

Technical Pull-Out

Q&A FOR YOUR CATALINA THAT'S BEEN FACTORY-APPROVED FOR ACCURACY



Catalina 470



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Beckoning, #76

Anchor Chain Twist

Twist, Shout, Knock Yourself Out: The Twisted Anchor Chain Syndrome from Joseph Rocchio

Onward spends about 200 nights a year on its anchor so I get lots of practice. Anchoring usually goes quickly and without incident using a Manson Supreme anchor with 300 feet of all chain rode. However, occasionally the chain deployment does not go as smoothly as it normally does. I have had chain strippers bent under mysterious conditions and jams. The problem is exacerbated for me because as a single-hander I do much of the chain deployment and retrieval remotely from the starboard helm station and thus I'm not on site to intervene. After a dicey incident at St. Marys GA, I decided it

was time to understand what was going on and I spent 3 to 4 hours on the bow watching how the chain and windlass interacted before figuring out how to fix things to reestablish a workable anchoring system.

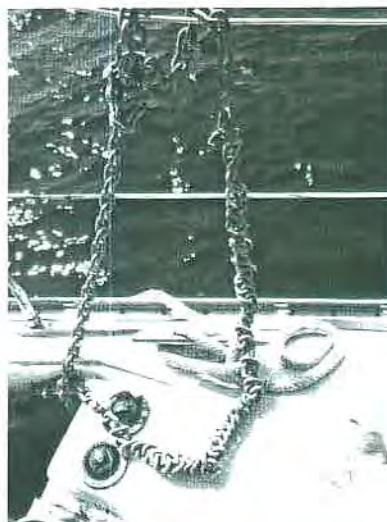
Here is how the problem occurs:

The chain, when the rode is being retrieved, develops twists on the locker side as it comes off the gypsy. The twists come from two sources: 1) the mechanical interaction of the chain with the turning gypsy; 2) twist that has been developed by the boat circulating around the anchor due to wind and current effects (this can add additional twists, or remove some, from the running total).

A swivel at the anchor end does not solve the latter problem because the chain is under enough tension on retrieval that the swivel has too much friction to turn under the small force that tends to untwist the chain (essentially gravity).

Due to these two reasons, a section of chain that is untwisted when deployed will end up in the locker with many twists after retrieval.

I discovered that these twists build up with each deployment & retrieval cycle! As the chain is deployed to anchor, most twists are essentially "filtered" off the rode before it reaches the windlass and are "stored" in the locker. This happens as the chain hangs under its own weight from the roller down into the locker. This allows gravity to straighten the chain and cause the twists in the short hanging section of chain to fall back into the locker. This happens in a continuous process and causes



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twists to get moved along the chain and get "stored". If the chain is deployed very rapidly – this filtering will be less effective (not enough time for gravity to work or too much tension on the chain coming out of the locker to the roller) and some of the twists will get deployed – only to be later retrieved.

After several anchoring cycles, a length of highly twisted chain forms in the locker. It can get so bad that it forms a ~ a 1.5" diameter section of compact links with almost no spacing between them (see photo). This mass of chain is so compact it cannot untwist. It will not feed properly on the windlass and will likely jam in the rotation lock or chain stripper. I believe this is how my chain strippers got bent.

Danger:

Once this section of compactly twisted chain is formed it is potentially dangerous because of its ability to jam and damage the windlass. I recommend that you **DO NOT OPERATE** the windlass under anything but very benign conditions and close supervision until this section is "cured".

The Cure:

Periodically untwist the chain. Here is a method I now use regularly. I put canvas down to protect the deck near the anchor locker. I don leather gloves and lift out the rode until the twisted segment is on deck. This length is usually just beyond the "average" amount of scope I've been using for the last several anchor deployments. Then I pick up a 4' - 5' length of chain and hold and shake it so that the twisted links untwist and fall toward the anchor end. I then carefully lower the untwisted length back into the locker making sure I do not reintroduce any twist. I then go on to the next section. In this way I move all the twists to the anchor end where I either disconnect the shackle from the anchor to let the twists "fall off" or I let the anchor with the consolidated section of twists drop down off the bow and allow them to untwist.

I have also taken the entire chain rode off the boat and laid it out on a pier to untwist it. This is much harder work and takes longer than the method above.

Another way that I will try in the future is to start at the anchor end and allow the twists to fall back into the locker as you take out the chain. This actually happens very naturally. In this way you can move the twists to the bitter end which may be more easily disconnected from the boat to let the twist "fall off".

I'm not comfortable with hanging 300' of chain and my anchor off the bow in deep water to let it untwist. Besides, as the chain runs around the gypsy when you retrieve it, new twists are introduced. Overall I believe the 4' - 5' section at a time methods above are easier.

Recommendations:

- Inspect the chain at regular intervals to make sure there is no section of compactly twisted chain in the length of rode you are likely to deploy under adverse conditions.
- If you have a section of compactly twisted chain that could be problematic – untwist the chain before you use the anchor again!
- Periodically check the torque on the screws that hold the chain stripper in place. These will come loose due to the vibration of the chain - stripper interaction. When loose it is much more easily damaged.
- I strongly recommend that ALL C470s that have the Maxwell 2000 windlass have the slotted screws that hold the chain stripper in place

replaced with hex-head 8-mm diameter screws with 15-mm length of thread. This will allow you to more easily and effectively torque the screws (and extract them if the stripper gets damaged).

- Carry a backup chain stripper if you anchor a good deal.
- Have at least two anchor hooks and lines available to allow you to secure the rode should you need to take the chain off the gypsy to fix a problem when the anchor is deployed.
- Inspect your chain for wear and rust. After six years of use including 3 of continuous cruising, the first 150' of Onward's rode had lost its galvanized coating allowing rust to build up when it sat in the locker for a few weeks while *Onward* was in a marina. Rusty chain stores twists more easily as they are harder to untwist as the chain deploys. Thus it is much more likely that a rusty section of compactly twisted chain will get fouled on the windlass. (If you have a rust problem, you may be able to swap ends of the chain and get almost double the life as you will seldom use the 2nd half of a long rode.)
- Be sure to regularly clean, lubricate, and torque the windlass friction cones. Remember there should be just enough friction to move the chain under light load. The cones should break free when too much force is needed to turn the gypsy. This will prevent damage to the windlass.
- When retrieving the anchor, the windlass should only see the force necessary to overcome gravity in lifting the chain. Use the boat engine to move the boat and handle wind and current loads.
- Be sure the bitter end of the chain is well secured inside the anchor locker!
- Be safe! Many cruisers each year lose fingers or fingertips by getting them crushed by the chain in an anchor windlass! It is VERY easy to unintentionally activate the foot switches when thrown off balance even while kneeling at the bow. NEVER put your hand anywhere near the chain and the gypsy when there is ANY load on the chain. Always use a chain hook to take the load. Deactivate the switches.

where

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James Holder,
Publisher and Editor

