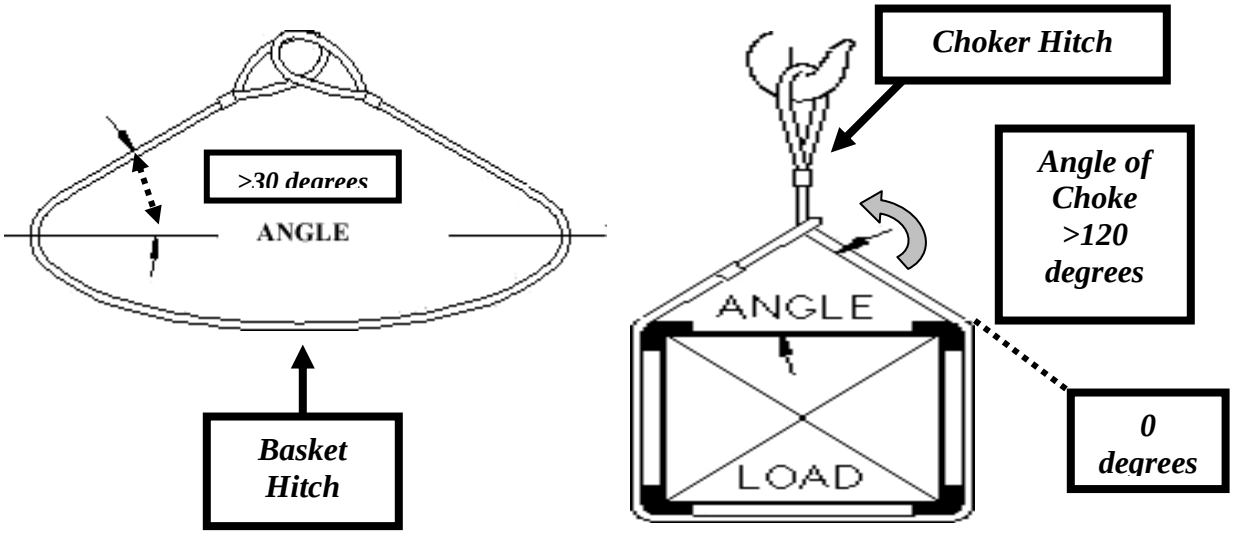
SYNTHETIC SLINGS

Slings may be constructed of synthetic fibers such as nylon, polyester, or other high performance fibers. They may be flat or round. The two most common types using in rescue/recovery are the Single Leg Sling, and the Spliced Endless Sling. The Single Leg Sling may be constructed in the Eye and Eye, Twisted Eye, or Folded Eye form. Generally synthetic slings are lighter in weight, more flexible, stronger, and less expensive than chain slings. These slings have the advantage of spreading the load out over a greater area as opposed to chain slings. Some slings have inspection devices built into them, such as colored fibers or fiber optic cables.

Disadvantages of synthetic slings includes stretch, tearing or cutting of the material, degradation caused by exposure to sun, heat, cold, or chemicals.



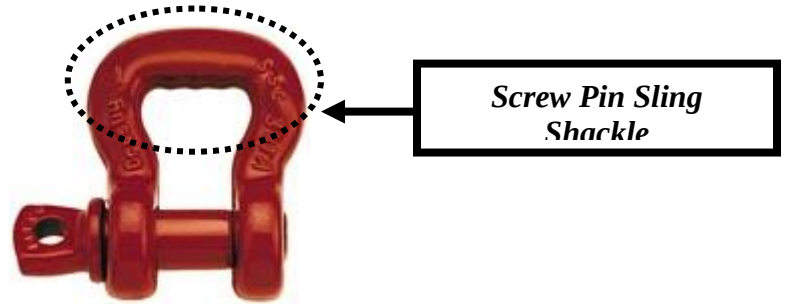
HITCHES-

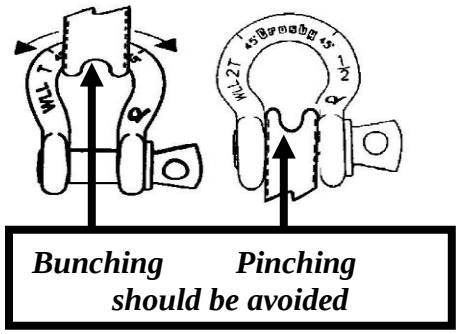
Basically three types of hitches are formed with synthetic slings. They are: Vertical Hitch, Basket Hitch, and Choker Hitch. Vertical and basket hitches are commonly used for flat stock materials that can be stacked. The Vertical Hitch supports the entire load on a single leg. The Basket Hitch has twice the capacity of a single leg if the legs are vertical. Choker hitches are used primarily for round stock, where gripping the load is important for load control. The capacity of a Choker Hitch is based on the hitch being formed properly. For full Choker Hitch capacity, the Angle of Choke for all types of slings should be a minimum of 120 degrees. According to the Web Sling & Tie Down Association, synthetic slings have a reduction of up to 25% at an Angle of Choke greater than or equal to 120 degrees (75% of WLL for a single leg hitch). If the Angle of Choke is less than 120 degrees the sling capacity will decrease even more.

The angle of the sling leg to the load, known as the Horizontal Sling Angle must not be less than 30 degrees. Tension (load) increases as the angle between the sling leg and load decreases. Generally the longest sling practical should be used within overhead lifting clearance. Rigging close to the load with a choker hitch increases sling leg tension.

BASKET RIGGING HITCHES
For
Wire Rope, Synthetic Slings, and Chain

Horizontal Angle	*Strength Relative to Single Leg Hitch*
90 degrees to load	2X (200%)
60 degrees to load	1.7X (170%)
45 degrees to load	1.4X (140%)
30 degrees to load	1X (100%)





SLING INSPECTION-

1. All slings must be inspected according to all applicable Federal and State OSHA rules and regulations, and any other applicable rules and regulations. All inspections must be documented.
2. Visually check for signs of deterioration, wear, physical, thermal and chemical damage.
3. Closely check for any broken threads or strands, and replace according to manufacturers recommendations.
4. Ensure that the certification tag or label is present, clean, and legible.
5. Only the manufacturer must make repairs. After repair, slings must be proof tested and a certification label attached to the sling.
6. Closely check each sling for signs of ultra-violet degradation. These signs are: bleaching of color, increased stiffness of material, and surface abrasion in areas not normally in contact with the load.
7. Closely check the entire sling for embedded particles or snags.
8. Replace any sling failing inspection.

SLING USE-

1. Avoid dynamic loading any sling.
2. Always pad contact points of the sling and load. Protect the sling from sharp and abrasive edges, or hot surfaces.
3. Don't expose slings to excessive heat or cold temperatures.
4. Don't leave slings lying in the sun.
5. **NEVER exceed the WLL of a sling or any attachment**.
6. Make hitches correctly to prevent slipping.
7. Don't knot two slings to extend them, or tie a knot in a sling.
8. Avoid kinking or twisting of slings when in use or storage.
9. Store slings in a cool, dry, dark area.
10. Avoid pinching or bunching of a sling in an attachment.
11. A sling eye of either synthetics or wire rope must not be placed over an object (usually a hook or other collector) that is greater in width than 1/3 of the eye length.
12. When using multiple leg slings, the rated load for the single leg sling shall not be exceeded in any leg of the multiple leg slings.
13. When using slings with non-symmetrical loads, calculations should be performed to prevent overloading any leg. When the COG is not equally spaced between the pick points the slings will not carry an equal share of the load. The sling connected closet to the COG in the same horizontal plane will carry a greater share of the load.
14. No one should stand under a freely suspended load, nor should they stand in-line or next to a sling that is under tension. Do not place any body part between the sling and the load, or between the sling and hook.
15. Slings should not be pulled from under a load when the load is resting on the sling. Do not drag a sling over a surface.
16. Loads should be rigged to the Center of Gravity (COG). A load properly rigged will lift level, otherwise the load will shift.

17. For more contact with the load use a double wrap basket hitch. Make certain the double wrap basket doesn't overlap at the bottom of the load. Adjust the double wrap basket hitch to equalize the load in each side of the basket.
18. A double wrap choker hitch must not be used with less than a 60 degree horizontal sling angle. Smaller angles will cause the slings to slide inward.
19. The maximum included angle when slings are collected in a hook is 90 degrees. When slings are collected in a shackle bow the maximum included angle is 120 degrees.
20. The minimum horizontal sling angle is 45 degrees if slings are placed into a hook. The minimum horizontal sling angle is 60 degrees if using a choker or basket hitch. The fittings at the load connection see the same load as the sling itself.
21. Do not use a sling that appears damaged.

REMOVAL OF SLINGS FROM SERVICE

A synthetic sling shall be removed from service if any of the following are present:

1. Holes, tears, cuts, embedded particles, or abrasive wear that exposes core fibers.
2. If the rated sling capacity tag is missing or not readable.
3. If the sling has been tied into a knot.
4. Melting, charring, or weld spatter is visible on any part of the sling.
5. Chemical burns or degradation is seen on any part of the sling.
6. Broken or worn stitching on the cover that exposes the core fiber.
7. Distortion, excessive pitting, corrosion, rusting, or other damage to a fitting attached to the sling.
8. Any condition that creates doubt as to the integrity or strength of the sling.

INSPECTION OF SLINGS

Initial Inspection-

Before any new or repaired sling is placed into service, it shall be inspected by a designated person to ensure the correct sling is being used, as well to determine the sling meets applicable specs and has not been previously damaged.

Frequent Inspection-

The inspection made by the user handling the sling each time it is used.

Periodic Inspection-

This inspection shall be conducted by a designated person. The specific frequency of inspection should be based upon:

1. Frequency of sling use
2. Severity of service conditions
3. Experience gained on the service life of slings used in similar applications
4. Periodic inspections should be conducted no less than annually

BASKET RIGGING HITCHES
For
Wire Rope, Synthetic Slings, and Chain

Horizontal Angle	*Strength Relative to Single Leg Hitch*	*Factor*
90 degrees to load	2X (200%)	1.00
60 degrees to load	1.7X (170%)	.866
45 degrees to load	1.4X (140%)	.707
30 degrees to load	1X (100%)	.500

Recommended Minimum
Connecting Hardware Diameter

Sling Size- Vertical Capacity	*Vertical (single leg) Hitch*	*Basket Hitch*
2,600	.50	.62
5,300	.62	.88
8,400	.75	1.00
10,600	.88	1.25
13,200	1.00	1.38
16,800	1.12	1.62
21,200	1.25	1.75
25,000	1.25	1.88
31,000	1.50	2.00
40,000	1.62	2.38
53,000	1.88	2.75

THE RIGGING TRIANGLE