

Stranding of cruiser Dragonfly at Thorpe Bay, 15th May 2013

Introduction

Dragonfly, a Snapdragon 21', came ashore in a strong S-S/W gale (Force 8, gusting Force 9) on the night of 14/15 May, probably around high tide, when its mooring chain broke.

Breaking of fairly new, good quality chain in good condition is very rare and worrying, so we investigated.

What happened

There were remarkably strong gusty winds that night. The TBYC weather station recorded the highest gust this year at 51mph, 207° at 3:42am, with highest sustained winds of 43mph 214° at the same time. High tide was 4:18am, nominally 5.3m but probably higher due to the gale.

Dragonfly's mooring failed due to a link twisting about 45°, separating at the weld. It is my understanding that the chain was 12mm tested chain, bought in 2010 and installed under Mooring Officer's supervision on the root dig that year, fully meeting TBYC recommendations. The chain had some wear and rust but appears good for several years more.

Dragonfly came up against beach huts to her north-west and was badly damaged against the protruding decks. Her mast was broken, coach roof fibreglass split, stanchions broken etc. Two huts were also damaged, one very slightly and the other's deck fence & bargeboard mainly.





The riser chain attached to the root. The riser was even more twisted when first seen.

Probable Causes

Peter & I visited Alan Bolton (chain & shackle specialist). It is only the second chain Alan has seen broken that way and his opinion was that it was largely due to the chain twisting hugely reducing the chain's breaking point.

The chain was greatly twisted; I've searched the Internet for information on loss of strength due to twisting but apart from general advice (e.g. to include a swivel) have found nothing definitive.

However, it seems to me that this degree of twisting weakens chain in several ways:

1. The twisting means that some links are taking the strain on the side of the link which is much weaker both due to the weld and to the longer axis.
2. Twisting shortens the chain enormously, so there is less damping of snatching due to lifting the chain off the sea bed and straightening the catenary curve.
3. Twisting stiffens the chain considerably, again reducing damping effects.
4. Snatching will shock the chain, and the twists will, I think, put enormous torque on the links. I've not found an analysis, but I suspect that the sideways links will tend to act as levers. (A - perhaps poor - analogy is wringing a wet cloth out. Stretching a cloth gets a little out; wringing it gets a huge amount out.)

With the twisting on this link, the link must have broken and continued to twist under tension before the chain separated. (In the chain photo it looks as if another link might be starting to twist - need to check the chain again.)

We checked other boats but saw little twisting. I used to get moderate twisting on Lillie before handing a drogue off the stern to stop her sailing round the mooring all the time.

Dragonfly has a skeg and rudder, which should reduce sailing in circles and snatching. However, when I saw her on the beach there was no tiller fitted and the rudder was free to move. I've found that an unsecured rudder makes the boat less stable than no rudder.

Our tentative conclusion is that the sea, onshore wind, tide & rudder combined to make Dragonfly repeatedly circle the mooring in the same direction (40 or 50 times?) twisting the chain; the cumulative (multiplicative) effects of twisting (probably effects 1, 4, 2, 3 in order of magnitude) hugely reduced the strength of the chain and the continued gales & surges broke a chain weakened somewhat by corrosion. It is possible also that this was a poor weld.

Of the other cruisers, Lillie had a (cheap) shackle come undone, but was saved by a parallel back-up rode; Another yacht had a backup rode come loose - knot undone.

Another boat (non TBYC) came ashore nearer Southend but missed groins & concrete and was little damaged.

RECOMMENDATIONS

1. Our current mooring guide is lukewarm on swivels, as they themselves are a single point of failure. We should revise this to say that if twisting of the chain is seen, a good quality swivel SHOULD be fitted. (Large buoys (where the pull is taken through the buoy by design) have a swivel built in.)
2. We should keep an eye on forecasts and recommend mooring checks before & after onshore storms.
3. We should make sure the TBYC Secretary has Beach Hut Association contact details.
4. We should recommend that moored yachts with fixed rudders immobilise them in a fore & aft position, and that boats with removable rudders have a drogue fitted if they tend to sail round their mooring.
5. We should continue to recommend comprehensive boat insurance rather than 3rd party only.
6. We should promulgate our conclusions to members.

Bill Dashfield
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