Heavy Weather Sailing and Storm Sails

Kaneohe Yacht Club
Chuck Hawley
Safety at Sea Seminar

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Don’t bury the lede…

“Weather the storm you cannot avoid, and avoid the storm you cannot weather.”

- Prepare your vessel in advance.
- Understand what techniques work with your boat.
- Have small, strong sails and reliable means of setting them.

The Beaufort Scale

- Invented in 1805 as a way to standardize descriptions of weather conditions
- Originally 0-12; in 1946 Force 13-17 were added
- Each number over 5 indicates a change in sail area should be considered
- (All images courtesy of John Jourdane.)

Force 0: Calm 0 knots

Force 1: Light Air 1-3 knots

Force 2: Light Breeze 4-6 knots

Force 3: Gentle Breeze 7-10 knots

Force 4: Moderate Breeze 11-16 kts

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Force 5: Fresh Breeze 17-21 knots

Force 6: Strong Breeze
22-27 knots

Force 7:
Near Gale 28-33 knots

Force 8:
Gale 34-40 knots

Force 9:
Strong Gale 41-47 knots

Force 10:
Storm 46–55 knots

Force 11:
Violent Storm 56-63 knots

Force 11:
Violent Storm 56-63 knots

Plan your departure (and your return)

- Avoid departures into threatening conditions
  - See “Formula for Disaster”, John Rousmaniere
- Cruisers should consider timing their departure based on weather, not business or vacation schedules
- If at sea, evaluate whether you can make it to a safe harbor
  - Can you stay off a lee shore?
  - Can you safely enter an inlet?

Clear the decks

- Remove all extraneous gear from the decks and store below
  - Fuel jugs
  - Dinghies
  - Cushions
  - Stowed sails
- Run jacklines; add tethers near companionway
- Consider additional jacklines in cockpit

Secure gear below

- Lockers will inevitably come open if not specifically designed to resist a knockdown or capsize
- Good stowage considerations:
  - No elbow latches
  - Thru-bolt, don't use screws
  - Don't rely on gravity for the sole and lockers under berths
  - Heavy duty battery tie-downs; gel or AGM batteries
  - Anchor and rode secure
  - Stove secure in gimbals
  - Books, canned goods, tools, engine spares secure

Preparation below decks

- Create easily consumed food in advance
  - Thermos of hot water, coffee
  - Sandwiches, energy bars, fruit available
- Maximize rest for the off-watch
- Charge handheld VHF for cockpit use
- Review damage control procedures
  - Abandon ship
  - Dewatering, thru-hull locations, tools and jury rig equipment
  - Crew Overboard procedure
  - Standing rules for life jacket, harness use

Additional preparation

- Monitor all available sources of weather information
- Locate and prepare drag devices
- Charge batteries; insure engine is ready to run
- Pump bilges; check for debris

Sail inventory

- Set up intermediate forestay and runners
- Bend on sails which may be needed
  - Trysail, sheets and lead blocks
  - Heavy weather jib and storm jib with sheets
- Reeve deep reef lines
- Inspect running rigging for chafe
- Storm sail images courtesy of Carol Hasse, Port Townsend Sailmakers


Removable stays’ l stay
shown in stored position.


Removable stays’ l stay shown in working position. Note removable pin.


Hand-adjustable turnbuckle allows stay to be tensioned.

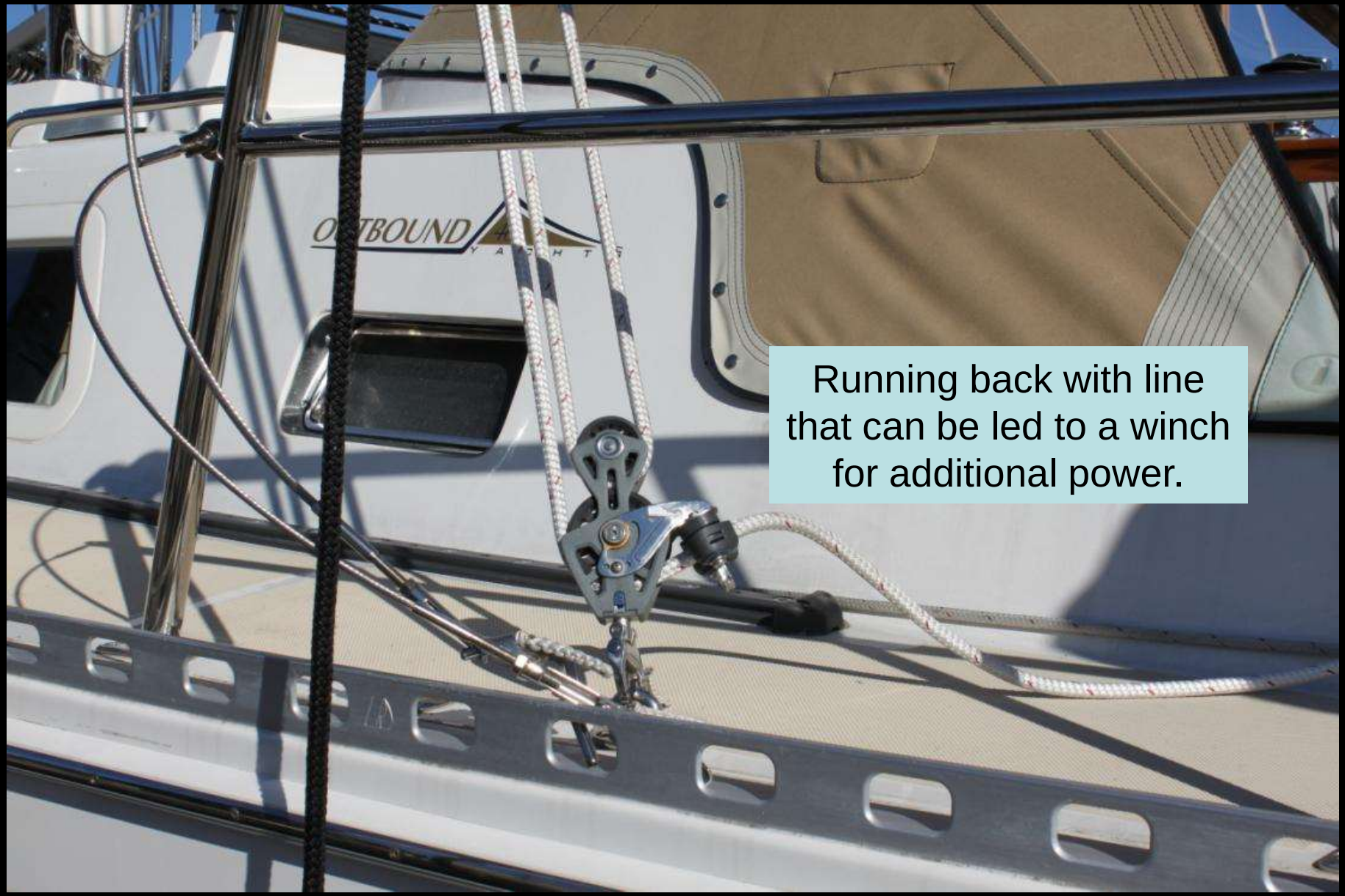
De-power the sail plan

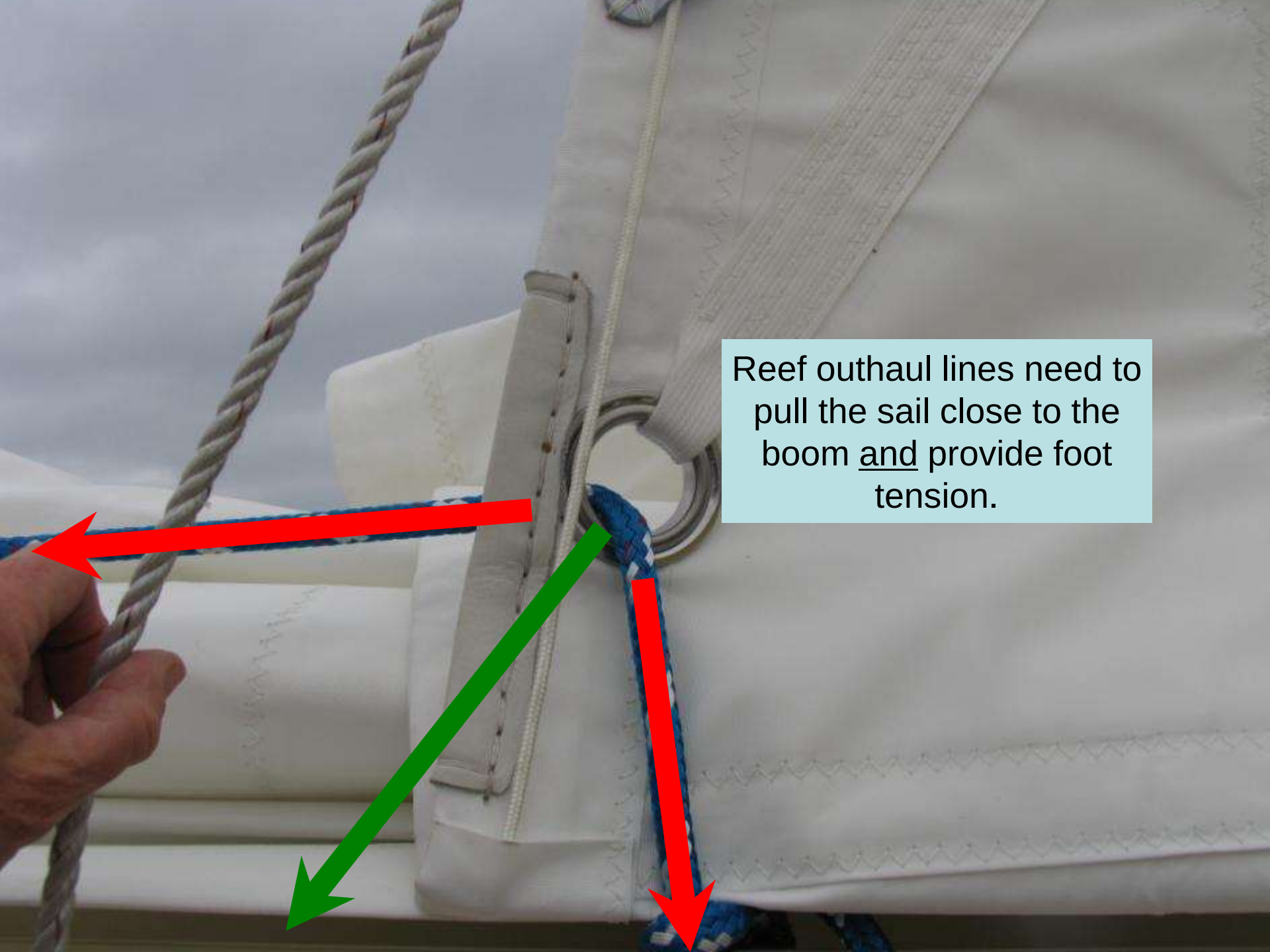
- Flatten sails
  - Backstay, halyard tension, foot tension
- Traveler down
- Sheet outboard
- Select flatter, newer sails
  - Don’t try to use a blown out sail on the assumption that it might, in fact, blow out

This is what happens if you try to use your furling genoa as a storm jib.

Shorten sail as the wind builds

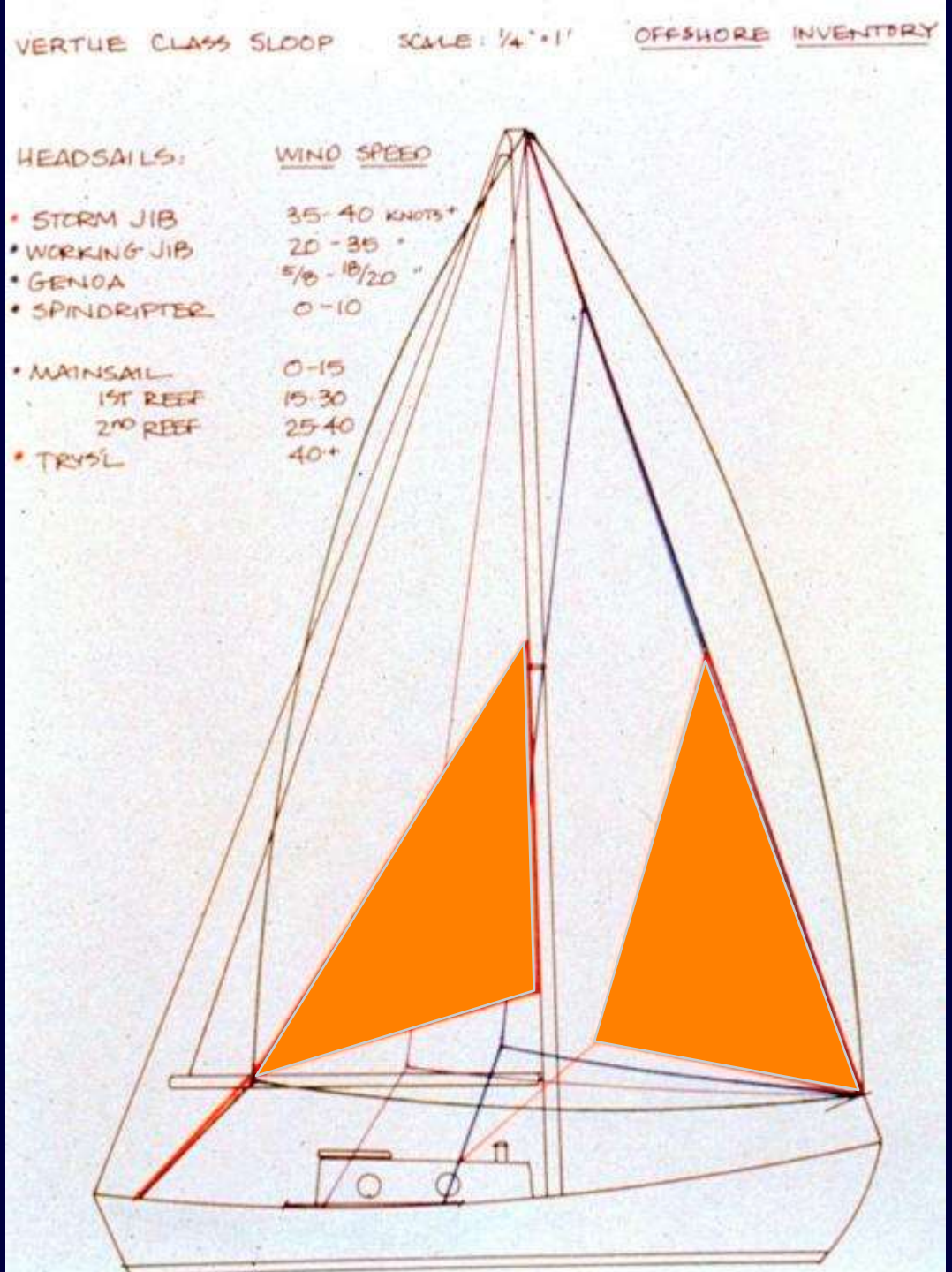
- Experiment with sheet leads and hydraulic settings before you experience storm conditions
- Keep helm balanced
- Move CE towards center of boat
- Counteract stays'l tension with runners/checkstays

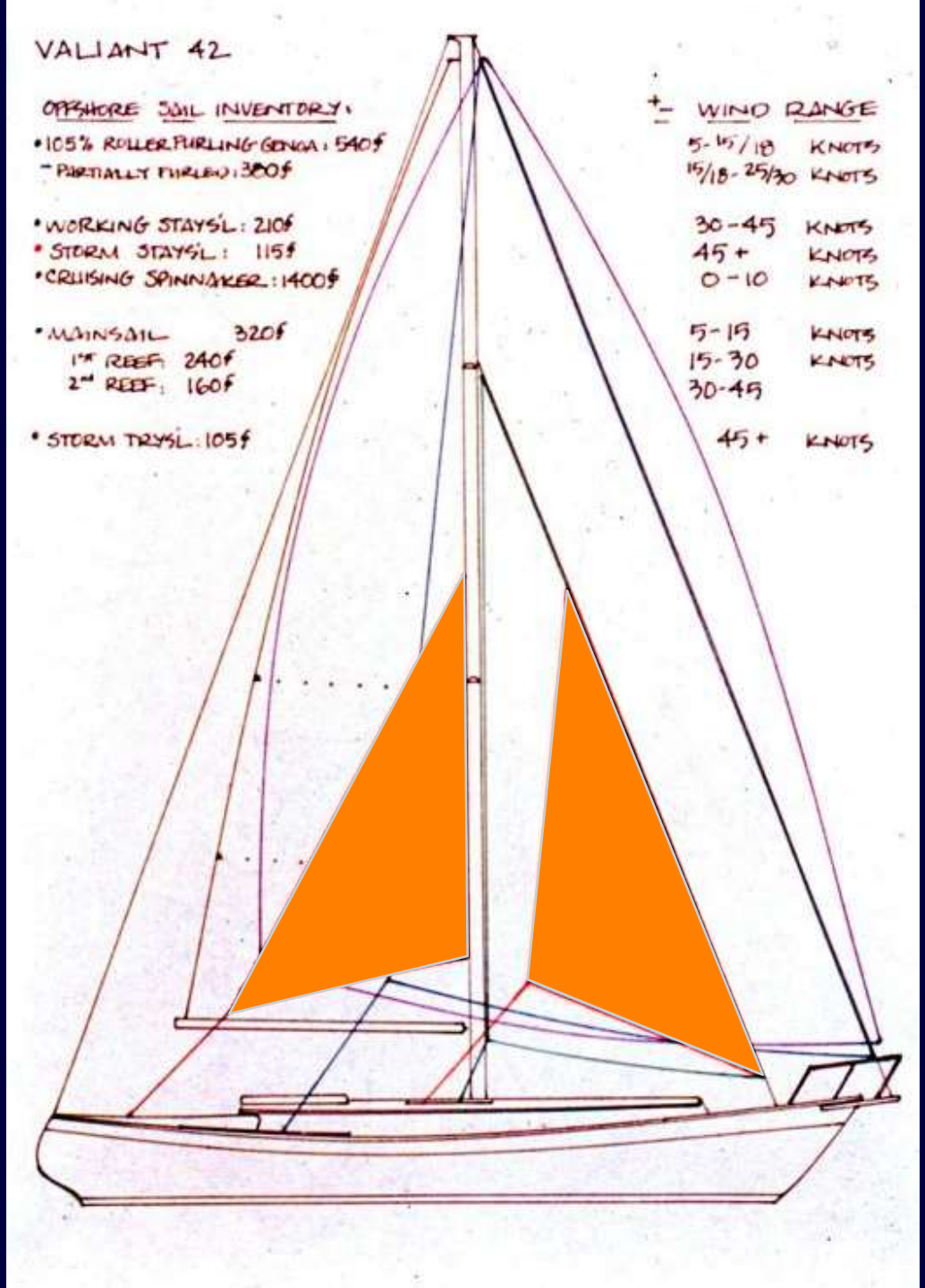

Running back with line
that can be led to a winch
for additional power.


Reef outhaul lines need to pull the sail close to the boom and provide foot tension.


Reefing tacks need to approximate the location of the tack when the sail is unreefed.

VERTUE CLASS SLOOP SCALE: 1/4"=1' OFFSHORE INVENTORY





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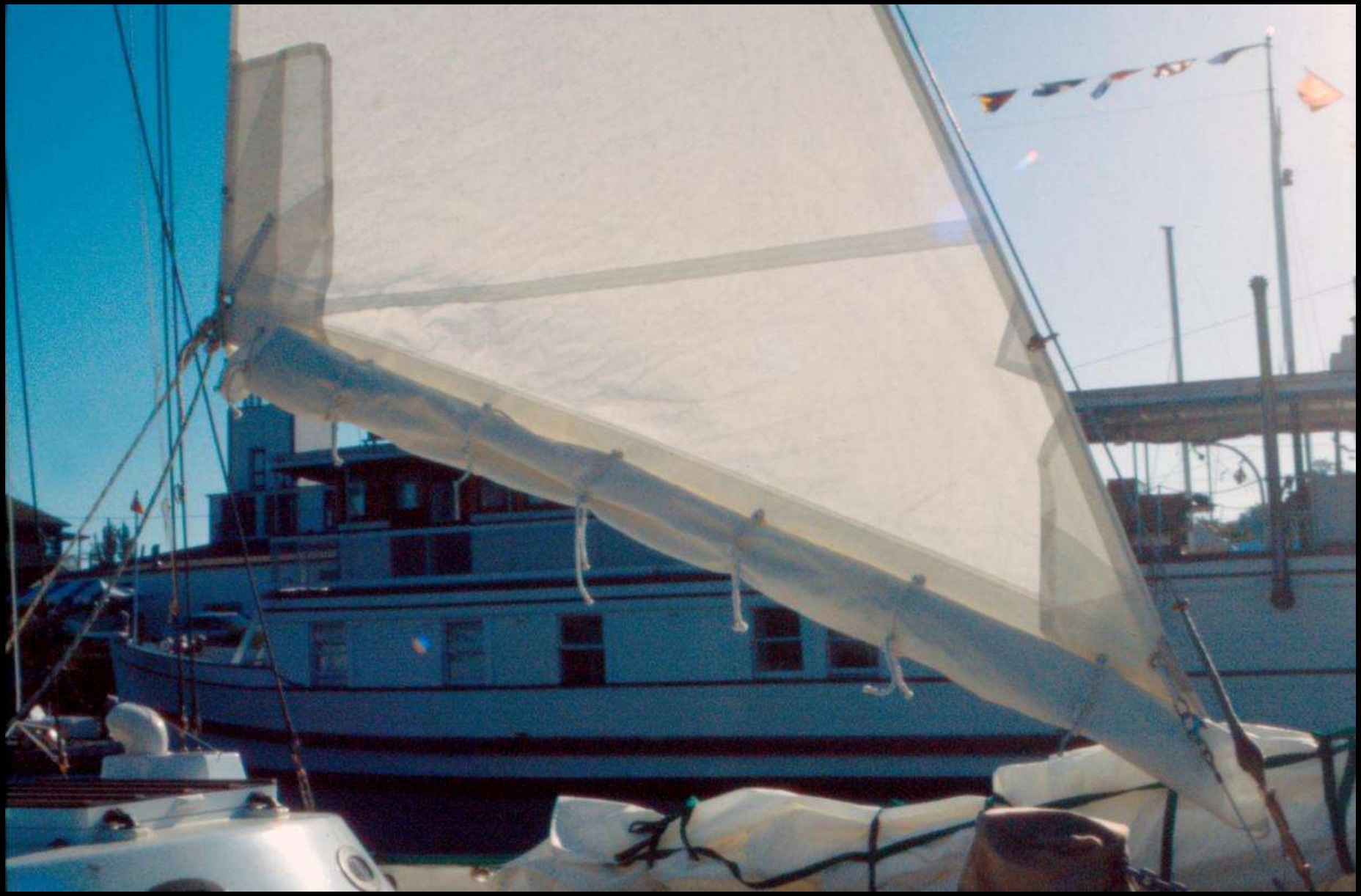
Storm Sails:
Storm Jib

- Offshore Special Regulations require that it be no larger than 5% of luff squared
- Cannot rely on headfoil or other slotted headstay
- High clew to allow waves to pass underneath
- Move inboard to stays'l stay to keep CE inboard



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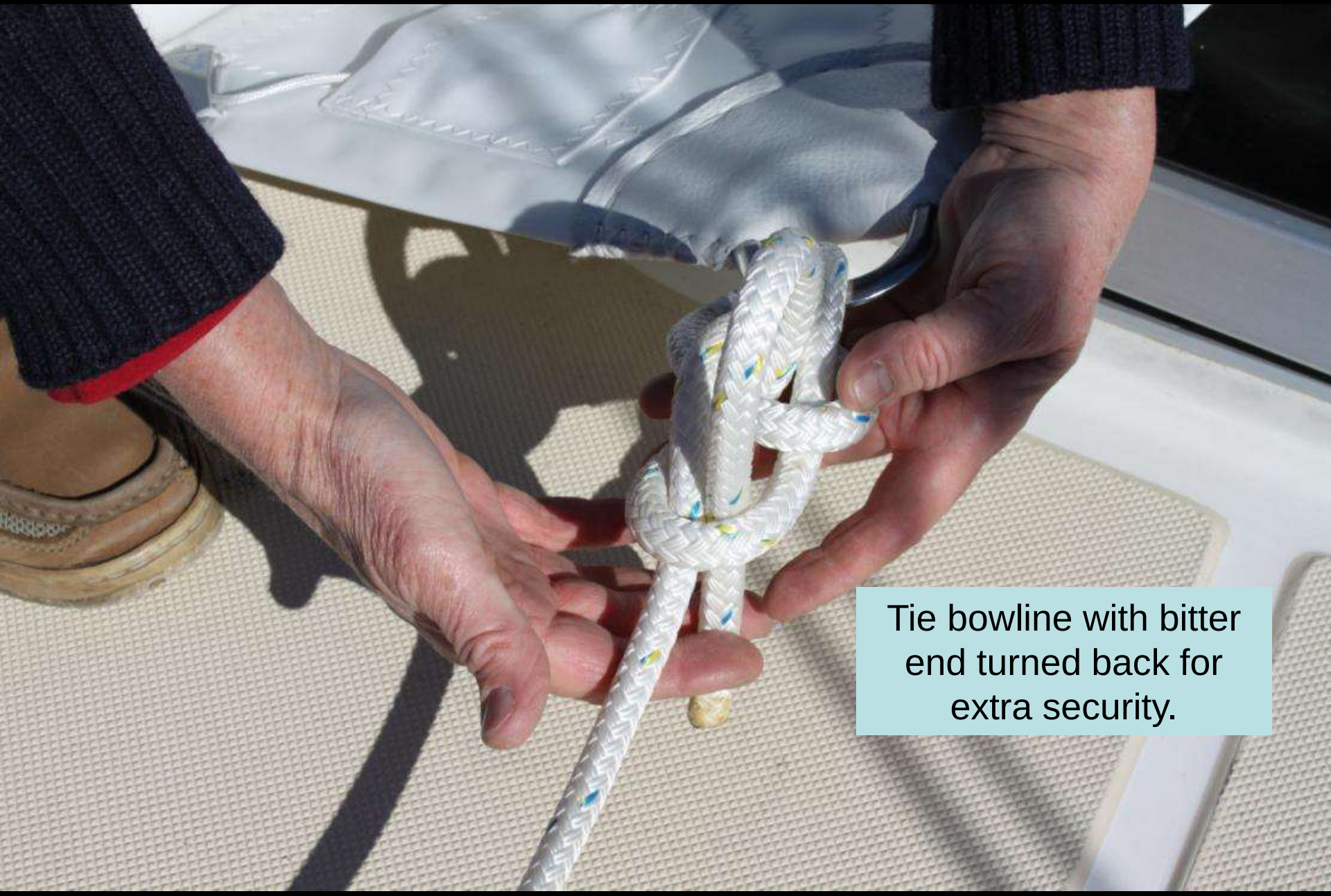
Put storm jib hanks on a length of line to keep the sail from being lost over the side.


Tie bowline with bitter end turned back for extra security.

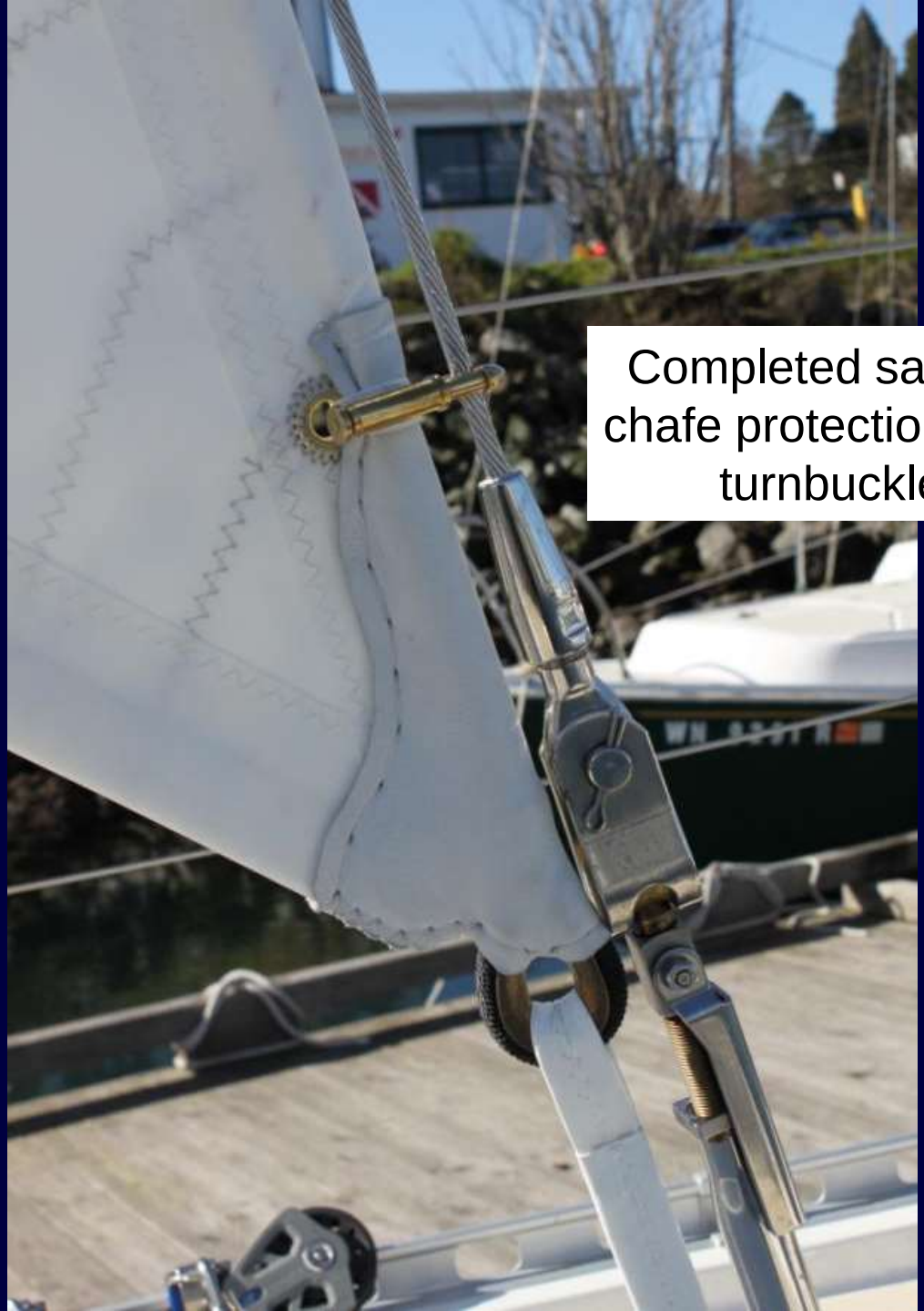

Storm jib sheets led to turning winch near cockpit.


Note chafe protection on pennant.
The tack of the storm jib attaches to the chainplate for the stays’l stay.


Note leather chafe protection at each hank.


Transfer one hank at a time from the length of line to the stay.

The storm jib is bent on with the bright head panel.



Completed sail showing chafe protection, pennant, turnbuckle, etc.

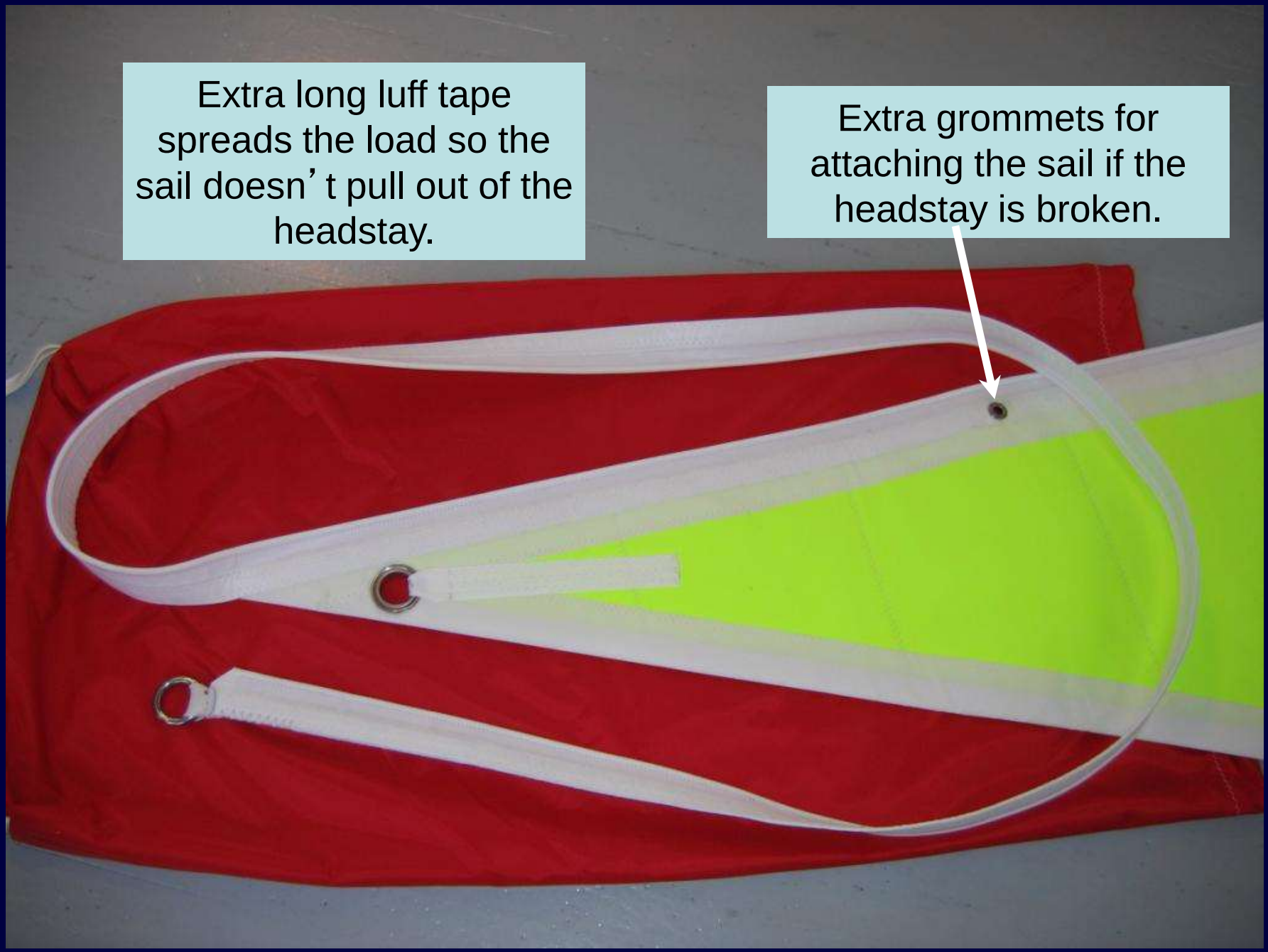
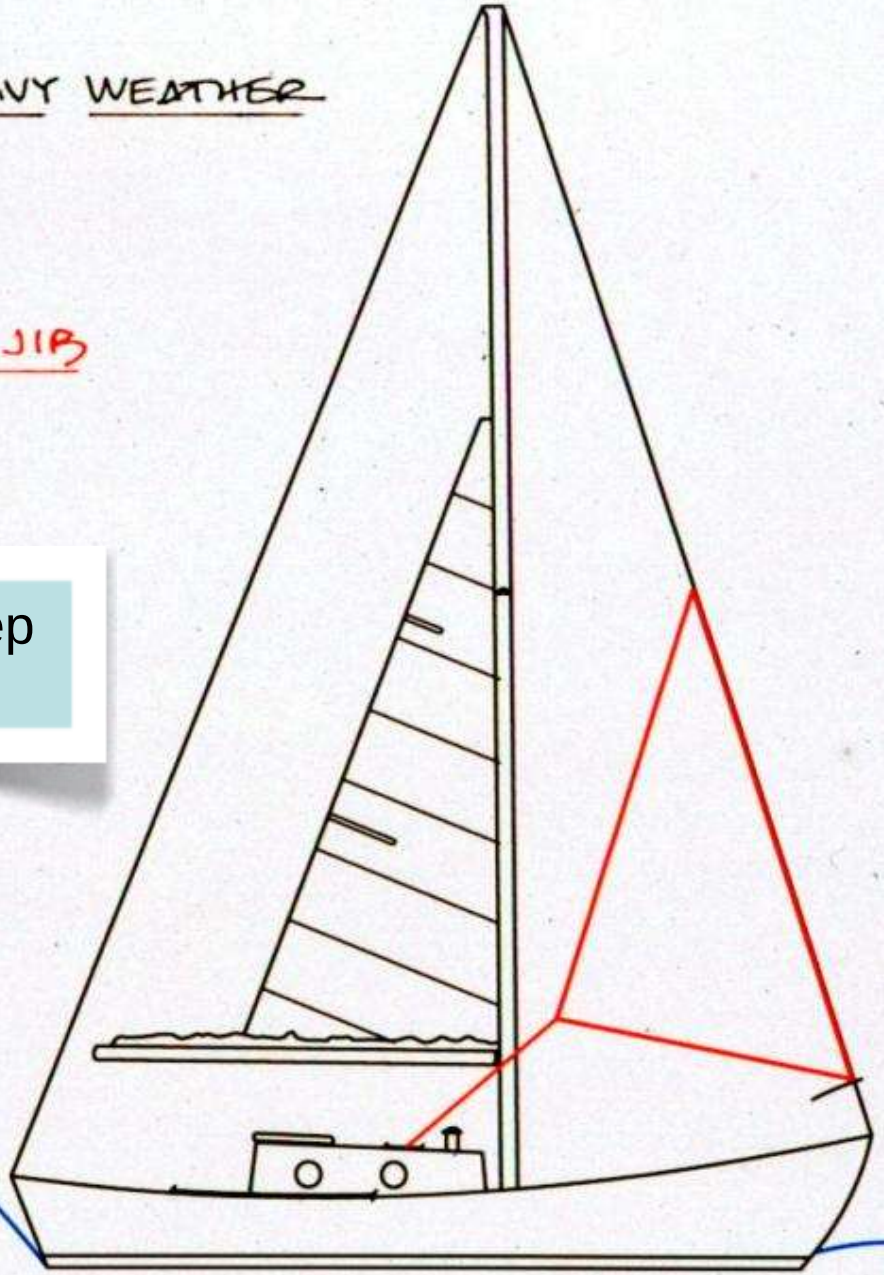

Extra long luff tape spreads the load so the sail doesn't pull out of the headstay.
Extra grommets for attaching the sail if the headstay is broken.

Figure out whether the sheets lead inside the shrouds or outside before you get into a storm.

VERTUE CLASS SLOOP HEAVY WEATHER

3rd REEF MAIN + STORM JIB

Why not just use a deep reef in the mainsail?



Why not to use your mainsail?

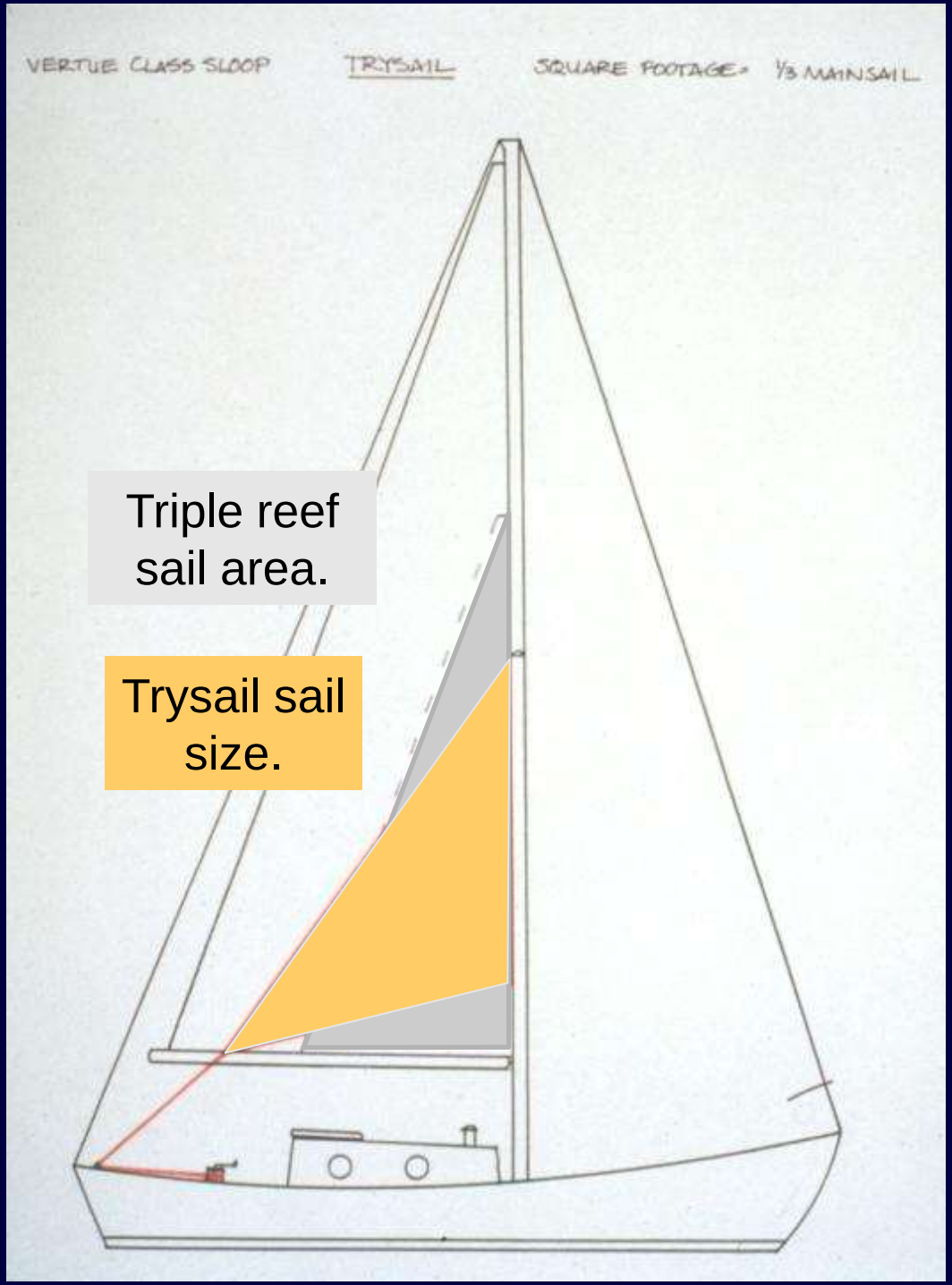
- Puts a lot of stress on the middle of the sail
- Dependent on the boom, which could be broken
- More weight, more hardware aloft

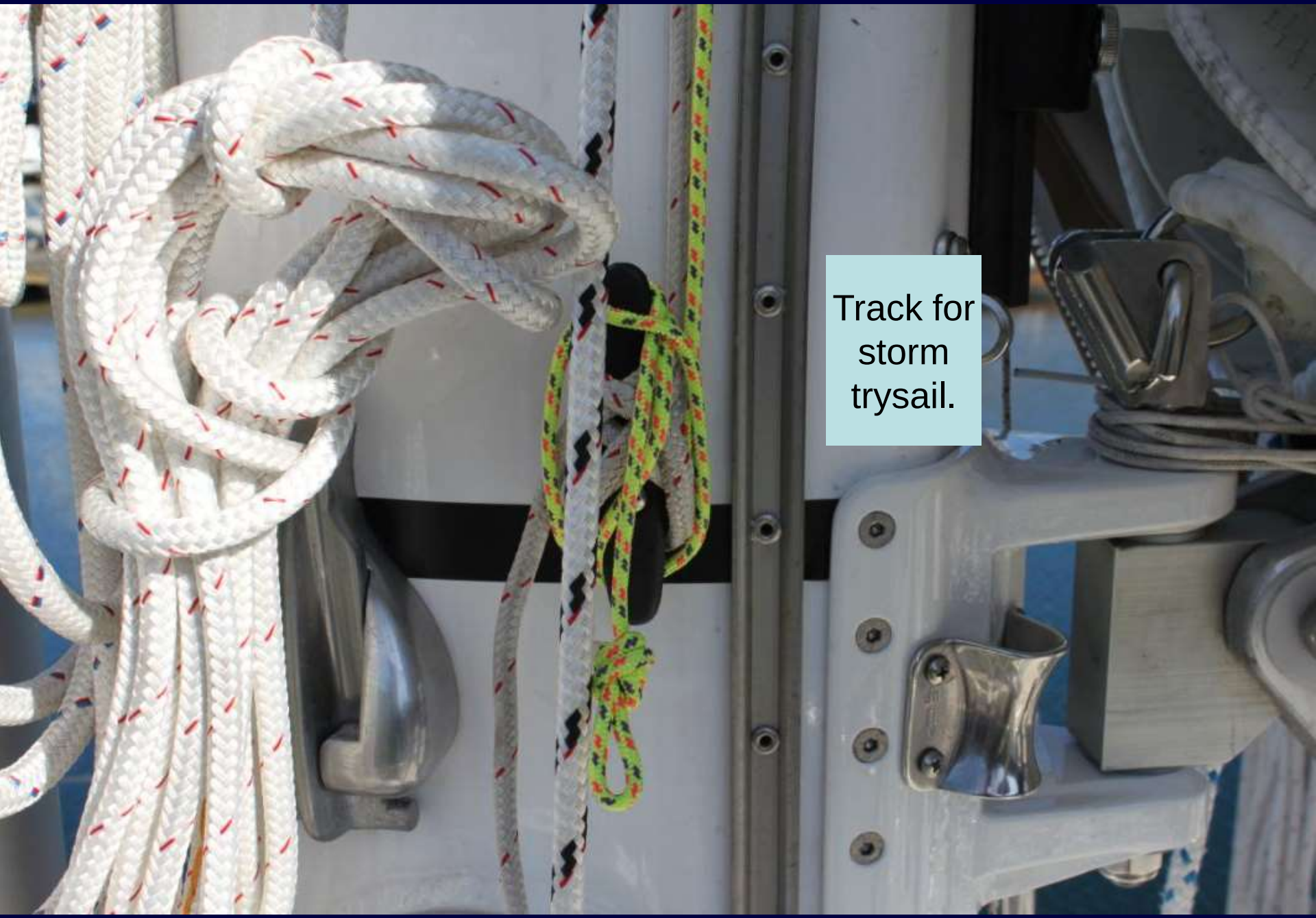
Storm Sails:

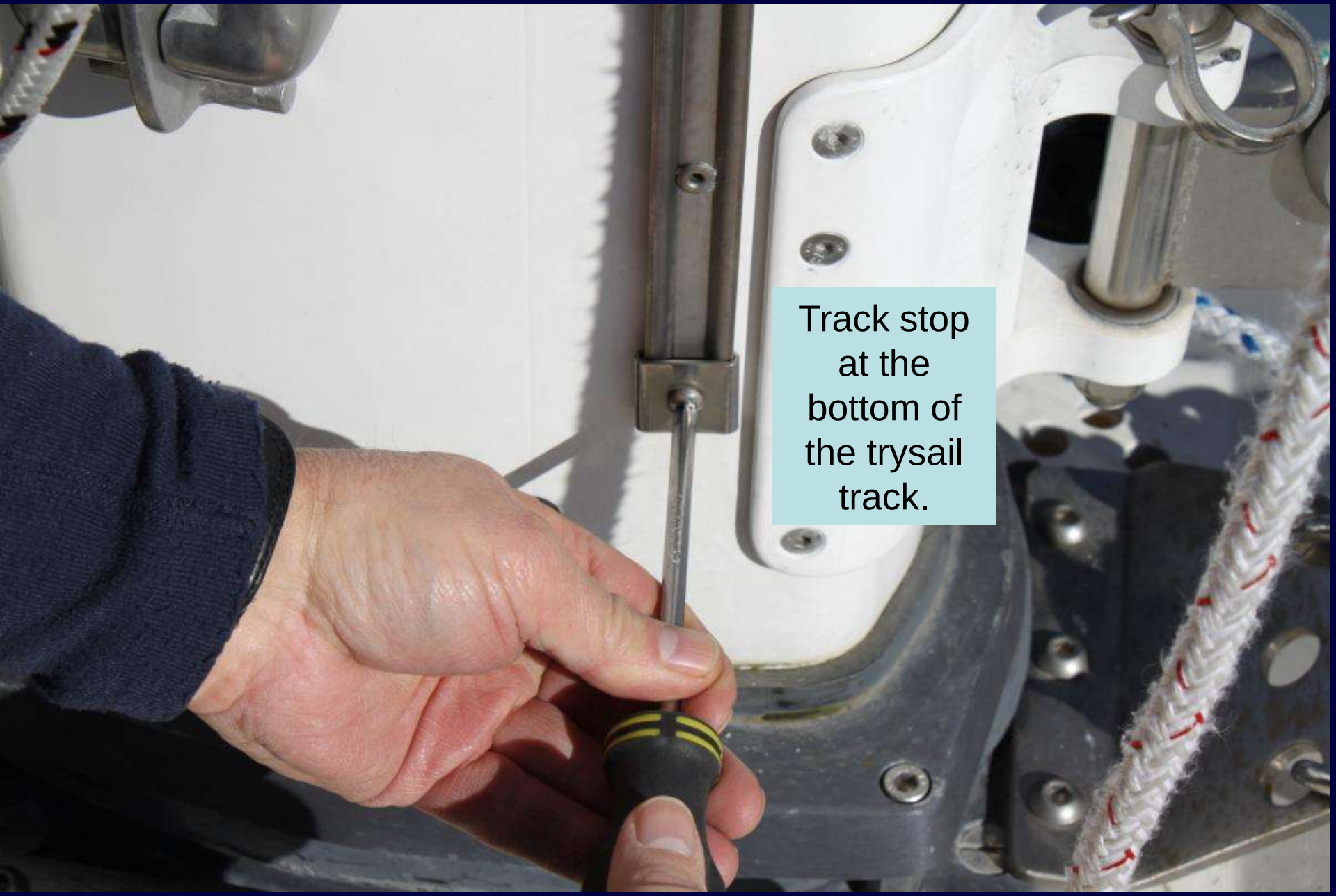
Storm Trysail

- Does not rely on boom (which may have been broken already)
- Generally sheets to gunwale aft
- Uses two sheets, like a genoa
- May require second track on many masts

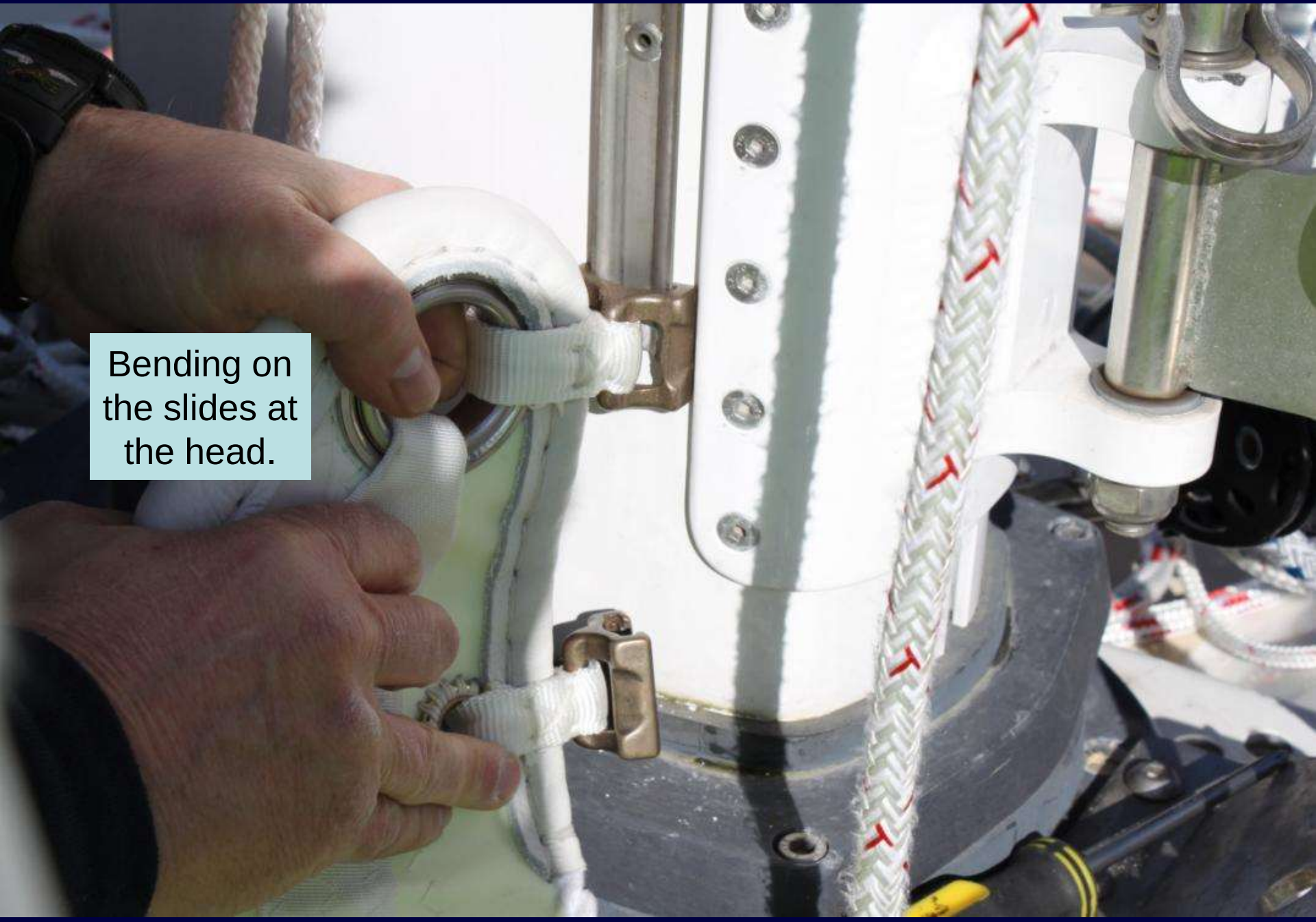
The size of the storm trysail should be about 1/3 of the area of the main.

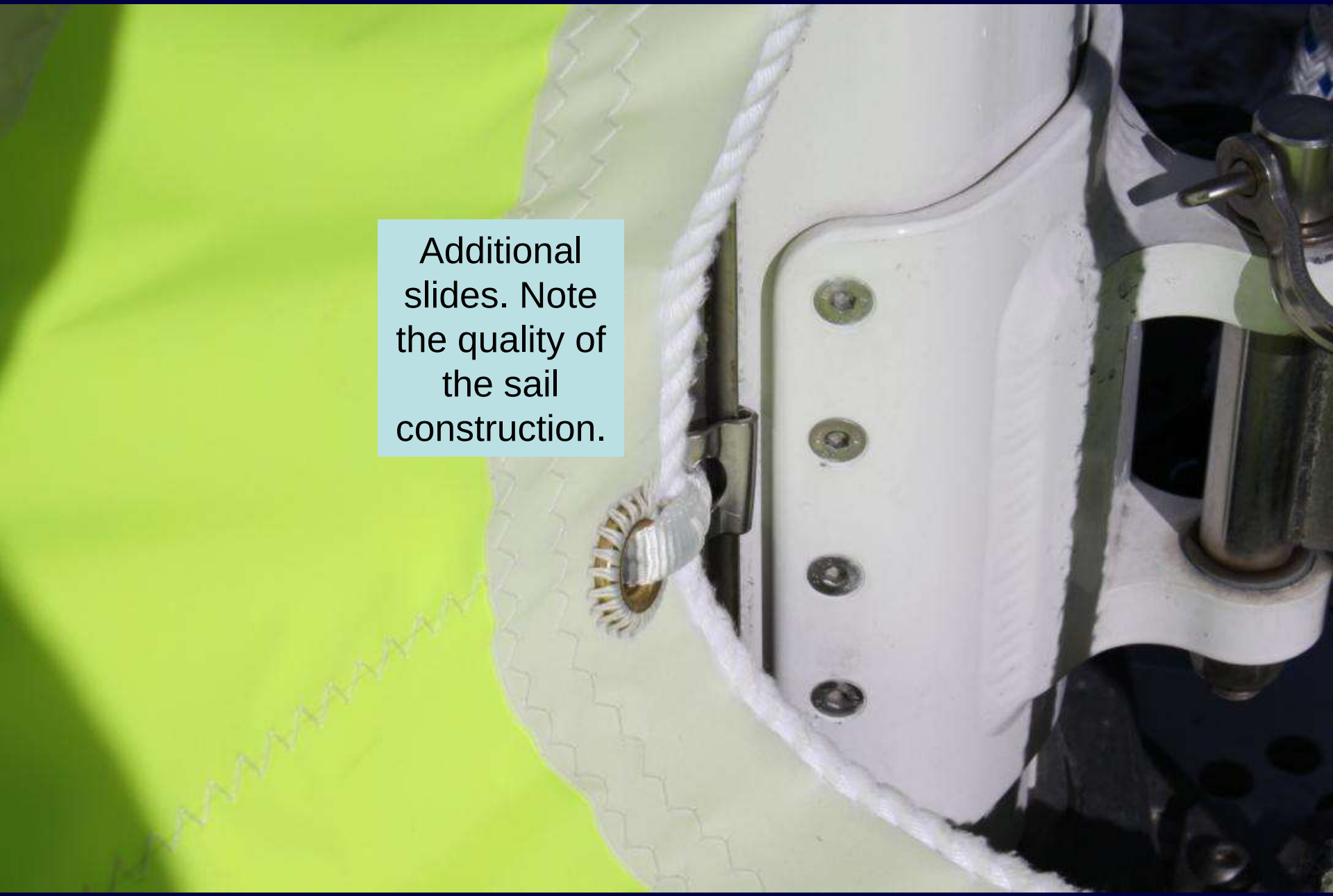



Track for storm trysail.

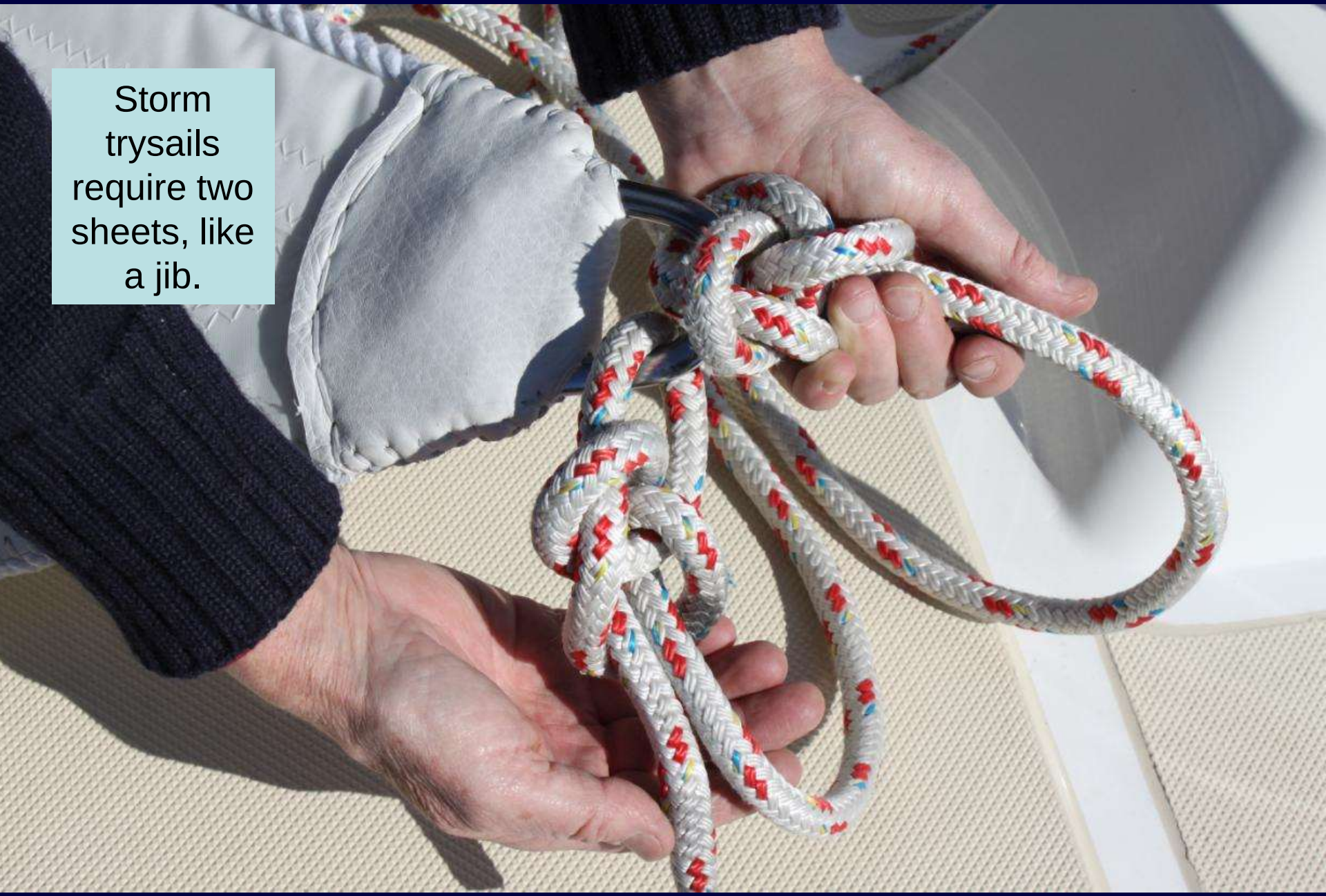

Track stop at the bottom of the trysail track.


Heavy cast bronze sail slides at the head of the sail.


Bending on
the slides at
the head.

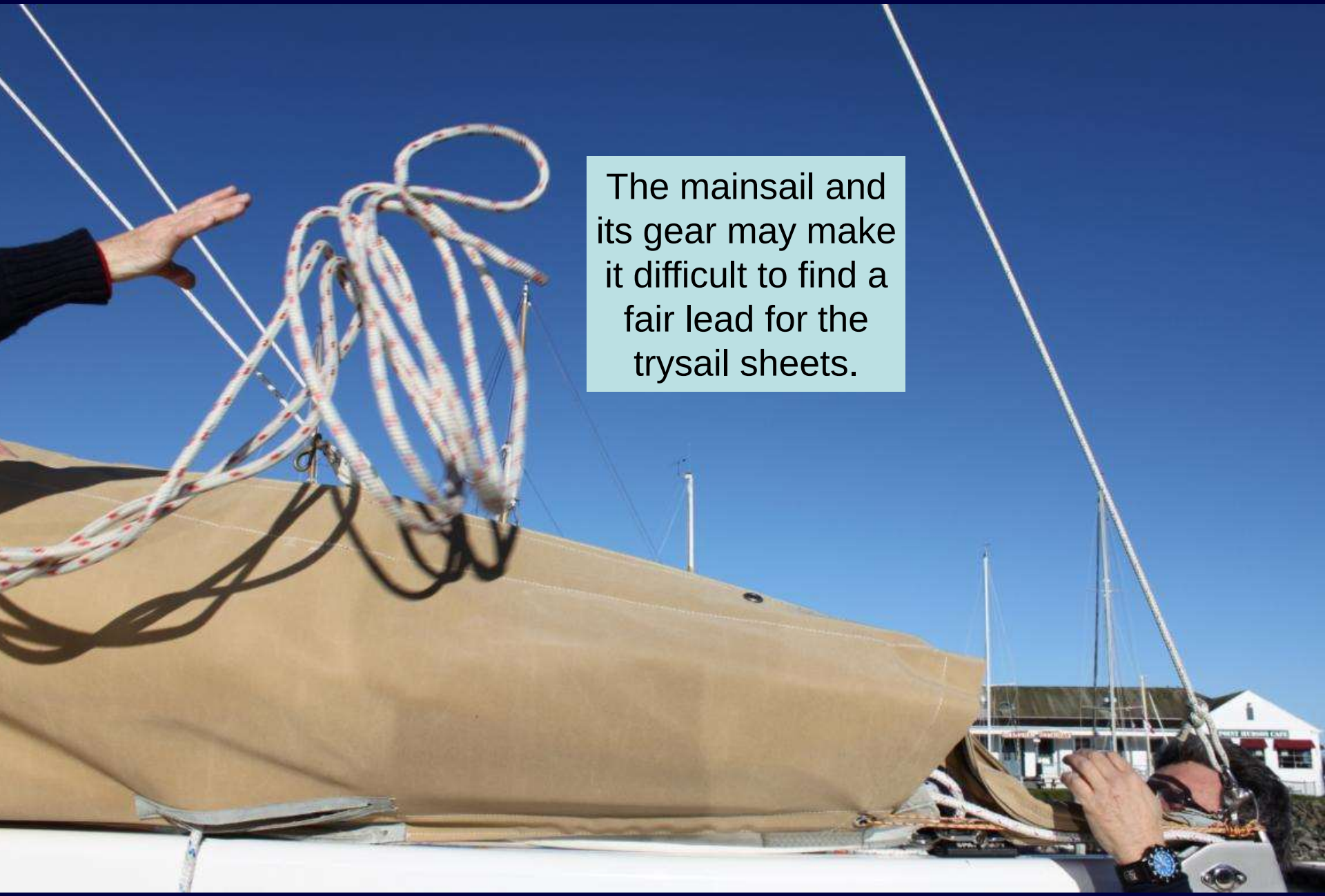

Additional slides. Note the quality of the sail construction.

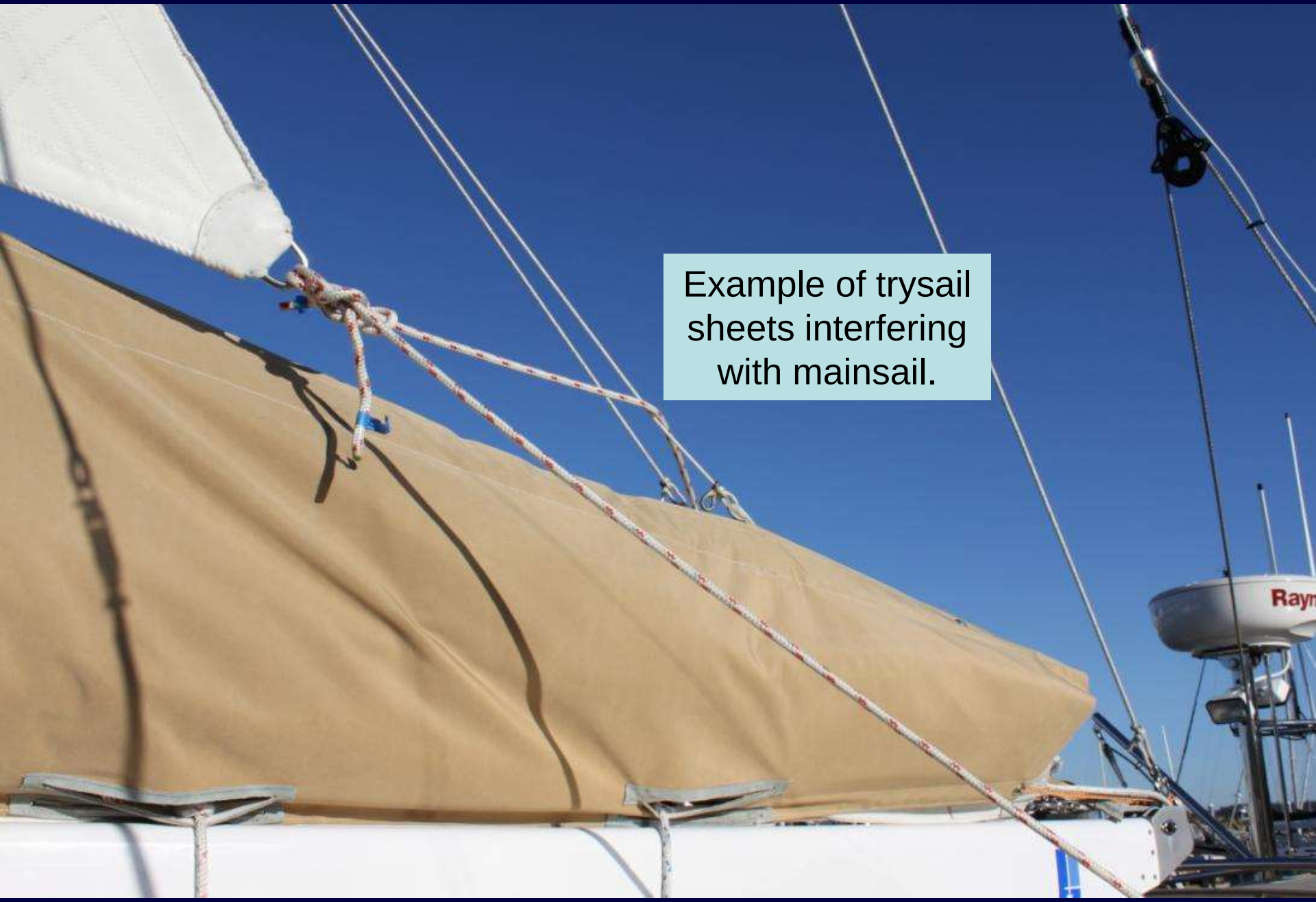
Storm trysail bent on and ready for hoisting. Sail can be bagged and left in place.


Storm trysails require two sheets, like a jib.


Trysail sheets will lead to blocks near the transom.


Sail before
hoisting.


The mainsail and its gear may make it difficult to find a fair lead for the trysail sheets.


Example of trysail sheets interfering with mainsail.

Trysails will require a pennant so they can fly clear of the main.


Boats in in-mast furling can also use trysails if they have a mast track for that purpose

Which is the best heavy weather technique?

- It depends on…
  - the boat design
  - the skill of the crew (drivers wanted!)
  - the gear onboard the boat
  - the amount of sea room
- Generally, cruising boats will have more options than racing boats

Options for heavy-ish cruising boats

Passive Techniques			
Racing Crew	Heaving To	Lying Ahull	Sea Anchor
Cruising Crew	Heaving To	Lying Ahull	Sea Anchor
Active Techniques			
Racing Crew	Forereaching	Scudding	Drogues
Cruising Crew	Forereaching	Scudding	Drogues

Options for lightweight cruisers

Passive Techniques			
Racing Crew	Heaving To	Lying Ahull	Sea Anchor
Cruising Crew	Heaving To	Lying Ahull	Sea Anchor
Active Techniques			
Racing Crew	Forereaching	Scudding	Drogues
Cruising Crew	Forereaching	Scudding	Drogues

Options for light race boats

Passive Techniques			
Racing Crew	Heaving To	Lying Ahull	Sea Anchor
Cruising Crew	Heaving To	Lying Ahull	Sea Anchor
Active Techniques			
Racing Crew	Forereaching	Scudding	Drogues
Cruising Crew	Forereaching	Scudding	Drogues

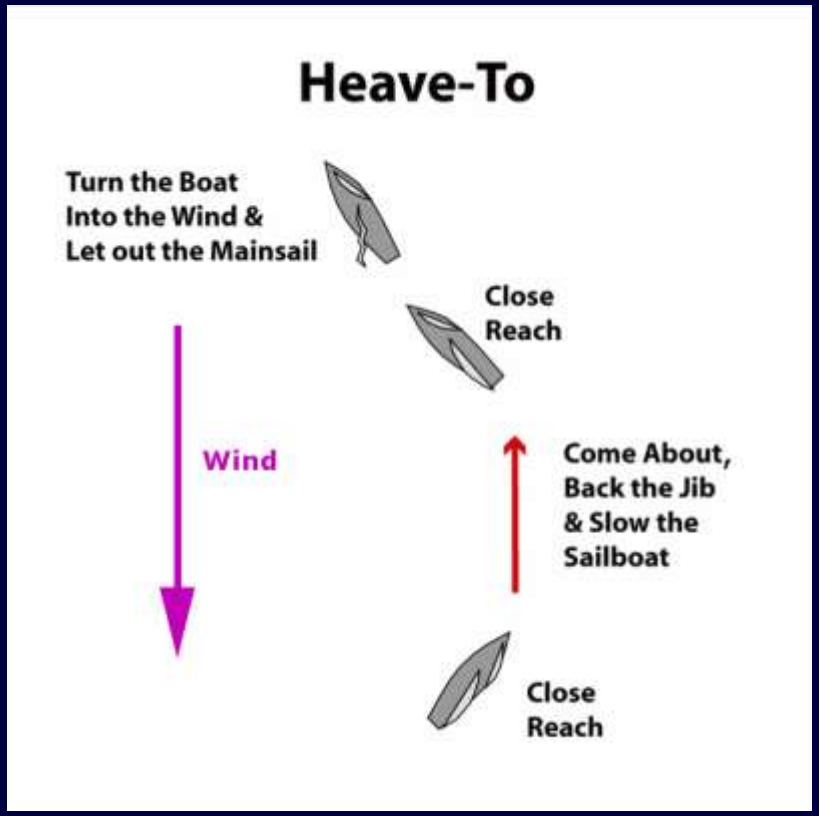
Technique:
Forereach with storm sails

- Generally better to take large seas on the bow
- Active sailing; requires rested drivers
- Close reach has wider slot for more directional choices

yendys
yendys

Technique: Heave-to

- Back a small headsail
- Adjust main traveler for slight drive
- Tie off helm somewhat to leeward to cause boat to head up if it picks up speed
- Consider Pardey's method of using sea anchor, too



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Sea Anchors

Technique:
Lie to a sea anchor

- Large diameter, high drag device set off bow
- Adjust rode to 300’ to 600’
- Monitor for chafe at regular intervals
- Tie helm amidships
- Set watch schedule (10 minutes?)
- Use time to dry out, fuel up, get sleep

Suggested Sea Anchor Sizes

Boat LOA	Displacement	Sea Anchor Dia.
<20	<4,000	6’
<25’	<8,000	9’
25-33’	<12,000	12’
30-40’	<25,000	15’
35-48’	<40,000	18’
40-90’	<95,000	24’

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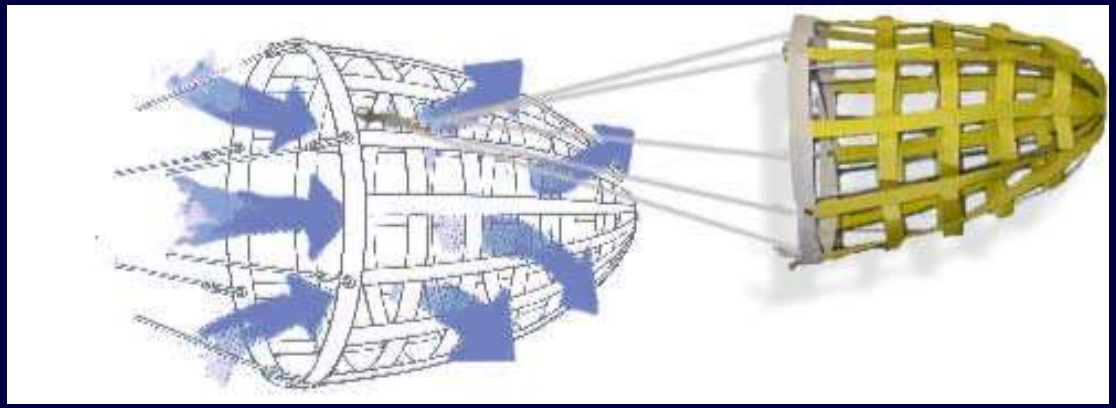
Technique:
Run with a drogue

- Reduces boat speed roughly by half
- Prevents boat from accelerating to speed of wave
- Keeps stern into wind/waves
- Boat must be steered actively
- Boat must have sea room
- Consider a bridle; monitor chafe



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Suggested Galerider Sizes

Displacement	Galerider Dimensions
<10,000	30" x 36"
10,000-30,000	36" x 42"
30,000-55,000	42" x 48"
55,000-90,000	48" x 54"

Technique: Scudding (downwind, no drogue)

- May be under storm sails or bare poles
- Target boat speed = (WL)^1/2
- Can be a bad choice; better to stream a drogue
- Must be actively steered
- As boat accelerates down wave face, pitch poling or broaches are common

Technique:
Lie ahull

- Bare poles; tie off helm
- Motion is pretty horrible
- Increasing chance of capsize as wave height = beam
- Generally a last resort
- Used frequently in 1979 Fastnet with poor results

Final thoughts

- Avoid heavy weather if possible
- Prepare in advance
  - Keep crew rested, hydrated and fed
- Have good weather information
- Have the proper tools
  - Storm sails
  - Drag devices
  - Lots of drivers