

OSC 12
Ohio Safety Congress & Expo

WELL AT HOME. SAFE AT WORK.

355 Rig It Right and You Won't Be Wrong, Part 2

Al Abel

Wednesday, March 28, 2:30 to 3:30 p.m.

Ohio Bureau of Workers' Compensation



Headlines . . .

Overhead Sling Causes Injuries
Dropped Load Pins Man
Worker Dies When Load Falls
Worker Severs Finger While Rigging
OSHA Investigating the Accident

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How Can You Manage Risk?

Risk management is a comprehensive set of actions that reduces the risk of a problem, a failure, an accident.

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Rigger's Responsibilities

- **The Inspection of Rigging Gear**
 - Frequent Inspection
 - Periodic Inspection
 - Initial Inspection
- **Responsibilities for Rigging**
 - Inspection
 - Connection
- **The Capacity of Rigging Gear**
 - Know the Working Load Limit
 - Use within the Working Load Limit
 - Do not Modify

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Rigging Equipment

- **Storage of Equipment**
 - Not in immediate work area
 - Protect from damage
- **Fabrication of Slings**
 - No knots to form eyes
 - Follow industry practices
- **Below-the-Hook Rigging Devices and Custom Equipment**
 - Designed
 - Tested
 - Marked
- **Design Factor**

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Common Rigging Problems

- Not Inspecting Gear
- Not knowing what to inspect for
- Capacity not known
- Not able to read rigging charts
- Improperly made below the hook devices
- Wire rope slings formed with clips

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Problems & The Rigging Charts

- Improper connections to sling eye
- Beating down choker hitch
- Basket hitch legs not vertical
- Capacity of sling not adjusted for angle
- Choker and basket hitches at sling angle smaller than 60°

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The Basic Rigging Plan

1. Who is responsible (competent) for the rigging?
2. Is the equipment in acceptable condition?
Appropriate type, proper identification
3. Are the working load limits adequate?
Capacity of gear known?
What is the weight of load?
Where is the center of gravity?
What is the sling angle?
Will there be any angular or side loading?
Are the slings padded against sharp corners?

?

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The Basic Rigging Plan

4. Will the load be under control?
Is the load rigged to the center of gravity?
Is the hitch appropriate?
Tag line needed?
Is there any possibility of fouling?
Clear of personnel?
5. Are there any unusual loading or environmental conditions?
Wind, temperature, other?
6. Special requirements?

?

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Inspection of Hardware

ASME B30.26



Inspection Frequency

The Inspection of slings & hardware includes:



- Initial inspection prior to first use
- Frequent inspection by designated person each day the hardware is used
- Periodic, at least annually, inspection accomplished by designated person as part of a thorough inspection program

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Inspection--Fittings

- Legible Identification
- Deformation
- Cracks or Sharp Nicks
- Modification
- Wire Rope at Termination
- Proper Function



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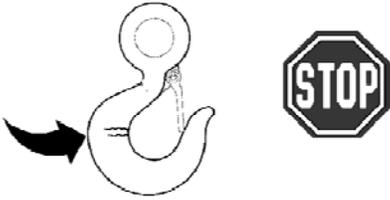
Inspection of Fittings-- Deformation



Any significant permanent deformation, or change in shape, indicates it has been overloaded and must be removed from service.

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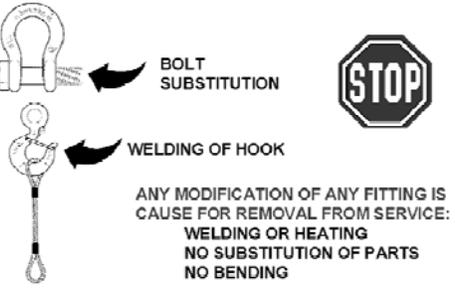
Inspection of Fittings-- Cracks & Sharp Nicks



Any crack, sharp nick or gouge in the surface of any fitting is cause for removal from service.

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Inspection of Fittings-- Modification



ANY MODIFICATION OF ANY FITTING IS CAUSE FOR REMOVAL FROM SERVICE:
WELDING OR HEATING
NO SUBSTITUTION OF PARTS
NO BENDING

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Hoist Ring Inspection



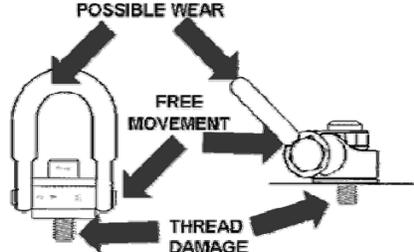
Always inspect hoist rings before use

Do not use parts showing cracks, nicks or gouges

Never use a hoist ring that shows signs of corrosion, wear or damage or if components are bent or elongated

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Hoist Rings-- External Inspection



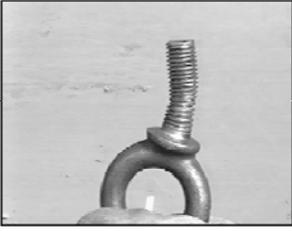
POSSIBLE WEAR

FREE MOVEMENT

THREAD DAMAGE

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CRANES
WIRE ROPE
FABRICATION
HARDWARE
SLINGS
FIELD SERVICE



What is the name of the hardware?

What is wrong with the hardware?

What caused the problem?

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What is the name of the hardware?

What is wrong with the hardware?

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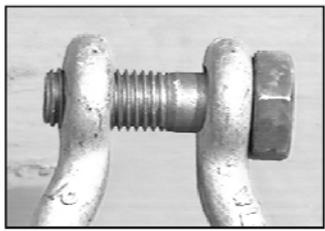
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What is the name of the hardware?
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What is the name of the hardware?
What is wrong with the hardware?

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Inspections



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FIELD SERVICE

Wire Rope Sling Inspection

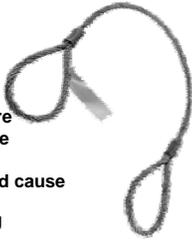


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HARDWARE
SLINGS
FIELD SERVICE

Inspection of Wire Rope Slings--Cause for Removal

- Broken wires
- Kinking
- Crushing
- Birdcaging
- Damage to rope structure
- Evidence of heat damage
- Corrosion
- Other damage that would cause doubt
- Missing or illegible sling identification
- Damaged end attachments



ANSI/ASME B30.9

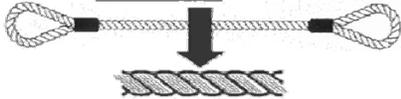
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HARDWARE
SLINGS
FIELD SERVICE

Inspection of Wire Rope Slings--Broken Wires

STRAND LAID AND SINGLE PART SLINGS

10 RANDOMLY BROKEN WIRES IN ONE ROPE LAY, OR 5 WIRES IN ONE STRAND IN ONE ROPE LAY IS CAUSE FOR REMOVAL



ONE LAY OF ROPE

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Inspection of Wire Rope Slings

SEVERE WEAR, ABRASION OR SCRAPING



METAL LOSS OF 1/3 OF THE DIAMETER OF THE INDIVIDUAL OUTSIDE WIRES IS CAUSE FOR REMOVAL

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Inspection of Wire Rope Slings

KINKING



KINKING IS CAUSE FOR REMOVAL FROM SERVICE

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Inspection of Wire Rope Slings

DOGLEG

LOOK FOR DISPLACED STRAND, IF A STRAND IS SIGNIFICANTLY DISLOCATED, REMOVE FROM SERVICE



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What is the name of the wire rope assembly?

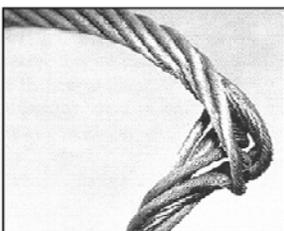
What is wrong with the assembly?

What caused the problem?

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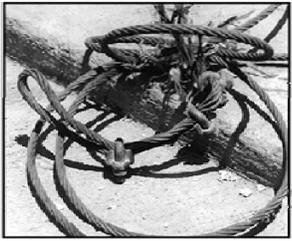
What is wrong with the assembly?

What caused the problem?

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What is the name of the wire rope assembly?

What is wrong with the assembly?

What caused the problem?

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Chain Sling Inspection

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Inspection of Chain Slings

Cause for removal

- Cracks or breaks
- Excessive wear, nicks or gouges
- Evidence of heat damage
- Weld splatter
- Chain or components do not hinge freely
- Stretched, bent, twisted or deformed chain links or components
- Missing or illegible sling identification
- Other damage that would cause doubt

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Inspection of Chain Slings

Cracks, Nicks and Gouges

CRACKS

GOUGES AND NICKS

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Inspection of Chain Slings

WEAR

WEAR NOT TO EXCEED 10% OR REFER TO CHART FOR SPECIFIC ALLOWANCE FOR MAXIMUM WEAR

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Inspection of Chain Slings

Deformation and Stretch

BENT LINK FROM SHARP CORNER

ONE LONG LEG

CHECK REACH VS. TAG

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What is type of sling?

What is wrong with the sling?

What caused the problem?

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CRANES

WIRE ROPE

FABRICATION

HARDWARE

SLINGS

FIELD SERVICE

Synthetic Sling Inspection



What is type of sling?

What is wrong with the sling?

What caused the problem?

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CRANES

WIRE ROPE

FABRICATION

HARDWARE

SLINGS

FIELD SERVICE

Synthetic Sling Inspection



What is type of sling?

What is wrong with the sling?

What caused the problem?

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CRANES

WIRE ROPE

FABRICATION

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SLINGS

FIELD SERVICE

Inspection of Web Slings

Cause for removal

- Acid or caustic burns
- Melting or charring on part of sling
- Holes, tears, cuts or snags
- Broken or worn stitches
- Excessive abrasive wear
- Discoloration, brittle or stiff areas on part of sling which may mean chemical or ultraviolet damage
- Missing or illegible sling identification
- Other damage that would cause doubt



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CRANES

WIRE ROPE

FABRICATION

HARDWARE

SLINGS

FIELD SERVICE

Polyester Round Slings-- Removal from Service

Cause for removal

- Acid or caustic burns
- Evidence of heat damage or weld splatter
- Broken or damaged core yarns
- Knots in any part of the sling
- Discoloration, brittle or stiff areas on part of sling which may mean chemical or ultraviolet damage
- Holes, tears, cuts, abrasive wear or snags that expose core yarns
- Missing or illegible sling identification
- Other damage that would cause doubt



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CRANES

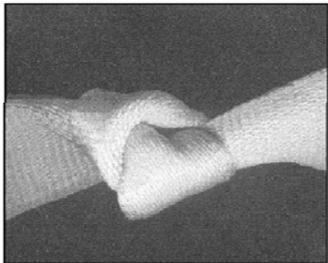
WIRE ROPE

FABRICATION

HARDWARE

SLINGS

FIELD SERVICE



What is type of sling?

What is wrong with the sling?

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CRANES

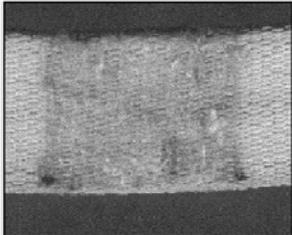
WIRE ROPE

FABRICATION

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What is type of sling?

What is wrong with the sling?

What caused the problem?

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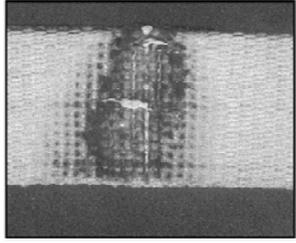
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What is type of sling?
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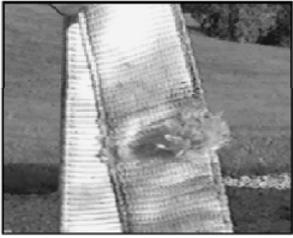
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What is type of sling?
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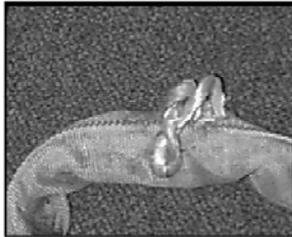
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What is type of sling?
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What is type of sling?
What is wrong with the sling?
What caused the problem?

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Let's do an inspection?

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Identify the Damage

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Localized, severe abrasion, metal loss, peening

Broken wires

Localized, severe abrasion, metal loss, peening

answer

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FIELD SERVICE

Identify the Damage

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Broken wires and broken strands

Damaged fitting (sleeve has metal loss)

Broken wires

answer

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Identify the Damage

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Severe rope body distortion

Twisted and bent hook

answer

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SLINGS
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Identify the Damage

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answer

Broken stitching in throat

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FIELD SERVICE

Identify the Damage

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answer

Knot

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Identify the Damage

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answer

Chemical damage

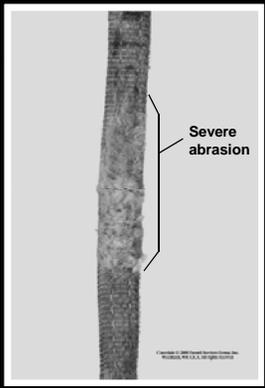
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Identify the Damage

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Severe abrasion

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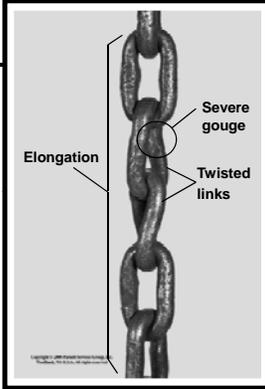
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Identify the Damage

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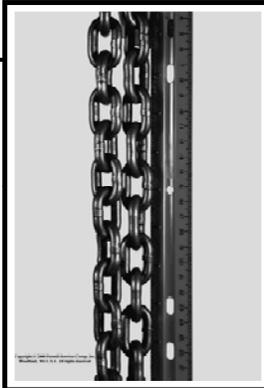


Elongation
Severe gouge
Twisted links

answer

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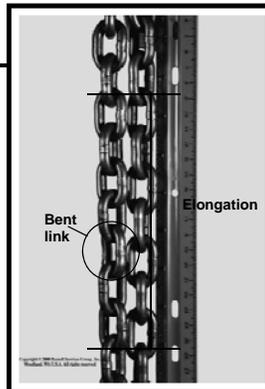
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Identify the Damage

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Bent link
Elongation

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Identify the Damage

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Homemade master link

Missing identification

Bent, twisted and elongated links

answer

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Identify the Damage

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Deformation

Homemade device

Missing identification

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Identify the Damage

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No mfr's markings (other side?)

Welded, Heat damage

Substandard bolt

answer

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"Plan Every Lift"

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Thank You for Attending!

Want more information?

- Speaker: aabel@mazzellalifting.com
- Office: 440.239.7000 ext. 212
- Cell: 216.410.1765
- www.mazzellalifting.com

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MAZZELLA Crane Service

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