

Safe Rigging Practices

Know How to Do It Right!
Then Do It Right!

Job Site Considerations

The handling, setting and erection of materials and equipment is a hazardous occupation. Each operation presents its own peculiar problems and no two jobs are alike. With proper consideration taken, each job can be performed free of bodily harm to the employee and without damage to the equipment.

Job Site Considerations

The person **authorized** and **qualified** to do rigging must always pay close attention to details. One careless moment or act can result in serious injury or death and tremendous property damage. *Proper rigging is an art and should never be left to the inexperienced.* If you don't know how to do it properly, then don't attempt it.

Job Site Considerations

Persons performing rigging tasks usually already have two strikes against them when they start!

1. Unfavorable Job conditions.
2. Job Schedule to meet.



Rigging Selection

Very rarely does the average worker on a construction site get the opportunity to actually pick the rigging. It is normally purchased by a supervisor, the Company Purchasing Department or it is sent out from another project. This in itself can create serious problems.

Rigging Selection

The rigging capacity and the material to be lifted must match. Using too small capacity rigging or components is just asking for an accident to happen.

- 1. Who is responsible (competent/qualified) for the rigging?**
 - a. Communications Established?

Rigging Selection

2. **Is the Equipment in Acceptable Condition?**
 - a. Appropriate Type?
 - b. Proper Identification?
 - C. Properly Inspected?

Rigging Selection

3. Are the Working Load Limits Adequate?

- a. What is the weight of the load?
- b. Where is the center of gravity?
- c. What is the sling angle?
- d. Will there be side loading?
- e. Capacity of the gear?

Rigging Selection

4. Will the Load be Under Control?

- a. Tag Line available?
- b. Is there any possibility of fouling?
- c. Clear of Personnel?

Rigging Selection

5. Are there any Unusual Loading or Environmental Conditions?

a. Wind?

b. Temperature?

c. Surfaces?(Ice, Suction, Water)

d. Unstable Object(s)?

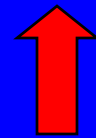
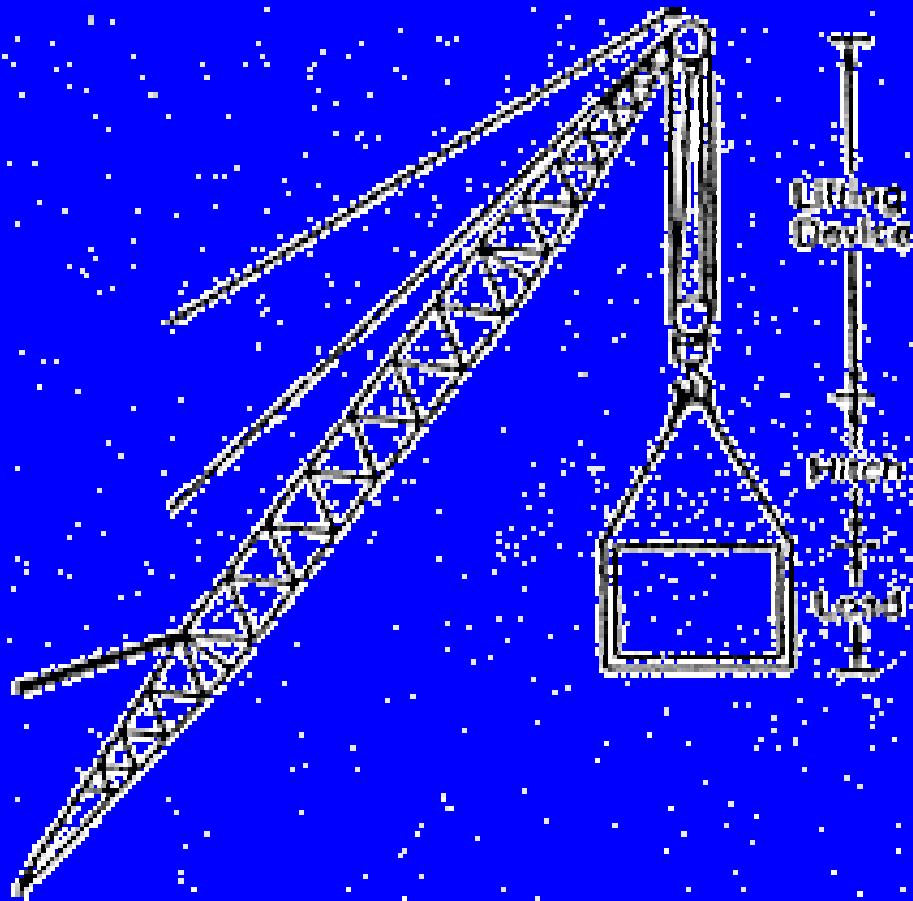
The Users Responsibilities



WARNING

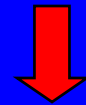
Can fail if damaged, misused, or overloaded. Inspect before use. Use only if trained. Observe rated capacity. **DEATH** or **INJURY** can occur from improper use or maintenance.

The Users Responsibilities



**Crane
Operator**

Rigger



The Users Responsibilities

Utilize Appropriate Rigging Gear Suitable For Overhead Lifting.

Utilize The Rigging Gear Within Industry Standards And The Manufacturers Recommendations.

Conduct Regular Inspection And Maintenance Of The Rigging Gear.

Basic Sling Operating Practices (ANSI 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 with knots or bolts or other makeshift devices.

Basic Sling Operating Practices (ANSI B30.9)

3. Sling legs shall not be kinked.
4. Slings shall not be loaded in excess of their rated capacity.
5. Slings used in a Basket Hitch shall have the load balanced to prevent slippage.
6. Slings shall be securely attached to the load.

Basic Sling Operating Practices (ANSI B30.9)

7. Slings shall be padded or protected from the sharp edges of their loads.
8. Suspended loads shall be kept free of obstructions.
9. All employees shall be kept clear of loads about to be lifted and of suspended loads.

Basic Sling Operating Practices (ANSI B30.9)

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 is prohibited.
12. A sling shall not be pulled from under a load when the load is resting on the sling.

Basic Sling Operating Practices (ANSI B30.9)

INSPECTION

Each day before being used, the sling and all fastenings and attachments shall be inspected for damage and defects by a ***competent person designated by the employer***. Additional inspections shall be performed during sling use as ***often as necessary*** to assure the safety of the operation.

Basic Sling Operating Practices (ANSI B30.9)

REPLACEMENT

Severe localized Abrasion or Scraping.

Ten Randomly Distributed Broken Wires in one Rope Lay, or Five Broken Wires in One Rope Strand in One Rope Lay.

Evidence of Heat Damage. (Cut with a Torch)

Basic Sling Operating Practices (ANSI B30.9)

REPLACEMENT

Kinking, Crushing, Birdcaging, or Any Damage Resulting in Distortion of the Rope Structure.

Damaged, Distorted or Field Welded Hooks.

Damaged or Worn End Attachments.

If In Doubt, Don't Use It!

Definitions

Balanced – load equally distributed on each side of the point of support.

Breaking strength – the approximate point, when under maximum load, the load handling device fails.

Definitions

Balanced – load equally distributed on each side of the point of support.

Bridle sling – A sling composed of multiple legs gathered in a fitting that goes over the lifting hook.

Competent person – selected or assigned by the employer as being qualified to perform a specific job.

Factor of safety – ratio of breaking strength to the force to be applied.

Definitions

Hitch “Basket” - loading with the sling passed under the load and both ends on the hook or a single master link.



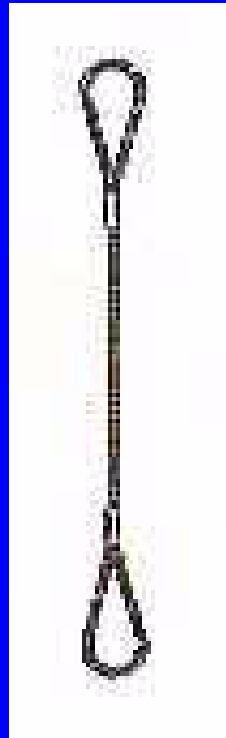
Definitions

Hitch “Choker” – loading with the sling passed through one eye and suspended by the other.



Definitions

Hitch “Vertical” – loading with the the load suspended vertically on a single part or leg of the sling.



Definitions

Master link – a steel link or ring used to support all legs of a chain or wire rope sling.



Mousing – lashing between the neck and the tip of a hook to prevent the load coming off.

Rated capacity – the maximum allowable working load.

Definitions

Rigging – the connecting of a load to a source of power so that it can be lifted and moved safely and predictably.

Safe working load – the maximum allowable working load established by the manufacturer.

Sheave – a wheel with a grooved circumference over which a rope is bent.

Definitions

Wire rope – consists of many individual wires laid into a number of strands which are in turn, laid around a center core.

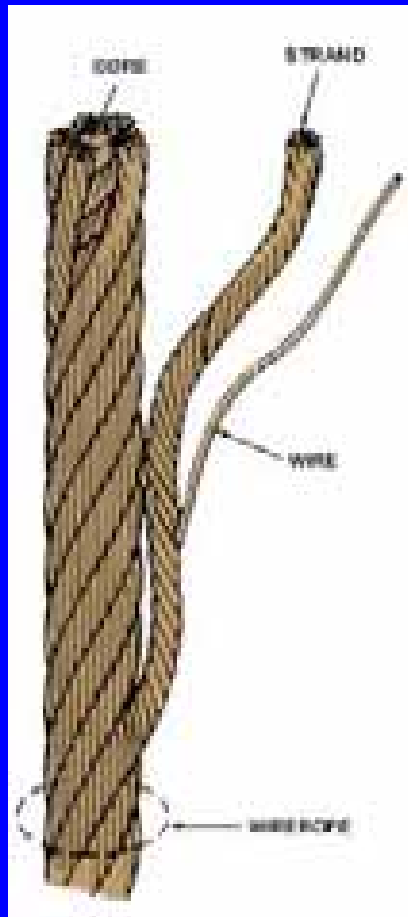


Safety Factors

To guard against failure of a wire rope in service, the actual load on the rope should only be a fraction of the breaking strength.

The safety factor includes reduced capacity of the rope below its stated breaking strength due to wear, fatigue, corrosion, abuse, and variations in size and quality.

Wire Rope Construction



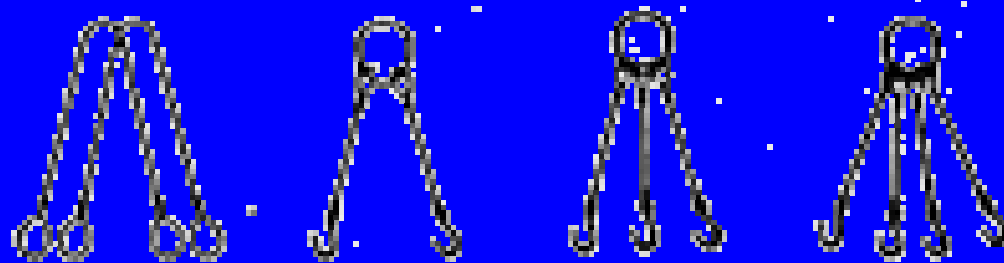
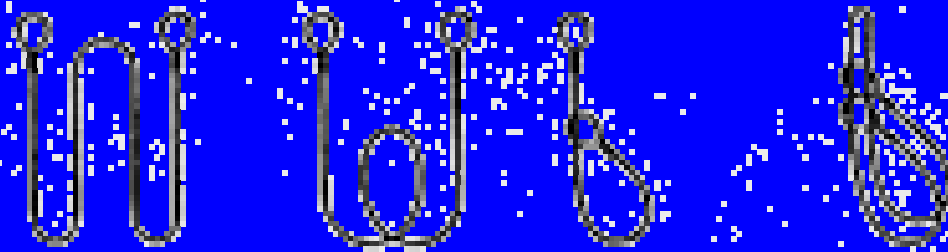
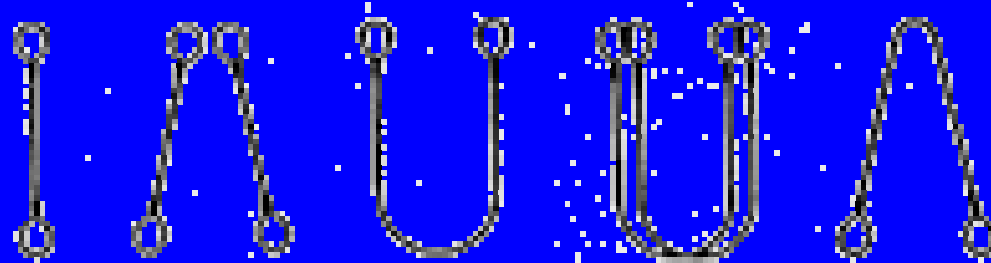
Wire Rope Capacities

SLING CAPACITY DECREASES AS THE ANGLE INCREASES.



A sling capable of lifting 1000 lbs. in a 30 degree vertical basket hitch, can only lift 866 lbs. at a 30 degree angle, 707 lbs. at a 45 degree angle, and 500 lbs. at a 60 degree angle.

Types of Wire Wire Rope Slings

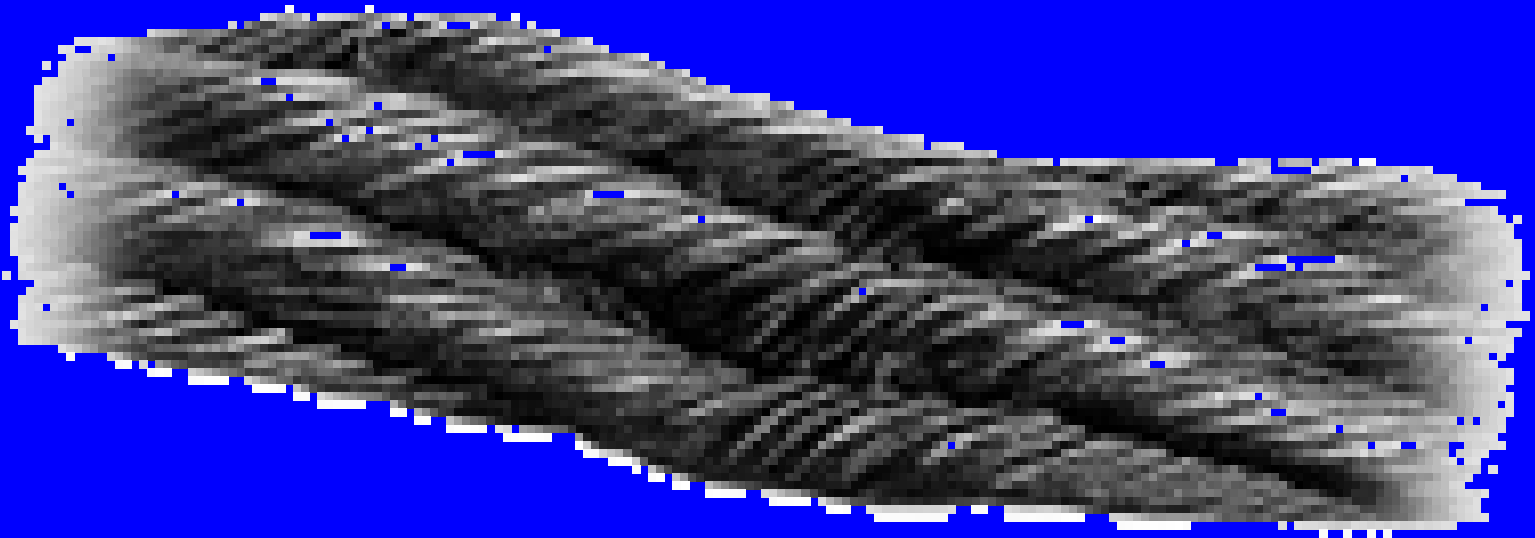


Type of Wire Wire Rope Sling Damage



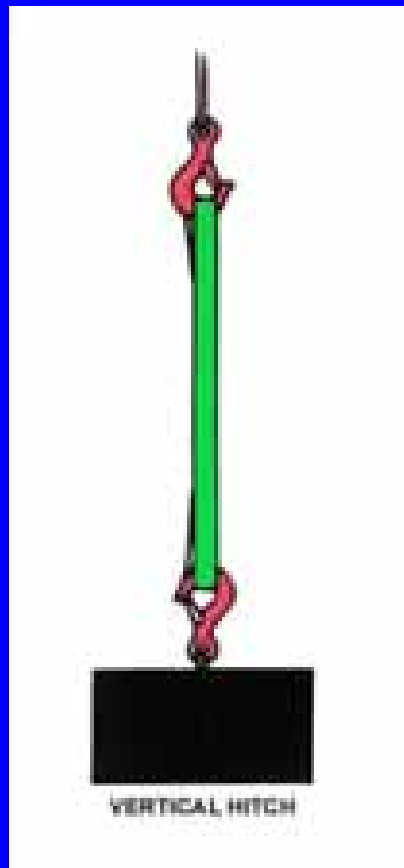
Birdcage damage

Type of Wire Wire Rope Sling Damage



Damage as a result of a kink in
the wire rope

Synthetic Slings



Synthetic Slings

Sling capacity varies from manufacturer to manufacturer, no set standard like wire rope has.

User must look at Individual Sling Capacity Tag to determine Safe Lifting Capacity of that sling.

If the Tag is not readable or is missing, **Do not use it!**

Inspect sling before each days use, and as often as necessary during the day to assure safety of sling!

Sharp edges can slice a sling in two without warning as the load is tensioned. Use softeners or padding on corners.

Chain Slings

Only **Grade 8** or better **ALLOY** Chain can be used for overhead lifting purposes! All chain is not rated the same!

Chain must have a capacity tag attached to it.

Chains will withstand more rough handling and abuse, but a chain with the same rated lifting capacity of wire rope will be much larger in diameter and heavier in weight.

Chains must be inspected daily before use and as often as necessary during use to assure safety.

It is the riggers responsibility to do the inspections!

Rigging Protection From Cutting or Slipping

Softeners, padding or use of blocking..

Protecting Rigging From Damage or Environment

Rigging components are expensive to buy and to replace!

Use them properly and store them properly!

Keep wire rope slings lubricated and all rigging stored out of the weather.

Treat the rigging as though your life depended on it!

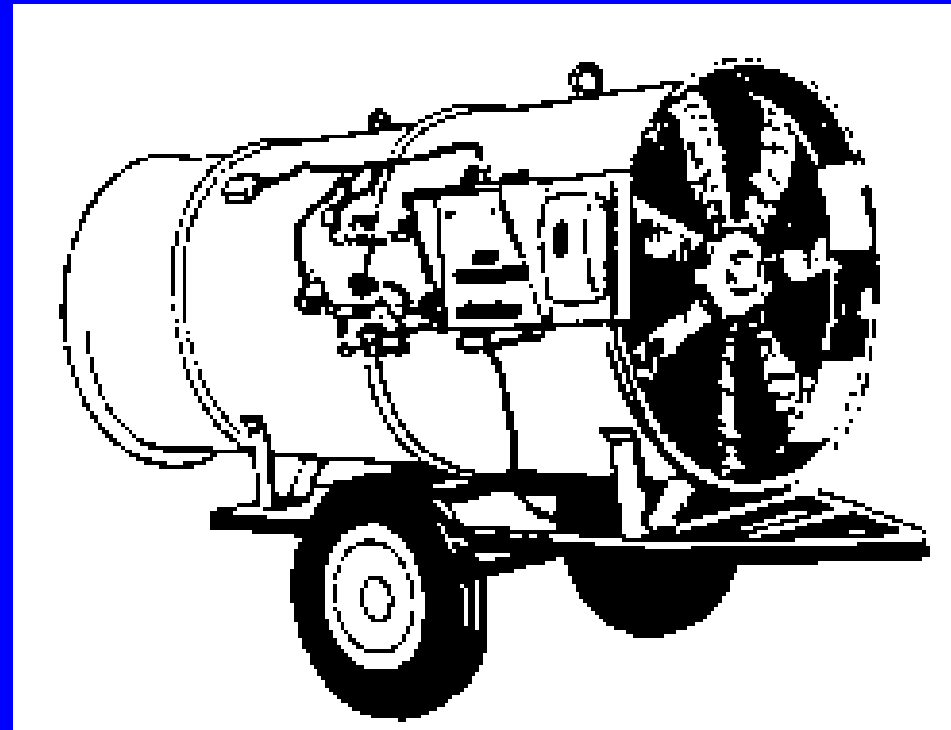
Because it does if it fails!

Don't use makeshift rigging or attempt to repair any rigging components.

Knots tied in rigging reduces the strength by 50% or more!

How Would You Rig This?

What would you need in the way of rigging materials?



How Would You Rig This?

What would you need in the way of rigging materials?



How Would You Rig This?

Would it matter if the tank were full or empty?



Removing Jewelry and Wearing Gloves!

Cause?

Not wearing gloves and not taking off the ring.

