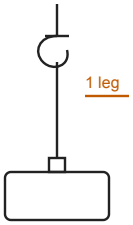
CREWFORGE · RIGGING

Hitches: summary sheet

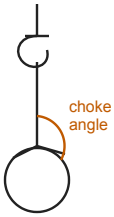
Vertical · choker · basket · sling angles · putting it together

Name: _____



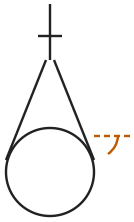
Vertical hitch

One leg straight from the hook to the load. That leg carries **the whole load**.
Use the tag's **vertical** rating.
`leg pull = W`
Eye in the **bottom of the hook bowl**, latch shut. Never on the tip.



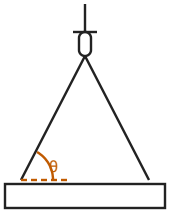
Choker hitch

The eye goes round the sling body and the choke cinches on the load.
Use the tag's **choker** rating, good at an angle of choke of **120° or more**.
Under 120°, apply the maker's cut (table on page 2). Never force a choke down. One choker only on a short load, over the centre of gravity; **long loads: two chokers**.



Basket hitch

Under the load, both ends on the hook: **two legs**.
`basket = 2 × vertical × sin angle`
Legs vertical: 2 × vertical. Legs at 60°: × 0.866. Round down as the maker's table does. Two baskets on long loads; protect the sling at edges.



Sling angles (bridle)

Measure the sling angle θ **from the horizontal**. Each leg pulls more than its share:
`T = (W ÷ 2) ÷ sin θ`
Check **each leg's pull against its own rating**. Never rig flatter than **30°**: the maker's tables stop there.

Sling angle factors

Sling angle θ (from horizontal)	90°	60°	45°	30°
sin θ (basket and bridle capacity factor)	1.000	0.866	0.707	0.500
1 ÷ sin θ (leg pull multiplier on W ÷ 2)	1.000	1.155	1.414	2.000
Example: 1,440 lb beam, two legs: each leg pulls	720 lb	831 lb	1,018 lb	1,440 lb

Worked example (page 5 of the lesson)

2,400 lb gearbox (maker's manual) · both housing lugs · 3/8 in Grade 80 chain, 7,100 lb a leg · 4 ft legs at 62° (sin 0.884)
Each leg: (2,400 ÷ 2) ÷ 0.884 = **1,358 lb** → 1,358 ÷ 7,100 = **19 %** of rating. Cover eyebolt: cover only.

Hitches: key numbers

Angle of choke: maker's cut to the choker rating

Synthetic web slings (Lift-All Table 4-2)

Angle of choke	% of choker rating
120° to 180°	100 %
105° to 119°	82 %
90° to 104°	71 %
60° to 89°	58 %
0° to 59°	50 %

Wire rope slings (KWRS table)

Angle of choke	% of choker rating
over 120°	100 %
90° to 120°	87 %
60° to 89°	74 %
30° to 59°	62 %
0° to 29°	49 %

Alloy chain uses its own rule (Crosby: choker 80 % of the vertical WLL, angle of choke 120° or more). Always use the table for the sling you have.

The slings in this lesson (maker's tags)

Sling	Vertical	Choker	Basket (vertical legs)	Design factor
1/2 in 6×19 IWRC EIPS wire rope, mechanical splice (KWRS Type 115)	5,000 lb	3,800 lb	10,200 lb	5 : 1
2 in 2-ply polyester web, eye and eye (Lift-All EE2-802)	6,400 lb	5,000 lb	12,800 lb	5 : 1
Purple polyester roundsling (Lift-All Tuflex EN30)	2,600 lb	2,100 lb	5,200 lb	5 : 1
3/8 in Grade 80 alloy chain, per leg (CM Herc-Alloy 800)	7,100 lb	see maker	n/a	4 : 1
5/8 in G-209 screw-pin anchor shackle (Crosby)	WLL 3-1/4 t (metric tonnes)			6 : 1

The design factor covers wear, shock and small errors. It is never spare capacity: a load over the tag is an overload, even if nothing breaks.

Plan every lift

1. **Weight**: from the nameplate, the maker's manual or the drawings. Know where the centre of gravity is.
2. **Lifting points**: the ones the maker rates for the whole unit (housing lugs, lifting eyes). Cover eyebolts lift covers only.
3. **Hitch and sling**: read the tag row for the hitch you use; apply the choke cut or the sling angle.
4. **Check each leg**: leg pull against that leg's rating. Hook over the centre of gravity. Eyes in the bowl, latches shut.
5. **Tag line on, everyone clear**, no one under the load. **Trial lift** a few inches; stop; check balance and rigging.

> This is exam prep, not a procedure. On the job, check the sling tag, the maker's data and your lift plan, and follow your province's OHS regulation (for example BC OHS Regulation Part 15, Ontario Reg. 851, Alberta OHS Code Part 6) and the employer's procedures.

Sources: KWRS Type 115 EIP IWRC mechanical spliced slings and "Wire rope slings: capacities & hitches" (choke table, 5:1, no angles under 30°); Lift-All web sling catalogue p. 21 (EE2-802) and Synthetic Web Sling Safety Bulletin Table 4-2; Lift-All Tuflex roundslings (EN30); Columbus McKinnon chain sling catalogue (Herc-Alloy 800, 4:1); Kito Crosby catalogue p. 24 (G-209) and p. 90 (S-319N hook); Crosby catalogue p. 390 (chain choker); ASME B30.9 (slings), cited by number. NPS pipe weights: ASME B36.10M. crewforge.ca