



Anchors and Anchoring

By

Mantus Anchors





MANTUS
ANCHORS

CONTENT

Define Need

Rode

Attachments

Anchors

Mantus





Be Prepared



DEFINE THE NEED

- LEISURE
- CRUISING
- STORM PREPARATION

DEFINE THE NEED

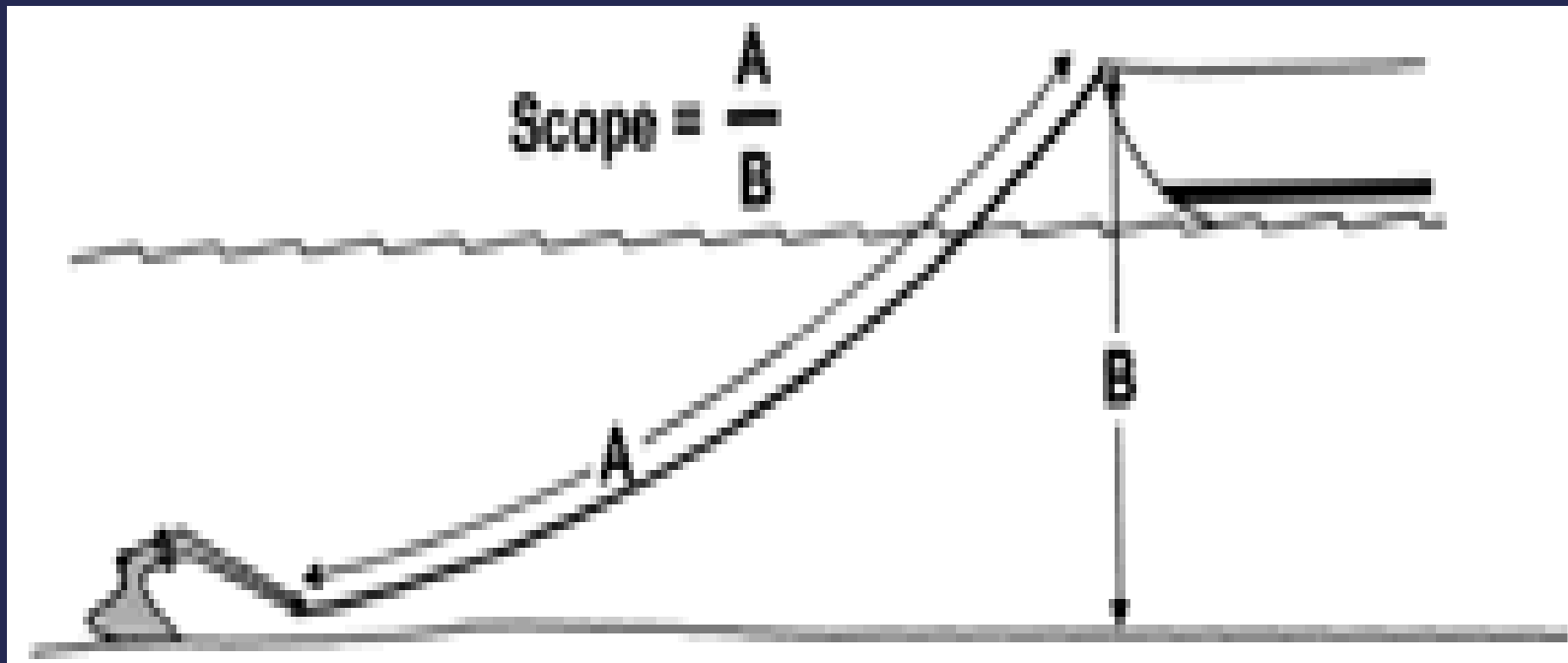
- **ABYC** — *Loads on Anchor Rode (Worst Possible situation, included dynamic loads due to waves and wind gusts)*

Wind Speed <i>(Knots)</i>	Anchor Name	Boat Length - Feet						
		20	25	30	35	40	50	60
15	Lunch Hook	90	125	175	225	300	400	500
30	Working	360	490	700	900	1,200	1,600	2,000
42	Storm	720	500	1,400	1,800	2,400	3,200	4,000
60	Violent Storm	1,440	980	2,800	3,600	4,800	6,400	8,000

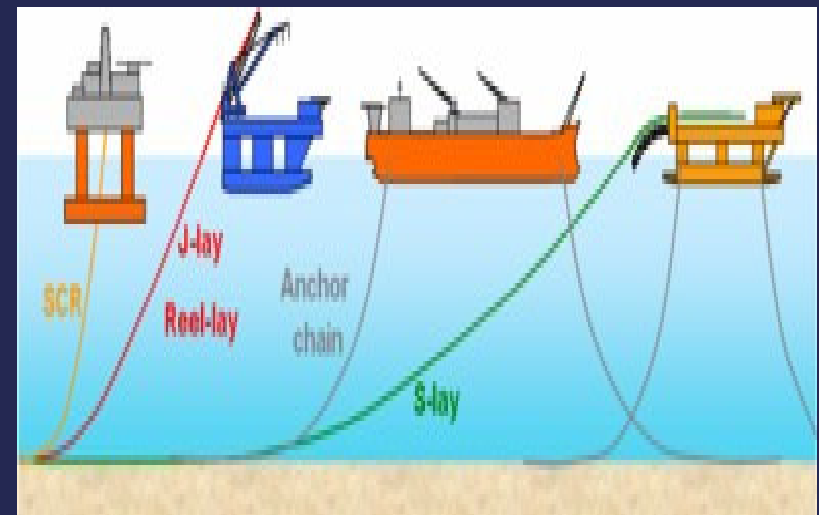
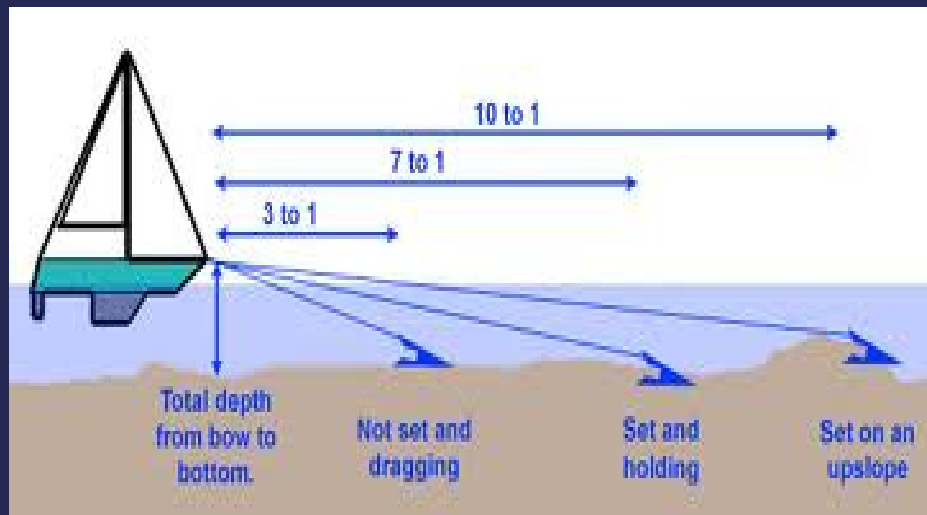
Rode

- Scope
- Line vs Chain Compromise
- Material
- Connections

Scope



RODE/SCOPE



WHAT LENGTH OF RODE?

Scope	% Max Hold Power	Deg
2/1	10 %	45
3/1	40%	19.5
4/1	55%	14
6/1	70%	9
8/1	80%	7
10/1	85%	5
20/1	89%	2.8

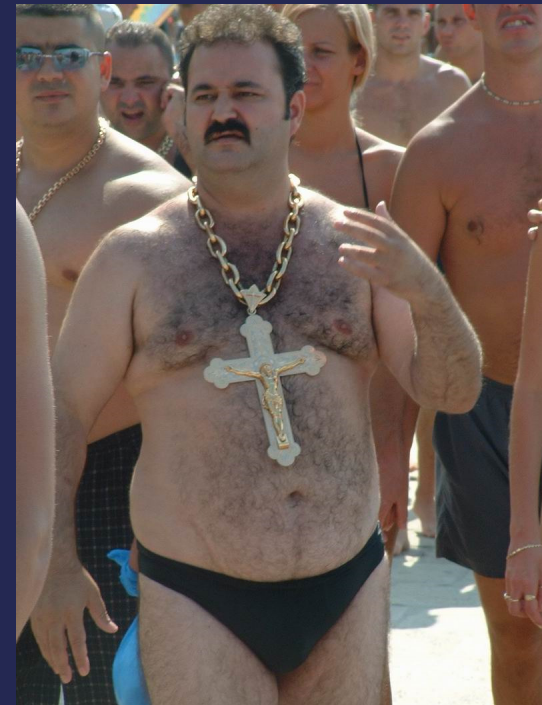
RODE

- Reasonable suggestion:
30 feet depth and 10:1 slope

300 feet

Rode

Rope vs. Chain



Rope

- **Cons**
- Chafe (BIG DEAL)
- Can be cut
- Not Self Stowing

- **Pros**
- Doesn't rust
- Stretch absorbs the shock
- Light compact

Type of Rope



Material and Braid

Three strand line
safe working load

Rope Type	1/4	5/16	3/8	1/2	5/8
Manila	120	160	182	182	213
Nylon	182	281	407	704	1144
Polyester	182	281	410	704	1100
Polypropylene	213	232	459	714	1054

Different Braids

Line Diameter (inches)	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Nylon Three Strand	250 WLL 2,000 UTS	375 WLL 3,000 UTS	550 WLL 4,400 UTS	737 WLL 5,900 UTS	937 WLL 7,500 UTS	1,175 WLL 9,400 UTS	1,525 WLL 12,200 UTS	2,087 WLL 16,700 UTS	2,937 WLL 23,500 UTS	3,675 WLL 29,400 UTS
Nylon Double Braid	250 WLL 2,000 UTS	375 WLL 3,000 UTS	550 WLL 4,400 UTS	737 WLL 5,900 UTS	937 WLL 7,500 UTS	1,175 WLL 9,400 UTS	1,525 WLL 12,200 UTS	2,087 WLL 16,700 UTS	2,937 WLL 23,500 UTS	3,675 WLL 29,400 UTS

Material and Braid

- Artificial Fiber which has the best elasticity (shock absorbing effect) is polyamide (Nylon).
- NYLON is 30% more elastic than POLYESTER

	Percent of Breaking Strength		
Braids of Nylon Line	10%	20%	30%
Three Strand	8%	11%	16%
Eight Strand	4.7%	6.9%	7.7%
Double Braid	3.0%	5.3%	6.7%

Best Line for Rode

- Rode, use polyester, double braid
(enough stretch, easy to handle)
- Bridle use nylon, three strand
(best resistance to abrasion, best stretch, twist not a big deal)



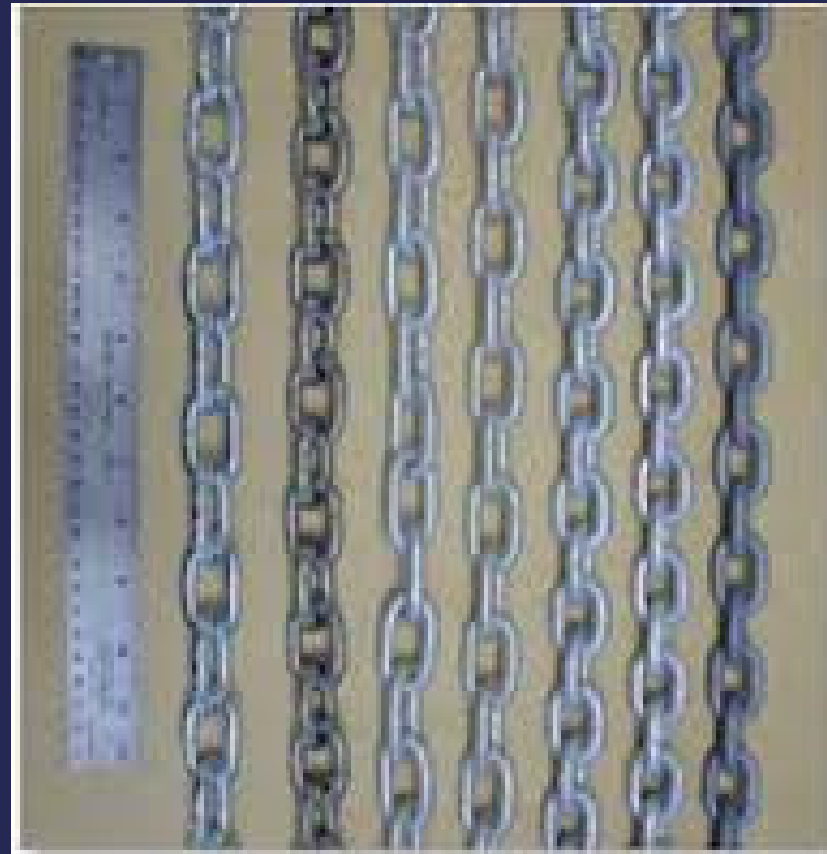
CHAIN



- SELF STOWING
- HARD TO DAMAGE (CHAFE/ACCIDENTS)
- ADDS RESISTANCE
- EASY TO PULL IN WITH HANDS
- HEAVY & NOT ELASTIC

CHAIN TYPE

- Proof-coil
- BBB
- G4 Hi-Test
- G-7
- Stainless



TYPE OF CHAIN

	1/4 (7mm)	5/16 (8.7mm)	3/8 (10mm)	1/2 (13mm)	5/8 (16mm)
Proof Coil Grade 30	1,300 WLL 5,200 UTS	1,900 WLL 7,600 UTS	2,650 WLL 10,600 UTS	4,500 WLL 18,000 UTS	6,900 WLL 27,000 UTS
BBB Grade 30	1,300 WLL 5,200 UTS	1,900 WLL 7,600 UTS	2,650 WLL 10,600 UTS	4,500 WLL 18,000 UTS	6,900 WLL 27,000 UTS
G4 HT Grade 40	1,950 WLL 2,600 WLL 7800 UTS	2925 WLL 3,900 WLL 11,700UTS	4050 WLL 5,400 WLL 16,200UTS	6900 WLL 9,200 WLL 27,600 UTS	9,750 WLL 13,000 WLL 39,000 UTS
Adjusted for 15% G 7 Chain	2890WLL 4550 WLL 13650 UTS	4350 WLL 6825 WLL 20475 UTS	6024 WLL 9450 WLL 28350 UTS	10260 WLL 16100 WLL 48300 UTS	14501 WLL 22750 WLL 68250 UTS
Stainless Steel 316	2,000 WLL 8,000 UTS	2,400 WLL 9,600 UTS	3,750 WLL 14,200 UTS	6,500 WLL 26,000 UTS	11,000 WLL 33,000 UTS

Grade 70 chain is available hot dip galvanized but has a 15% knock down.

CHAIN

	3/8 BBB	3/8 Stainless	5/16 G 40	5/16 G 70	1/4 G 70
Price/foot	5.99	10.99	5.99	6.41	5.37

Hi-Test Chain can not be re- galvanized several times.



CONNECTIONS

ROPE TO CHAIN

- "eye" splice over a thimble



- rope to chain splice



Shackles

- Industrial Grade (Type IV A)
- Specialty Alloy Shackles (Type IV B)

Shackle Sizing

- If sizing for Grade 30 chain use Industrial Grade (Type IV A) shackle, one size bigger than your chain
- If sizing for HT (G4) chain use Specialty Alloy Shackles (Type IV B), one size bigger than your chain
- If sizing for stainless steel chain use a forged SS shackle that is one size bigger than your chain.
- ****Shackles are sized by their body dimension, the pin is usually one size bigger than the size of the shackle****

Swivels

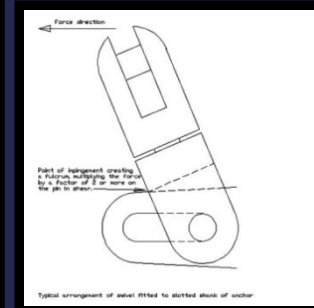
- Swivels are used to attach an anchor to the chain with the purpose of preventing chain twisting as the boat moves around in the anchorage. Swivels also help the anchor come up in the correct orientation into the bow roller on retrieval.

Side Loaded ?

- Swivels . . . Always check their breaking strength, and mount only via a shackle..



Swivel Jammed



Swivels . . . Always check their breaking strength, and mount only via a shackle..

Swivel

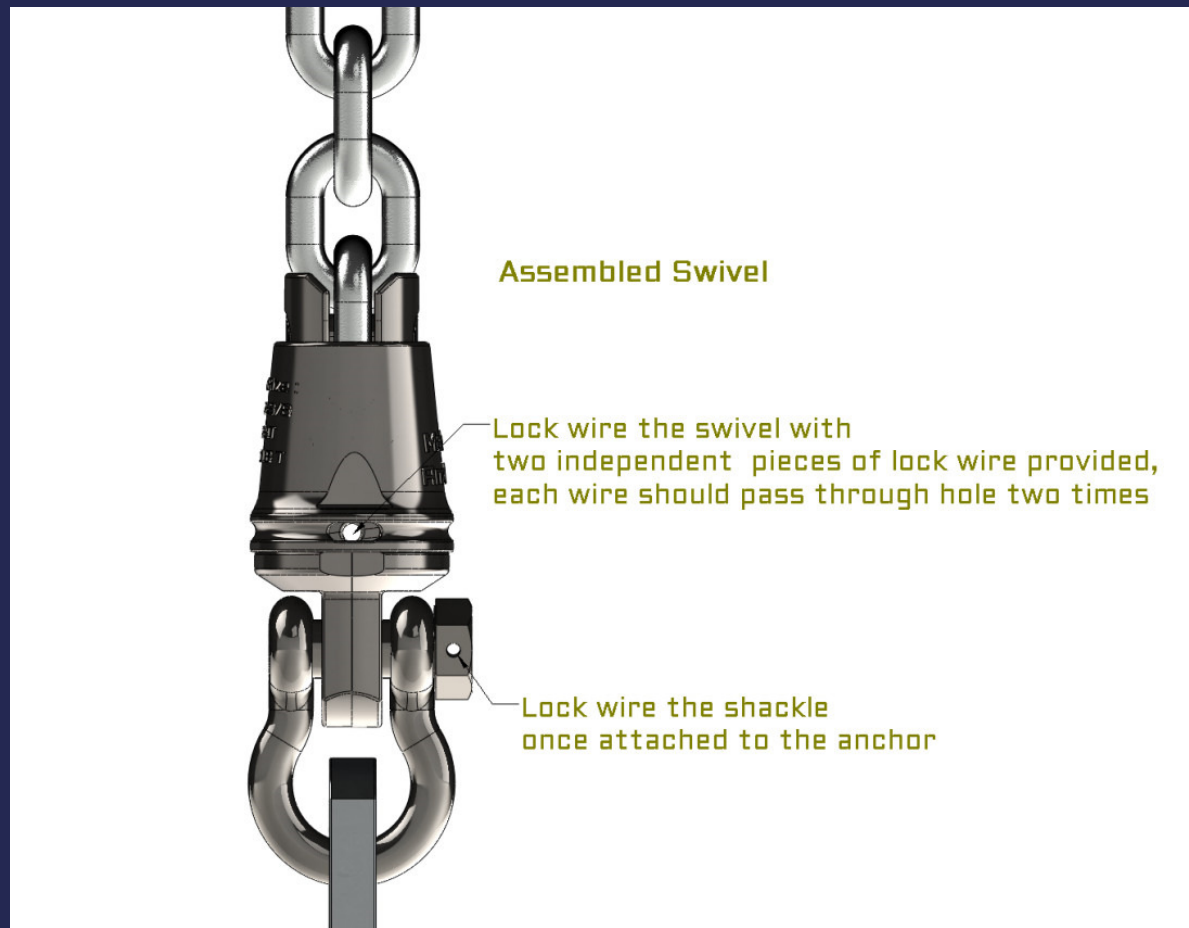


Swivels . . . Always check their breaking strength, and mount only via a shackle..

Expensive Side



Mantus Swivel



C - Links



- Heat-treated, carbon steel C-links that are marked with a load standard are virtually as strong as the chain which they join. Provided they will pass through the gypsy, which most will, they are fully acceptable for yachting use.
- Stainless steel C-links are less strong than carbon steel equivalents but are adequate for general use. Although they will not rust in normal anchoring use, they can promote increased rates of zinc loss from attached chain, by galvanic action. Use them with caution.
- Links of the type often seen in chandleries, unmarked and of unknown origin, should be avoided. Many seem to be badly made, of inappropriate materials, and to use them for anchoring would be risky.

Bridle, Why?

Wind Speed <i>(Knots)</i>	Anchor Name	Boat Length - Feet						
		20	25	30	35	40	50	60
15	Lunch Hook	90	125	175	225	300	400	500
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Shock Absorption

- ANCHOR, SWIVEL, CHAIN, CLEATS, WINDLASS

35 foot boat in 60 knots

- No bridle – 3600 lbs
- With Bridle – 1200 lbs

Is Catenary enough



Elasticity



Elasticity

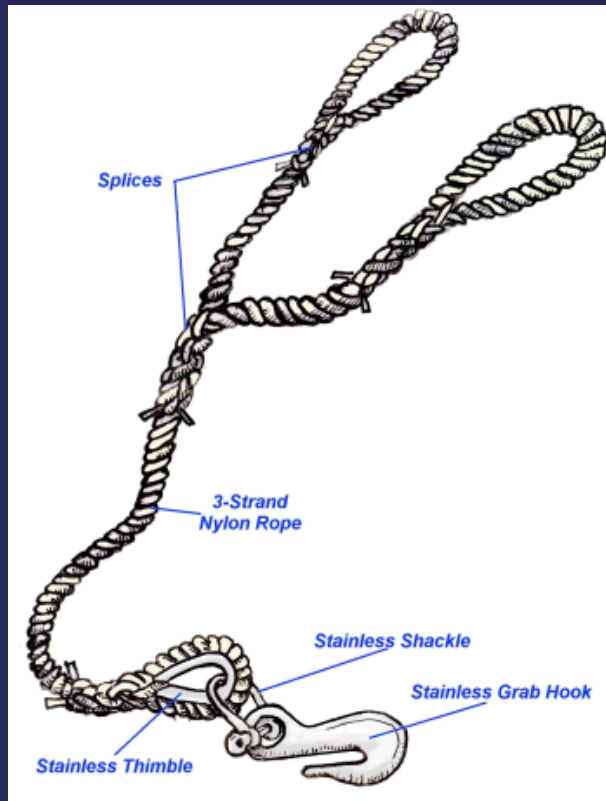


Elasticity

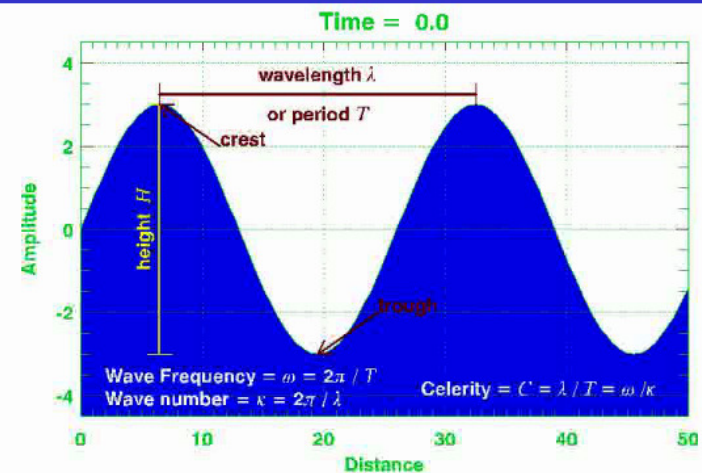


Bridle length

- 4 foot waves at anchorage



Basic Properties of Waves...all waves!



Note that these definitions work also for radio waves, gamma rays and light waves.

In this case the interface is between the ocean and the atmosphere or between layers of different densities

Bridle Length

- WLL of line is $\frac{1}{6}$ to $\frac{1}{8}$ of the Breaking Strength
- Bridle Stretch of 11% at 20% of UBS
On a 30 foot bridle this is 3 feet

100 feet of chain
10:1 slope 5%



100 feet of chain
5:1 slope 12%

LETS examine this situation



Our Bridle

- Three strand nylon, with good chafe protection.



Single or Double

- Monohoul - single line



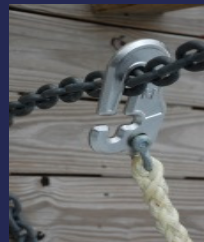
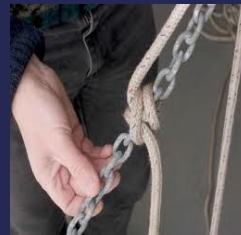
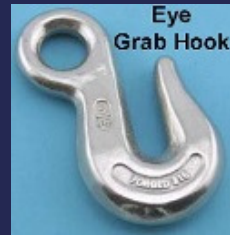
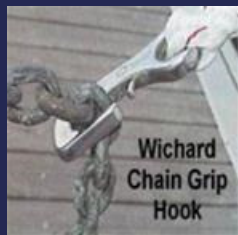
- Cats — two lines



Bridle Longevity

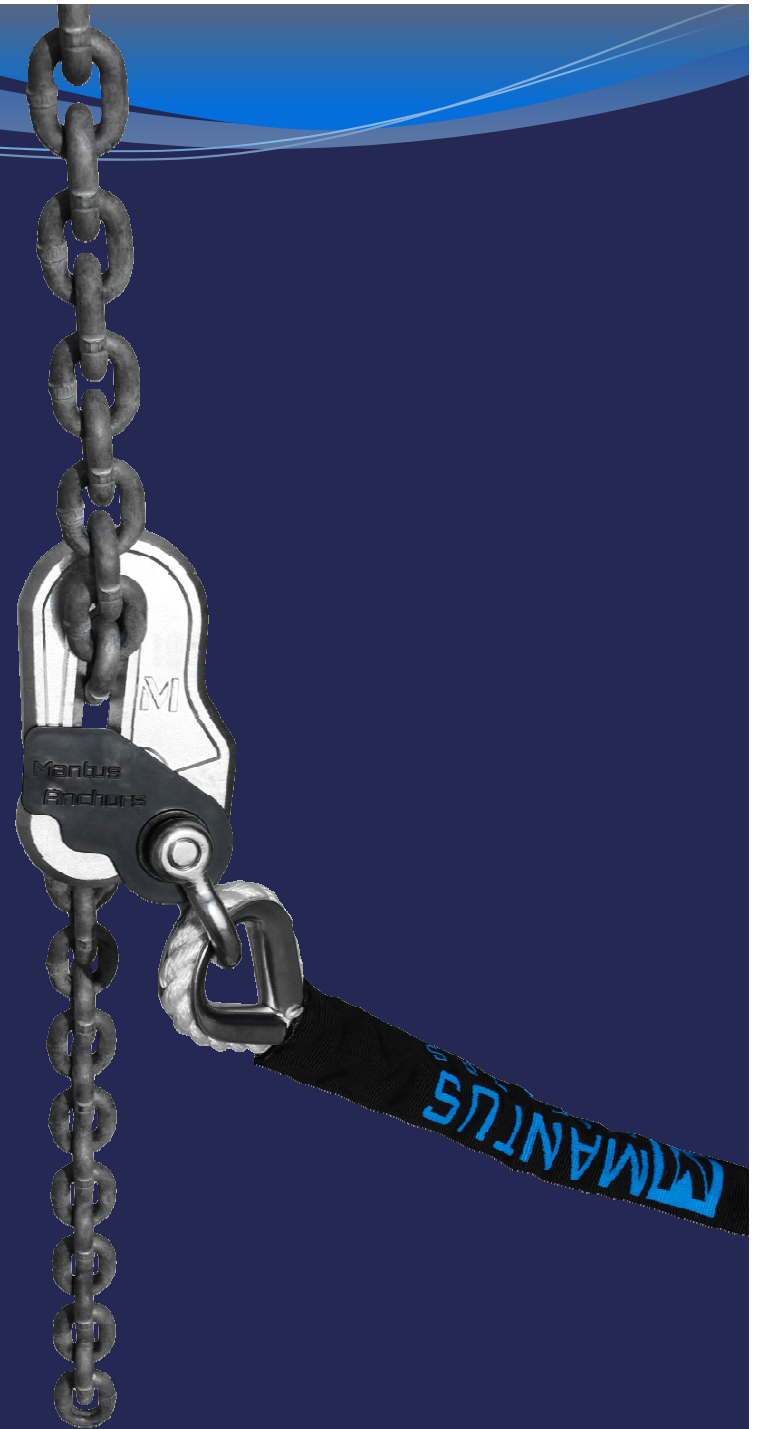
- Replace every 3-5 years to expect eperformance
- Store in a UV protected space

Bridle Chain Hook



Mantus

Hook



Not All Bottoms are equal



DON'T YELL

- PRACTICE
- PREPARE AHEAD OF TIME
- NO IT'S NOT SELF EVIDENT

Anchor Selection



OUR BABY

