How sling angles affect lifting capacity

Remember this saying:

“As sling angles decrease, the sling stress increases.”

This means that as the horizontal angle between the sling legs decrease, the load on each sling leg increases. The stress is the same whether a sling is used in the basket hitch or 2 slings are used, as with a 2-legged bridle hitch. Look at the angle of the sling legs in the example below:

Imagine that your arms are holding a 5-pound load in each hand at these exact angles. Which angle would be the most comfortable and allow you to hold that weight capacity for the longest period of time? The stresses that you feel on your arms and shoulders are the same stresses that the sling feels. Keep those angles and that stress in mind when you’re attaching a load to any lifting equipment – mobile or stationary.

An easy way to determine the actual stress on a sling is by using the Two-Legged Bridle Hitch calculation.

- Divide the Length of the sling by the Height of the hook from the top of the load.
- Multiply that number by the weight of the load divided in half and the result will be the stress on each leg (L/H x W/2).
- If using a 3 or 4-Legged Bridle Hitch, divide the weight by 3. The 4th leg doesn’t bear any weight; it’s for balance only. Lengthening the sling legs will also increase the sling angle.

For quick figuring in the shop:
- A 60-degree leg angle causes a loss in lifting capacity of 15%
- A 45-degree leg reduces capacity by 30%
- A 30-degree leg causes a loss of 50% in lifting capacity