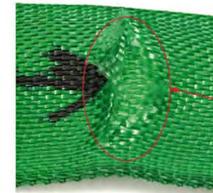
TO PREVENT: Never tie knots in slings and never use slings that are knotted.



THE DAMAGE: Cuts to the cover NOT exposing internal core yarns –Tuflex roundslings all have a double walled jacket protecting the inner core yarns from damage. If damage (except for chemical or heat) appears only to the outer jacket and does not expose the inner core yarns, the sling may remain in service. To extend sling life, the sling may be returned to Lift-All for inspection and application of a patch to cover the damaged area.

WHAT TO LOOK FOR: Broken fibers of equal length indicate that the sling has been cut by an edge. In this case, the inner jacket remains intact.

TO PREVENT: Use wear pads between the sling and all edges that come in contact with the sling.



Links

- <https://www-bd.fnal.gov/msd/lift/> - lifting fixtures
- <https://eshq.fnal.gov/atwork/safety-occupational/fall/> -Fall Protection

Thank you