Never use any kind of clip to directly connect two straight lengths of wire rope to form a continuous piece.

Do not make up slings for lifting using clips. It is good rigging practice to use factory made slings for lifting.

When clips are attached, they should be tightened according to torque values provided in the manufacturer's tables. The torque values are for clean, dry, and unlubricated threads. After the assembly is loaded, the torque values should be checked and the clips retightened as necessary; the wire rope will stretch some when initially loaded. Clip assemblies should be periodically inspected and retorqued to specification. The clip size must always correspond to the wire rope size. For example, a 1/2- inch clip is used with an 1⁄2- inch wire rope.

Note: Clips are not designed to be used with plastic coated wire rope.

Installing U-Bolt Clips

Clips must be installed in accordance with the procedure shown below. The turn back, the number of clips, and torque values are taken from manufacturers' tables similar to the table on page 2.20 in Figure 2.31.

Step 1

1. Select the proper size thimble and clips for the wire rope being terminated. Always use the same size clip as the wire rope diameter. If the saddle of the clip has grooves, they must correspond to the lay of the wire rope. Turn back the specified length of wire rope for the size wire rope being used. (Check the manufacturer's table.) Apply the first clip one base width (of the clip) from the dead end of the wire rope. The saddle of the clip must always contact the live end side; the U-bolt must contact the dead end side. Lightly finger tighten nuts to hold the clip in position.

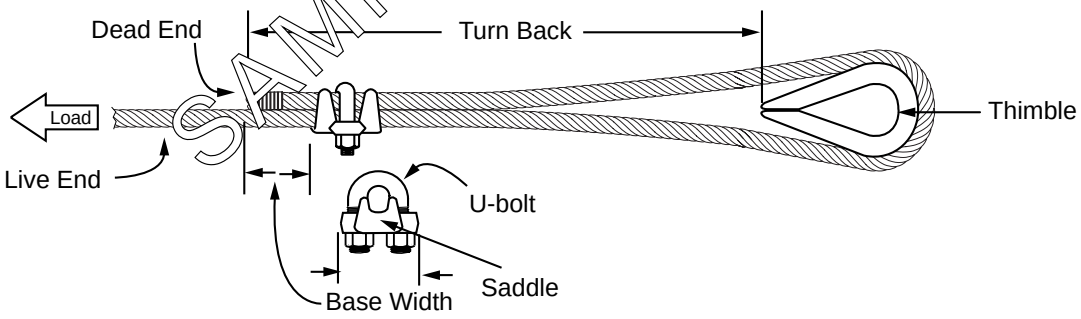


Figure 2.28

Step 2

2. Apply the second clip as close to the loop or thimble as possible. Take up any slack in the wire rope and lightly finger tighten the second clip nuts to hold it in place.

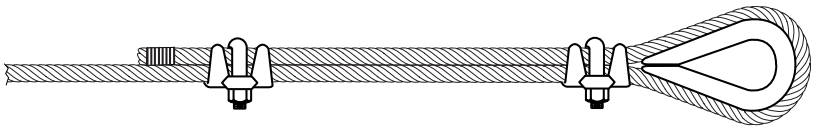


Figure 2.29

If only two clips are required, proceed to Step 4.

Step 3

3. If additional clips are called for in the reference table, space them equally between the first and second clips. Lightly finger tighten each clip as it is positioned. Be sure there is no slack rope between any of the clips.

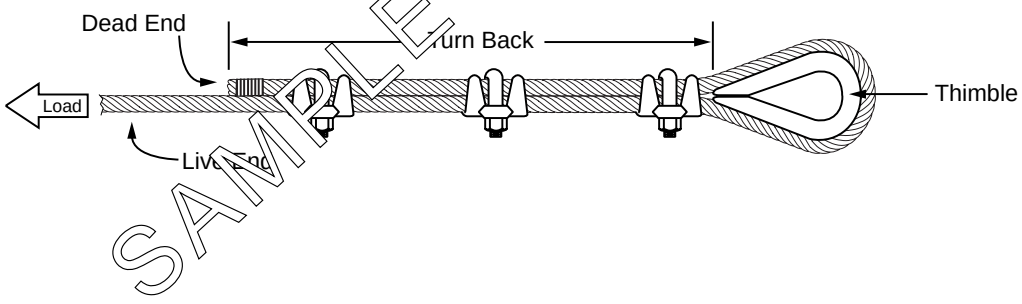


Figure 2.30

Step 4

4. Tighten the nuts equally on each clip to the torque specification from the table. Apply a load to test the assembly. The load should be a weight equal to the maximum expected load when in use. After the test load, the clip nuts should be retorqued to specification; the wire rope will stretch some during initial loading.

Basket Hitch

To form a basket hitch,

1. Pass one end of a sling around a load.
2. Connect each end of the sling to a shackle, both of which are attached the rigging system.

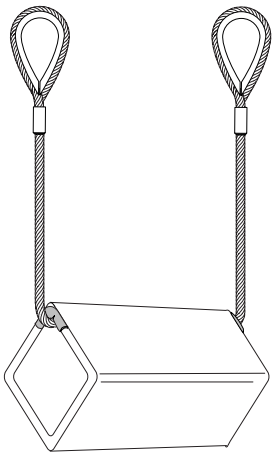


Figure 3.22

This hitch results in two hitch legs, each consisting of an eye and a length of the sling. In a proper basket hitch, these legs must be parallel to each other, so there is a perpendicular drop to the load. See Figure 3.22.

The basket hitch load must be balanced to prevent the load from turning or sliding along the sling, which could damage the load and the sling.

When a sling is used as a basket hitch, it has almost twice the safe working load it has when used as a single part hitch. The manufacturers' tables will give a safe working load for a sling when it is used in a basket hitch.

If both ends of the sling are brought together at an angle (see Figure 3.23), it is not a true vertical basket hitch. The legs are no longer parallel, and the sling's lifting capacity is significantly reduced.

When lifting at an angle, the stress on a sling is more than the weight of the load—just as the man in the drawing below experiences more stress on his arms when holding the buckets out from his side at an angle than when holding the same buckets straight down. Section 8 discusses how to determine the stress on a sling when it is used at an angle to lift a load.

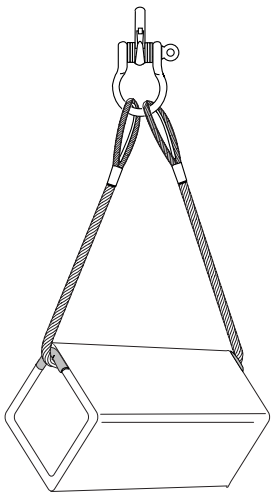
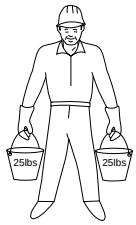
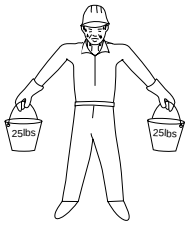


Figure 3.23

This arrangement is <u>not</u> a true vertical basket hitch.



Easier



More difficult

Variations

Other commonly used hitches are variations or combinations of the three basic hitches. In addition to the examples shown below, special hitch configurations are manufactured to fill specific needs.

Bridle Hitch

In a bridle hitch assembly, two, three, or four single part slings are used together to hoist an object. See Figure 3.24. The legs (slings) can be attached with a wide variety of end fitting.

The bridle hitch provides good stability when the weight of the load is equally distributed.

With a bridle hitch, the weight does not produce a straight downward pull on the sling. Because the slings are used at an angle, **the weight that can be safely lifted in a bridle hitch assembly is less than the weight that can be safely lifted in a vertical pull.** For sling size selection, the load on the sling must be calculated using the angle the sling forms to the vertical. How to make these calculations is covered in Section 8.

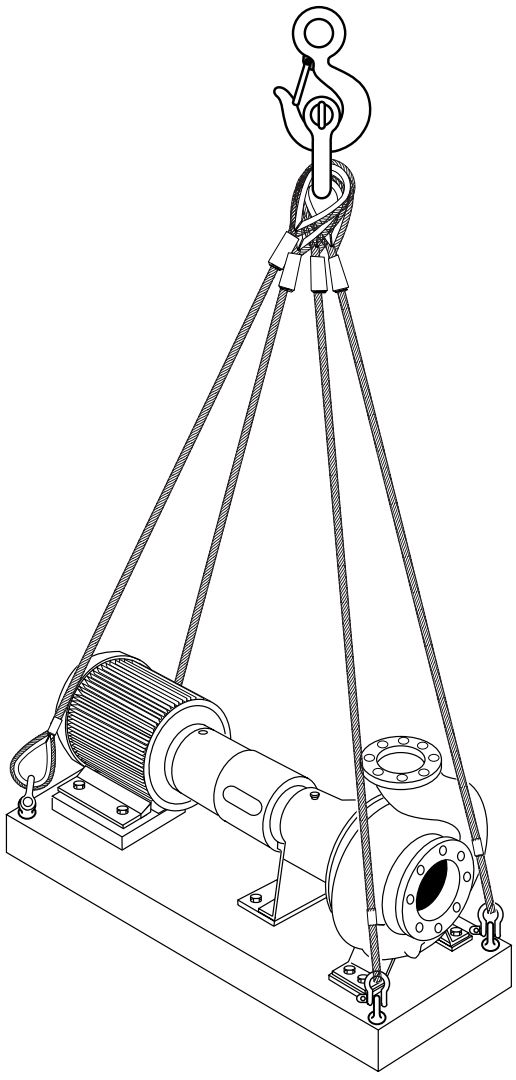


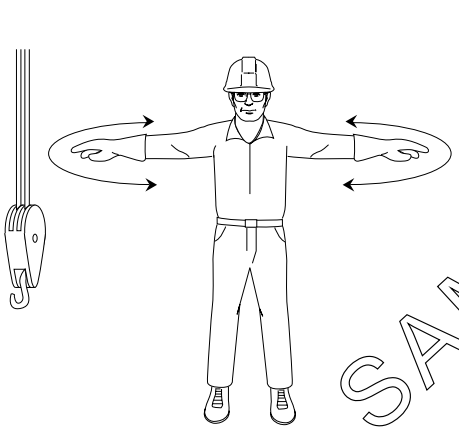
Figure 3.24

Caution

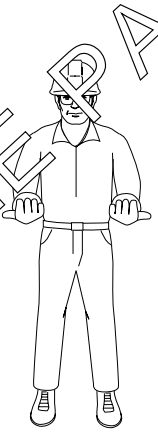
It is possible for the load in a three- or four-leg bridle hitch to shift during movement such that the entire load is supported by only two legs.

7.21
Match the hand signals below with the message they convey. Some messages will not have a match.

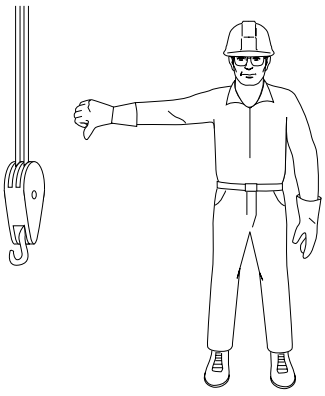
a. Emergency stop
b. Move slowly
c. Lower boom
d. Raise boom
e. Dog everything
f. Retract boom
g. Extend boom
h. Travel
i. Stop
j. Hoist



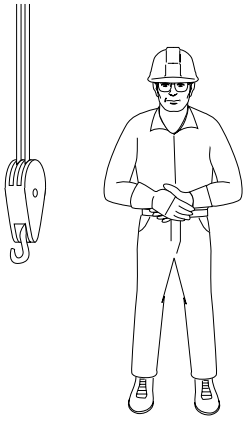
____



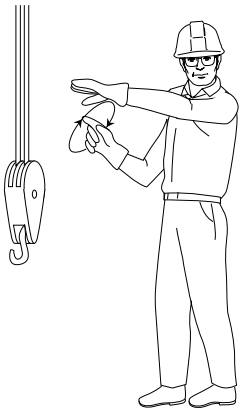
____



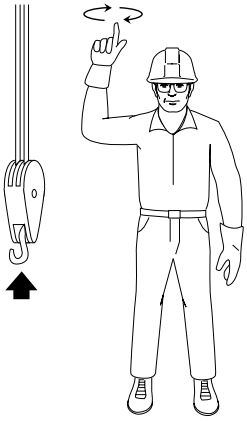
____



____



____



____

Figure 8.3 shows the same arrange-

Figure 8.3 shows the same arrangement with the center of gravity off-center. In this case, the sling on the left carries 1,000 pounds or two thirds of the load, and the sling on the right carries 500 pounds or one third of the load.

The load on rigging hardware is not only a result of how many sling legs share the load but how the weight is distributed. Section 6, pages 6.13-6.26 disucss how shared load can be determined.

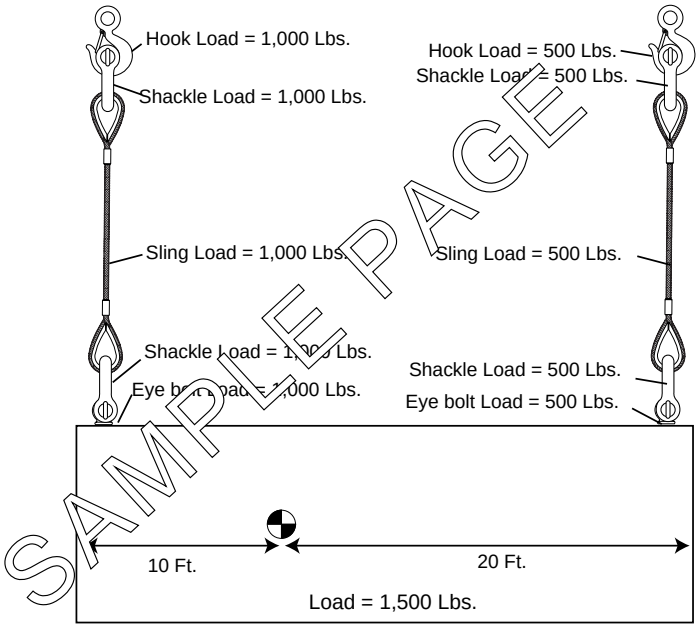


Figure 8.3

On a hitch with more than three legs, each leg should be sized as if there were only two legs. When lifting with bridles or other hitch configurations with more than three legs, it is **often and mistakenly** assumed that each leg of the bridle will support its share of the load at all times. In actual practice, as the load is lifted and moved, small differences in dimensions of one or more legs may cause the weight distribution to shift. The result is that two slings carry all or most of the weight while the other slings balance the load.

For example, with a four-leg bridle sling, it is possible for one leg to be slightly longer than the others which shifts most of the load on the opposite two diagonal legs. It is impossible to know which legs are carrying the load at any time. Therefore, **the load for each leg of a four- or more-leg bridle should always be sized as if the bridle has only <u>two</u> legs**.