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crosbyhook.com

Slings: Angles & Multiples
In a recent study on sling angle best
# Rigging Information

## Users Guide for Lifting

### Risk Management

<table>
<thead>
<tr>
<th>Definition</th>
<th>Terminology</th>
<th>For Additional Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive set of actions that reduces the risk of a problem, a failure, an accident.</td>
<td>Working Load Limit (WLL)</td>
<td>The Crosby Group LLC</td>
</tr>
<tr>
<td>ASME B30.9 (Slings) and ASME B30.26 (Rigging Hardware) requires users to have training.</td>
<td>Proof Test</td>
<td>P.O. Box 3128 Tulsa Oklahoma 74101 Phone: (918) 834-4611 1-800-777-1555</td>
</tr>
<tr>
<td>Users shall be trained in the selection, inspection, cautions to personnel, effects of environment and rigging practices.</td>
<td>Ultimate Strength</td>
<td>Web: <a href="http://www.thecrosbygroup.com">www.thecrosbygroup.com</a></td>
</tr>
<tr>
<td>All slings and rigging hardware require proper identification.</td>
<td>Design Factor</td>
<td>E-Mail: <a href="mailto:crosbygroup@thecrosbygroup.com">crosbygroup@thecrosbygroup.com</a></td>
</tr>
<tr>
<td>Rigging hardware at minimum to be identified with name or trademark of the manufacturer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>See ASME B30.9, ASME B30.10 and ASME B30.26 for full information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to Crosby Group Catalog and other product application information.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## The Basic Rigging Plan

Plan every lift. The questions to answer below are just a good starting point before the material moving activity begins. Add questions from your past experience or job specific requirements.

1. Who is responsible for the rigging?
2. Has communication been established?
3. Is the rigging in acceptable condition?
4. Is the rigging appropriate for lifting?
5. Does the rigging have proper identification?
6. Does all gear have known working load limits?
7. What is the weight of the load?
8. Where is the load’s center of gravity?
9. What is the sling angle of loading?
10. Will there be any side or angular loading?
11. Are the slings protected from corners, edges, protrusions and abrasive surfaces?
12. Are the working load limits adequate?
13. Is the loadrigged to the center of gravity?
14. Is the hitch appropriate for the load?
15. Is a tag line required to control the load?
16. Will personnel be clear of suspended loads?
17. Is there any possibility of fouling?
18. Will the load lift level and be stable?
19. Any unusual environmental concerns?
20. Any special requirements?

The rigging must be used within manufacturer’s recommendations and industry standards that include OSHA, ASME, ANSI, API and others.

## Responsibility

### User Responsibility

1. Utilize appropriate rigging gear suitable for overhead lifting.
2. Utilize the rigging gear within industry standards and the manufacturer’s recommendations.
3. Conduct regular inspection and maintenance of the rigging gear.
4. Provide employees with training to meet OSHA, API and ASME (B30.9, B30.26, etc.) requirements.

### Manufacturer’s Responsibility

1. Provides product and application information
2. Provides product that is clearly identified
   - Name or logo
   - Load rating and size
   - Traceability
3. Provides product performance
   - Working load limit
   - Ductility
   - Fatigue properties
   - Impact properties
4. Provides product training and training resources
### INSPECTION OF RIGGING HARDWARE

#### INSPECTION FREQUENCY PER ASME B30.26

A visual inspection shall be performed by the user or designated person each day before the rigging hardware is used. A periodic inspection shall be performed by a designated person, at least annually. The rigging hardware shall be examined and a determination made as to whether they constitute a hazard. Written records are not required.

#### REJECTION CRITERIA PER ASME B30.26

- Missing or illegible manufacturer’s name or trademark and/or rated load identification (or size as required)
- A 10% or more reduction of the original dimension
- Bent, twisted, distorted, stretched, elongated, cracked or broken load bearing components
- Excessive nicks, gouges, pitting and corrosion
- Indications of heat damage including weld spatter or arc strikes, evidence of unauthorized welding
- Loose or missing nuts, bolts, cotter pins, snap rings, or other fasteners and retaining devices
- Unauthorized replacement components or other visible conditions that cause doubt as to the continued use of the sling

**Additionally, inspect wire rope clips for:**
1. Insufficient number of clips
2. Incorrect spacing between clips
3. Improperly tightened clips
4. Indications of damaged wire rope or wire rope slippage
5. Improper assembly

**Additionally, inspect wedge sockets for:**
1. Indications of damaged wire rope or wire rope slippage
2. Improper assembly

#### ADDITIONAL REJECTION CRITERIA AND INFORMATION PER ASME B30.10 - HOOKS

- Any visibly apparent bend or twist from the plane of the unbent hook
- Any distortion causing an increase in throat opening of 5%, not to exceed 1/4”
- Missing or illegible rated load identification
- Missing or illegible hook manufacturer’s identification or secondary MFG. identification
- Hooks shall not be returned to service until approved by a qualified person
- Hooks require a written record of the periodic inspection, minimum of once per year

### INSPECTION OF SLINGS

#### INSPECTION FREQUENCY PER ASME B30.9

A visual inspection for damage shall be performed by a designated person each day or shift the sling is used. A complete inspection for damage shall be performed periodically by a designated person, at least annually.

#### REJECTION CRITERIA PER ASME B30.9

- Missing or illegible sling identification; evidence of heat damage; slings that are knotted; fittings that are fitted, corroded, cracked, bent, twisted, gouged, or broken; other conditions, including visible damage, that cause doubt as to the continued use of the sling.

#### WIRE ROPE SLINGS

- Excessive broken wires, for strand-laid and single part slings, ten randomly distributed broken wires in one rope lay or five broken wires in one strand in one rope lay
- Severe localized abrasion or scraping, kinking, crushing, birdcaging, any other damage resulting in damage to the rope structure
- Severe corrosion of the rope or end attachments
- Documentation that the most recent periodic inspection was performed shall be maintained
- Inspection records of individual slings are not required

#### CHAIN SLINGS

- Cracks or breaks
- Excessive wear, nicks or gouges
- Stretched chain links or components
- Bent, twisted or deformed chain links or components
- Excessive pitting or corrosion
- Lack of ability of chain or components to hinge freely
- Weld spatter
- A written record of the initial inspection referencing individual sling identification is required
- A written record of the most recent periodic inspection shall be maintained and shall include the condition of the sling

#### WEB SLINGS

- Acid or caustic burns
- Melting or charring of any part of the sling
- Holes, tears, cuts or snags
- Broken or worn stitching in load bearing splices
- Excessive abrasive wear or snags
- Discoloration and brittleness
- or stiff areas on any part of the sling, which may mean chemical or ultraviolet / sunlight damage
- Documentation that the most recent periodic inspection was performed shall be maintained

#### ROUND SLINGS

- Acid or caustic burns
- Evidence of heat damage
- Holes, tears, cuts, abrasive wear or snags
- That expose the core yarns
- Broken or damaged core yarns
- Weld spatter that exposes core yarns
- Discoloration and brittleness
- or stiff areas on any part of the slings, which may mean chemical or other damage
- Documentation that the most recent periodic inspection was performed shall be maintained
**WIRE ROPE SLING CONNECTIONS AND HITCHES**

**CONNECTION TO FITTINGS**

Use a thimble to protect slings and increase D/d.

Never place a slinging eye over a fitting with smaller diameter or width than the rope’s diameter.

**CHOKER CAPACITY**

A choker hitch has 75% of the capacity of a single leg sling only if the angle of choke is 120 degrees or greater. A choke angle less than 120 degrees can result in a capacity as low as 40% of the single leg.

**MULTIPLE LEG SLINGS**

A choker hitch has 75% of the capacity of a single leg sling only if the angle of choke is 120 degrees or greater. A choke angle less than 120 degrees can result in a capacity as low as 40% of the single leg.

**BASKET HITCH CAPACITY**

A basket hitch has twice the capacity of a single leg only if D/d ratio is 25/1 and the legs are vertical.

**CHAIN SLING CONNECTIONS AND HITCHES**

**CONNECTION TO FITTINGS**

Use master links to collect slings and to connect to hook.

Use grade 8 (80) or grade 10 (100) fittings that match the WLL of chain and offer proper securement.

**CHOKER CAPACITY**

A chain choker hitch has 80% of the capacity of a single leg sling only if the angle of choke is 120 degrees or greater. Rated loads for angles of choke less than 120 degrees shall be determined by the sling MFG or a qualified person.

No loss in capacity results if a cradle grab hook is used when angle of choke is 120 degrees or greater.

**BASKET HITCH CAPACITY**

A true basket hitch has twice the capacity of a single leg only if the legs are vertical. Note that the basket is formed by using a chain sling with two masterlinks at each end connected to the hook.

**MULTIPLE LEG SLINGS**

Triple leg chain slings have 50% more capacity than double leg chain slings (at same sling angle) only if the center of gravity is in the center of connection points and legs are adjusted properly. They must have an equal share of the load.

Quad (4 leg) chain slings offer improved stability but do not provide increased capacity only if all legs share an equal share of the load.

---

**CAPACITY % OF ANGLE SINGLE LEG**

<table>
<thead>
<tr>
<th>Angle</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>200%</td>
</tr>
<tr>
<td>60</td>
<td>170%</td>
</tr>
<tr>
<td>45</td>
<td>140%</td>
</tr>
<tr>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

---

**HORIZONTAL CAPACITY % OF ANGLE SINGLE LEG**

<table>
<thead>
<tr>
<th>Angle</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>200%</td>
</tr>
<tr>
<td>60</td>
<td>170%</td>
</tr>
<tr>
<td>45</td>
<td>140%</td>
</tr>
<tr>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>
**WEB SLING AND ROUNDSLING CAPACITIES**

**WEB SLING IDENTIFICATION INCLUDES:**

- **SLING TYPE:**
  - TC - TRIANGLE CHOKER
  - TT - TRIANGLE TRIANGLE
  - EE - EYE AND EYE
  - EN - ENDLESS
- **NUMBER OF PLYES:** 1 OR 2
- **WEBBING GRADE:** 9 OR 6
- **SLING WIDTH (INCHES):**

**ROUNDSSLING IDENTIFICATION INCLUDES:**

- **SLING NUMBER:** 1-13
- **SLING NUMBERS ARE FOR REFERENCE ONLY, SOME ROUNDSLINGS HAVE DIFFERENT RATINGS.**
- **SLING COLOR:** PURPLE, GREEN, YELLOW, TAN, RED, WHITE, BLUE, ORANGE

**SLING COLOR IS NOT FOLLOWED BY ALL MANUFACTURERS AND SOME COLORS HAVE MORE THAN ONE RATED LOAD.**

**WEIGHTS AND MEASURES**

<table>
<thead>
<tr>
<th>UNIT</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT WEIGHT STEEL</td>
<td>490 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT ALUMINUM</td>
<td>165 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT CONCRETE</td>
<td>150 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT WATER</td>
<td>62 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT SAND AND GRAVEL</td>
<td>120 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT COPPER</td>
<td>560 LBS/FT³</td>
</tr>
<tr>
<td>UNIT WEIGHT OIL</td>
<td>58 LBS/FT³</td>
</tr>
</tbody>
</table>

**CENTER OF GRAVITY AND SLING LOADING**

**WHEN LIFTING VERTICALLY, THE LOAD WILL BE SHARED EQUALLY IF THE CENTER OF GRAVITY IS PLACED EQUALLY BETWEEN THE PICK POINTS. IF THE WEIGHT OF THE LOAD IS 10,000 LBS., THEN EACH SLING WILL HAVE A LOAD OF 5,000 LBS. AND EACH SHACKLE AND EYEBOLT WILL ALSO HAVE A LOAD OF 5,000 LBS.**

**CENTER OF GRAVITY AND SLING LOADING**

**WHEN THE CENTER OF GRAVITY IS NOT EQUALLY SPACED BETWEEN THE PICK POINTS, THE SLING AND FITTINGS WILL NOT CARRY AN EQUAL SHARE OF THE LOAD. THE SLING CONNECTED TO THE PICK POINT CLOSEST TO THE CENTER OF GRAVITY WILL CARRY THE GREATEST SHARE OF THE LOAD.**

**SLING 2 IS CLOSEST TO COG. IT WILL HAVE THE GREATEST SHARE OF THE LOAD.**

**SLING 2 = 10,000 X 8 / (8+2) = 8,000 LBS.**

**SLING 1 = 10,000 X 2 / (8+2) = 2,000 LBS.**

**VOLUME OF RECTANGLE = HEIGHT x WIDTH x LENGTH**

**VOLUME OF SPHERE = 3.14 x (DIAM. x DIAM. x DIAM.) / 6**

**VOLUME OF CYLINDER = 3.14 x (DIAM. x DIAM. x LENGTH) / 4**
OPERATING PRACTICES - ASME B30.9

WHENEVER ANY SLING IS USED, THE FOLLOWING PRACTICES SHALL BE OBSERVED.

1. SLINGS THAT ARE DAMAGED OR DEFECTIVE SHALL NOT BE USED.
2. SLINGS SHALL NOT BE SHORTENED OR LENGTHENED BY KNOTTING OR TWISTING.
3. SLING LEGS SHALL NOT BE KINKED.
4. THE RATED LOAD OF THE SLING SHALL NOT BE EXCEEDED.
5. SLINGS USED IN A BASKET HITCH SHALL HAVE THE LOADS BALANCED TO PREVENT SLIPPAGE.
6. SLINGS SHALL BE SECURELY ATTACHED TO THEIR LOAD.
7. SLINGS SHALL BE PROTECTED FROM EDGES, CORNERS, PROTRUSIONS AND ABRASIVE SURFACES TO PREVENT SLING DAMAGE.
8. DURING LIFTING, WITH OR WITHOUT LOAD, PERSONNEL SHALL BE ALERT FOR POSSIBLE SNAGGING.
9. ALL EMPLOYEES SHALL BE KEPT CLEAR OF LOADS ABOUT TO BE LIFTED AND OR SUSPENDED LOADS.
10. HANDS OR FINGERS SHALL NOT BE PLACED BETWEEN THE SLING AND ITS LOAD WHILE THE SLING IS BEING TIGHTENED AROUND THE LOAD.
11. SHOCK LOADING SHOULD BE AVOIDED.
12. A SLING SHALL NOT BE PULLED FROM UNDER A LOAD WHEN THE LOAD IS RESTING ON THE SLING.

INSPECTION: EACH DAY BEFORE BEING USED, THE SLING AND ALL FASTENINGS AND ATTACHMENTS SHALL BE INSPECTED FOR DAMAGE OR DEFECTS BY A COMPETENT PERSON DESIGNATED BY THE EMPLOYER. ADDITIONAL INSPECTIONS SHALL BE PERFORMED DURING SLING USE WHERE SERVICE CONDITIONS WARRANT. DAMAGED OR DEFECTIVE SLINGS SHALL BE IMMEDIATELY REMOVED FROM SERVICE.

LOAD CONTROL

POSITIVE LOAD CONTROL

REEVING THROUGH CONNECTIONS TO LOAD INCREASES LOAD ON CONNECTION FITTINGS BY AS MUCH AS TWICE.

DO NOT REEVE!
### Risk Management

| Comprehensive Set of Actions That Reduces the Risk of a Problem, a Failure, an Accident |

**You Need**
- Product Knowledge
- Application Knowledge
- Manufacturer of Known Capability
- Products That Are Clearly Identified with the Following:
  1. Manufacturer’s Name and Logo
  2. Load Rating or Size That References Ratings
  3. Traceability Code

**A Good Risk Management Program Recognizes**
- Performance Requirements Include the Following:
  1. Load Rated Products
  2. Quenched and Tempered
  3. Ability to Deform When Overloaded
  4. Ability to Withstand Real World Loading in Day to Day Use. Toughness

### Mechanical Advantage and Total Load

**Mechanical Advantage**

- **Mechanical Advantage is the Leverage Gained by a Multiple Part Block. Must Have a Traveling Block to Have Mechanical Advantage.**
- The Theoretical Advantage Is Equal to the Number of Parts of Line Supporting the Traveling Block.

#### True Mechanical Advantage

<table>
<thead>
<tr>
<th>Advantage for Bronze Bushing</th>
<th>Advantage for Anti Friction</th>
<th>Number of Line Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.16</td>
<td>5.60</td>
<td>6</td>
</tr>
<tr>
<td>5.90</td>
<td>6.47</td>
<td>7</td>
</tr>
<tr>
<td>6.60</td>
<td>7.32</td>
<td>8</td>
</tr>
<tr>
<td>7.27</td>
<td>8.16</td>
<td>9</td>
</tr>
<tr>
<td>7.91</td>
<td>8.98</td>
<td>10</td>
</tr>
<tr>
<td>8.52</td>
<td>9.79</td>
<td>11</td>
</tr>
<tr>
<td>9.11</td>
<td>10.60</td>
<td>12</td>
</tr>
</tbody>
</table>

**Total Load**

The total load placed on the block and its end fitting determines the working load limit required.

---

### Working with Blocks

#### Overhaul Weight

To determine the weight of the block or overhaul ball that is required to free fall the block, the following information is needed:
- **Size of wire rope**, 
- **Number of line parts**, 
- **Type of sheave bearing**, 
- **Length of crane boom**, 
- **And Drum Friction**.

#### Block Reaving

Straight laced reeving is a basic method of placing the rope through a set of blocks. The end of the rope is fed through the outside sheave of the upper block to the outside sheave of the lower (traveling) block. This continues to the last sheave.

**Advantages:**
1. Allows blocks to run closer together.
2. Is simple.
3. Has no reverse bends.

**Drawbacks:**
- Tilting because of imbalanced loading can cause block rotation and wear of the sheaves and wire rope.

#### Symmetrical Reeving

Reeve blocks symmetrically to distribute load evenly. All sheaves must be reeled to achieve the full working load limit of the block.

**Block Cabling**

1. Reduce wire rope length
2. Use even part reeving
3. Dead end to boom
4. Evaluate wire rope construction

---

For additional information refer to the Crosby General Catalog.
RIGGING WITH BLOCKS

ONE PART OF LINE

TOTAL LOAD: Load Wt. (1000 lbs.) + Winch Pull (1000 lbs.) = 2000 lbs. MINIMUM

NO MECHANICAL ADVANTAGE = ONE WINCH PULL = 1,000 LBS.

TWO PARTS OF LINE

TOTAL LOAD: Load Wt. (1000 lbs.) + Winch Pull (500 lbs.) = 1500 lbs. MINIMUM

MECHANICAL ADVANTAGE = TWO WINCH PULL = 500 LBS.

PULL (P) REQUIRED (LEVEL GROUND) = WEIGHT (W) X FRICTION FACTOR (f)

MANY SURFACES HAVE A FRICTION FACTOR < 1

(f) for STEEL ON STEEL is .16 lubricated

(f) for STEEL ON STEEL is .8 clean

(f) for WOOD ON METAL is .2 to .6 clean

(f) for WOOD ON WOOD is .25 to .5 clean

WINCH PULL REQUIRED = WEIGHT X FRICTION FACTOR

MECHANICAL ADVANTAGE

 BLOCK LOADING - ANGLE FACTOR MULTIPLIERS

A single line sheave block used to change load line direction can be subject to total loads greatly different from the line pull

<table>
<thead>
<tr>
<th>ANGLE</th>
<th>FACTOR</th>
<th>ANGLE</th>
<th>FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>2.00</td>
<td>100°</td>
<td>1.29</td>
</tr>
<tr>
<td>10°</td>
<td>1.99</td>
<td>110°</td>
<td>1.15</td>
</tr>
<tr>
<td>20°</td>
<td>1.97</td>
<td>120°</td>
<td>1.00</td>
</tr>
<tr>
<td>30°</td>
<td>1.93</td>
<td>130°</td>
<td>.84</td>
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<td>40°</td>
<td>1.87</td>
<td>135°</td>
<td>.76</td>
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<tr>
<td>45°</td>
<td>1.84</td>
<td>140°</td>
<td>.68</td>
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<tr>
<td>50°</td>
<td>1.81</td>
<td>150°</td>
<td>.52</td>
</tr>
<tr>
<td>60°</td>
<td>1.73</td>
<td>160°</td>
<td>.35</td>
</tr>
<tr>
<td>70°</td>
<td>1.64</td>
<td>170°</td>
<td>.17</td>
</tr>
<tr>
<td>80°</td>
<td>1.53</td>
<td>180°</td>
<td>.00</td>
</tr>
<tr>
<td>90°</td>
<td>1.41</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

TOTAL LOAD = LINE PULL X ANGLE FACTOR

EXAMPLE, AT 45 DEGREES, AND 10,000 LB LINE PULL,
TOTAL LOAD = 10,000 X 1.84 = 18,400 LBS.

FOR ADDITIONAL INFORMATION REFER TO THE CROSBY GENERAL CATALOG
RIGGING INFORMATION

SHEAVE INSPECTION

Minimum groove radii for worn sheave tolerances per “Wire Rope User’s Manual” (third edition)

<table>
<thead>
<tr>
<th>NOMINAL WIRE ROPE SIZE</th>
<th>NOMINAL WIRE ROPE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in.)</td>
<td>(in.)</td>
</tr>
<tr>
<td>1/4</td>
<td>.128</td>
</tr>
<tr>
<td>5/16</td>
<td>.160</td>
</tr>
<tr>
<td>3/8</td>
<td>.192</td>
</tr>
<tr>
<td>7/16</td>
<td>.224</td>
</tr>
<tr>
<td>1/2</td>
<td>.256</td>
</tr>
<tr>
<td>9/16</td>
<td>.296</td>
</tr>
<tr>
<td>5/8</td>
<td>.320</td>
</tr>
</tbody>
</table>

Check flanges for wear, chips and cracks
Check bearings for wobble, lubrication & ease of rotation
Check grooves for proper size

CHECKING GROOVE SIZE FOR PROPER SIZE

SHEAVE FLEET ANGLE

- Fleet Angle is the entrance and exit angle of the wire rope relative to the sheave
- Fleet angle should be no more than 1-1/2 degrees


FOR ADDITIONAL INFORMATION REFER TO THE CROSBY GENERAL CATALOG

BLOCK HOOK INSPECTION

CROSBY RECOMMENDS AS A MINIMUM:

1. A visual inspection for cracks, nicks, wear, gouges and deformation as part of a comprehensive documented inspection program, should be conducted by trained personnel in compliance with the schedule in ASME B30.10.

2. For hooks used in frequent load cycles or pulsating load, or exposed to corrosive conditions (Road Salt, etc.) the hook and thread should be periodically inspected by Magnetic Particle or Dye Penetrant.

LUBRICATION OF HOOK BEARINGS:

Anti Friction — Every 14 days for frequent swiveling; every 45 days for infrequent swiveling.

Bronze Thrust Bushing or No Bearing — Every 16 hours for frequent swiveling; every 21 days for infrequent swiveling.

ASME B30.10 INSPECTION FREQUENCY

1. Initial Inspection - prior to use, all new, altered, modified, or repaired hooks shall be inspected to verify compliance with the applicable provisions in ASME B30.10 by a designated person. Written records are not required.

2. Frequent Inspection - shall include observations during operation by a designated person. Written records are not required.
   (a) Normal service - monthly. Normal service is operating at less than 85 percent of rated load except for isolated instances.
   (b) Heavy service - weekly to monthly. Heavy service is operating at 85 to 100 percent of rated load as a regular specified procedure.
   (c) Severe service - daily to weekly. Severe service is heavy service coupled with abnormal operating conditions.

3. Periodic Inspection - a complete visual inspection by a designated person. Disassembly may be required. Periodic inspection interval shall not exceed one year except as approved by a qualified person.
   (a) Normal service - yearly with equipment in place.
   (b) Heavy service - semi-annually, with equipment in place unless external conditions indicate need for disassembly.
   (c) Severe service - quarterly with equipment in place unless external conditions indicate the need for disassembly. Detailed inspection may show the need for a non-destructive test.

Note: Hooks that do not meet manufacture or ASME B30.10 requirements should be removed from service. Hooks shall not be returned to service until approved by a qualified person.

FOR ADDITIONAL INFORMATION REFER TO ASME B30.10 AND OSHA 1910.179 OVERHEAD GANTRY CRANES
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