

## RIGGING AND HOISTING PART 2

### Rigging a Load

Perform the following when rigging a load:

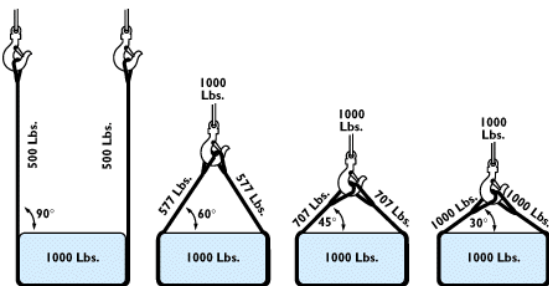
- ✚ Determine the weight of the load. **DO NOT GUESS.**
- ✚ Determine the proper size for slings and components. Look for a permanently attached identification tag on each sling stating the size, grade, rated capacity and the name of the sling manufacturer. If the identification is not attached, take the defective equipment out of service.
- ✚ Make sure that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
- ✚ Make sure that ordinary (shoulder less) eye bolts are threaded in at least 1.5 times the bolt diameter.
- ✚ Use safety hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
- ✚ Use wear pads to protect slings from sharp edges. Remember that machinery foundations or angle-iron edges may not feel sharp to the touch, but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding.
- ✚ Verify that each sling is capable of supporting the load based on the projected horizontal angle of the sling during the lift.
- ✚ Calculate the sling tension before the lift to ensure that it can support the load.
- ✚ Determine the center of gravity and balance the load before moving the load. Initially lift the load only a few inches to test the rigging and balance.
- ✚ Tag lines **SHALL** be used as required to prevent the load from swinging during the lift.

### How Angles Effect Sling Stress

As the angle between the legs of the sling increase, the load each leg has to lift increases. This applies to a single sling used in a basket hitch as well as a multi-leg sling or bridle.

1. First, divide the total load to be lifted by the number of legs to be used. This provides the load per leg if the lift were being made with all the legs lifting vertically.
2. Determine the angle between the legs of the sling and the vertical.
3. Then MULTIPLY the load per leg by the Load Factor for the leg angle being used (from the table at the right) to compute the ACTUAL LOAD on each leg for this lift and angle. **NOTE: THE ACTUAL LOAD MUST NOT EXCEED THE RATED SLING CAPACITY.**
4. Example: In the drawing below (sling angle of 45 degrees):  $1000 \div 2 = 500$  (Load Per Leg if a vertical lift)  $500 \times 1.414 = 707$  lbs. = ACTUAL LOAD on each leg at the 45-degree horizontal angle being used.

It is critical therefore, that rated capacities be reduced to account for sling angles. Angles less than 45 degrees are not recommended and those below 30 degrees should be avoided whenever possible. Use the formula and chart shown below to calculate the reduction in rated capacities caused by various sling angles.



Sling Angles in Degrees	Factor	Sling Angles in Degrees	Factor
15	.259	55	.819
20	.342	60	.866
25	.423	65	.906
30	.500	70	.940
35	.574	75	.966
40	.643	80	.985
45	.707	85	.996
50	.766	90	1.000



Meeting Date: \_\_\_\_\_  
Supervisor: \_\_\_\_\_

Trainer: \_\_\_\_\_  
Location: \_\_\_\_\_

**Attendees: (Please print clearly)**


## RIGGING AND HOISTING PART 2 QUIZ

1. Always determine the weight of the load. **DO NOT GUESS.** True or False? \_\_\_\_\_
2. If a rigging strap does not have a capacity label it must be taken out of service. True or False? \_\_\_\_\_
3. Make sure that ordinary (shoulder less) eye bolts are threaded in at least 1.5 times the bolt diameter. True or False? \_\_\_\_\_
4. You do not have to calculate the sling tension before a lift. True or False? \_\_\_\_\_
5. Determine the proper size for slings and components. Look for a permanently attached identification tag on each sling stating:
  - A. Name of the sling manufacturer & the size
  - B. Grade
  - C. Rated capacity
  - D. All of the above
 \_\_\_\_\_
6. It doesn't matter where the center of gravity is on a load when rigging or lifting. True or False? \_\_\_\_\_
7. Tag lines **SHALL** be used as required to prevent the load from swinging during the lift. True or False? \_\_\_\_\_

Using the chart below, answer these questions:

	Types I, II, III, and IV							Type V
	Single-Leg - Hitch Type			Two Leg - Horizontal Angles				Endless Vertical
Width, in.	Vertical	Choker	Vertical Basket	Vertical	60°	45°	30°	
1	1,100	880	2,200	2,200	1,900	1,600	1,100	2,200
1 1/2	1,600	1,280	3,200	3,200	2,800	2,300	1,600	3,200
1 3/4	1,900	1,520	3,800	3,800	3,300	2,700	1,900	3,800
2	2,200	1,760	4,400	4,400	3,800	3,100	2,200	4,400
3	3,300	2,640	6,600	6,600	5,700	4,700	3,300	6,600
4	4,400	3,520	8,800	8,800	7,600	6,200	4,400	8,800
5	5,500	4,400	11,000	11,000	9,500	7,800	5,500	11,000
6	6,600	5,280	13,200	13,200	11,400	9,300	6,600	13,200

8. How much weight will a 2-inch Type III sling lift when used as a choker?
  - A. 1,760 #
  - B. 2,200 #
  - C. 4,400 #
 \_\_\_\_\_
9. The same sling lift used as a vertical basket will lift 4,400 #. True or False? \_\_\_\_\_
10. A Type III 5 inch sling would be able to perform a two leg 45° lift weighing 7,800 pounds. True or False? \_\_\_\_\_

**Printed Name:** \_\_\_\_\_ **Trained by:** \_\_\_\_\_

**Signature:** \_\_\_\_\_ **Trained by Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Location:** \_\_\_\_\_