Chesapeake Tartan 30 Association

TARTAN 30 STARBOARD CHAINPLATES

Brad Armendt, *T-30 #282, Emprise*, May 1998*

Question: I am having a problem with my chainplate on the starboard side. Seems the bulkhead is bowing forward at the bottom attachment point, causing the forward attachment point (where the lower stay is attached) to rise up through the deck. The deck has several cracks where the chainplate comes through the deck and a slight bow between the upper and lower attachment points. Wondering if anyone else has had this problem and what your solution has been. Mark Huizen, *Windfall*, #353

Answer: Yours is one of about ten inquiries I have had on this subject. All have been concerned with the starboard chainplate; apparently the bulkhead to which the port chainplate is mounted is much stiffer, and the problem does not occur there.

I also had a problem with my starboard chainplate on *Emprise*. I thought at the time (probably about 1980) that I had neglected to keep the chainplate properly caulked, and that water had gotten through and perhaps softened the bulkhead that the chainplate is bolted to. From close examination of the cracking of the deck above, it seemed that the chainplate had rotated upward when under load, so that it cracked the deck around the forward (lower shroud) part of the chainplate (see Figure 1). When sitting in the slip, with no sailing loads on the rig, the chainplate looked perfectly normal, and did not press upward against the deck at the front.

I removed the chainplate and did my best to saturate the bolt holes and the area of the bulkhead near the chainplate with a very low-viscosity penetrating epoxy called Boatlife Git Rot (which is still available). The idea was to seal the wood and restore as much strength as possible, if rot had occurred. After this cured, I replaced the chainplate but laminated it with three plates of $^1/_4$ inch thick 2024 aluminum, one forward of the bulkhead and two aft of it (Figure 2). The $^1/_4$ inch plates were 3 inches by 19 inches. The plate on the forward side and one on the aft side had a $1^1/_2$ inch by 10 inch notch cut out of one corner, so that they fit around the stainless steel chainplates (Figure 3). The original five stainless steel bolts ($^3/_8$ inch in diameter) were replaced with similar but longer bolts which passed not only through the chainplate and bulkhead, but also the aluminum plates. In addition, I put eight more of these stainless steel bolts through the length of the aluminum plates and the bulkhead, down almost 19 inches below the deck. Thus, in addition to the load carried by the chainplate to the bulkhead by the original five bolts, the eight additional bolts carried load to a much larger area of the bulkhead, well away from the area that I thought might have softened. And I thought the three $^1/_4$ inch thick aluminum plates should greatly stiffen the area near the chainplate attachment.

The upper deck and core around the lower shroud chainplate was excavated over about a four-inch circle (leaving only the bottom fiberglass skin of the deck); I had the boatyard repair the hole and spray gelcoat over the top.

Did that work? Well, after perhaps 15 more years of sailing, including some hard racing and more than a few storms, the chainplates still seemed solid and tight. The area around the forward (lower shroud) chainplate that was repaired with fiberglass showed some fine cracks radiating from the chainplate, but I think they were mostly in the gelcoat; they were not visible on the bottom of the deck. I now think what happens is that under occasional *heavy* load the whole boat flexes and the horizontal brace part of the forward SS chainplate pushes upward against the deck, causing the cracks.

During the winter of 1997-98 we put our boat in the yard for an AwlGrip paint job and some other renovations. This required removal of ALL hardware and teak from the cabin, deck and topsides, except the teak toerails. The port chainplates were left in and masked for the painting, but the starboard ones were removed. The core of the deck around the starboard chainplates was found to be watersoaked, so the top fiberglass layer of the deck and the plywood core was removed over an area about two feet in diameter. In most of this area the plywood core was replaced with fairly dense closed cell foam, but the area within several inches radius around the chainplates was replaced with solid fiberglass. Then the top fiberglass layer of the deck was relaid. After this was finished, you cannot see that any repair

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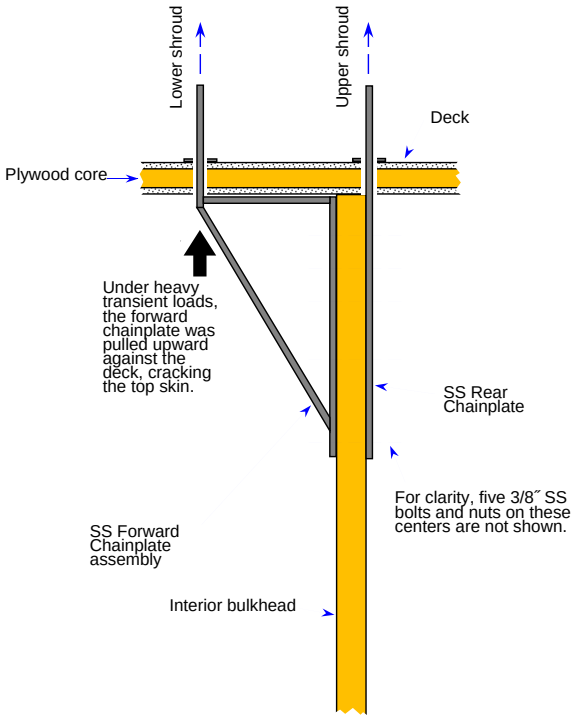

FIGURE 1. Original Installation.

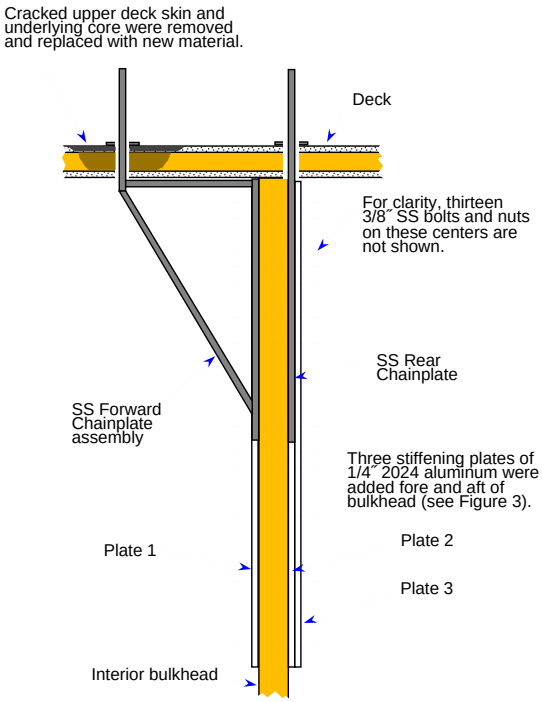

FIGURE 2. Repair circa 1980.

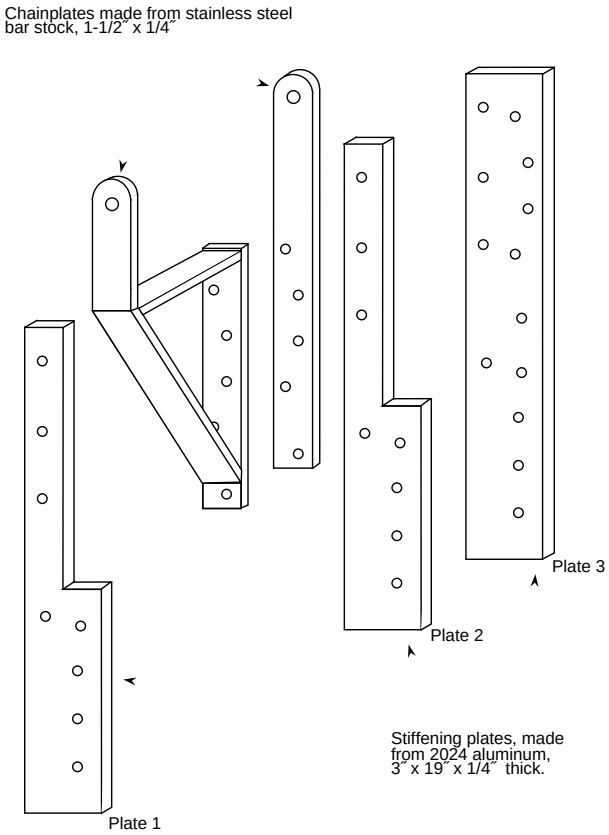

FIGURE 3. Exploded View of Chainplates and Stiffening Plates Used in 1980 Repair
(Deck, bulkhead, bolts & nuts not shown)

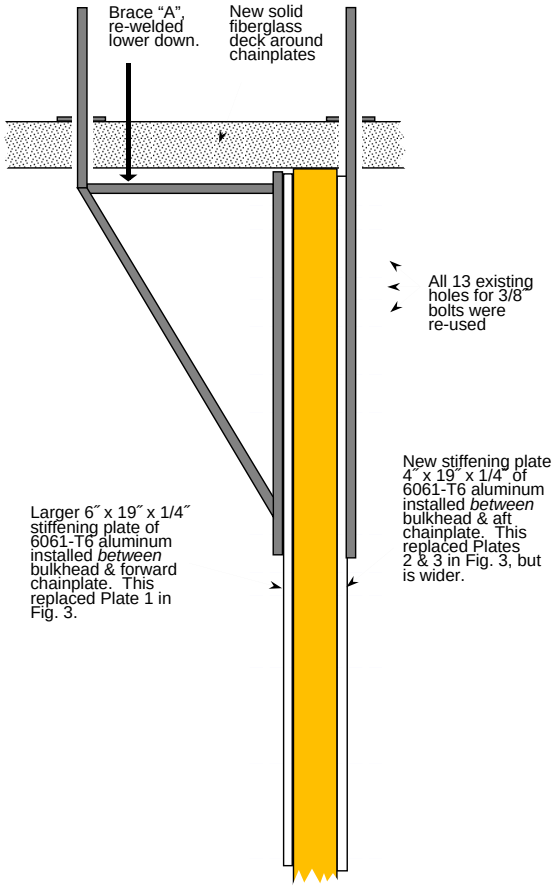

FIGURE 4. Second Repair, Feb 1998 (enlarged view)

was made. One good thing is that, because the deck core is now *closed-cell* foam, I should never again have to worry about water leaking past the chainplates and soaking into the *deck*, but it could still run down and soak the bulkhead where the chainplates are attached. The yacht yard strongly recommended use of Sikaflex 240 (the slow-cure one) for caulking the chainplates, because of its excellent adhesion together with considerable elasticity when cured, so that adjacent parts can move quite a bit without tearing the caulk apart, or pulling it loose from the hole.

While we had the starboard chainplates out of the boat, the forward one (for the lower shroud) was modified. The horizontal brace was cut out and rewelded about $^1/_2$ inch lower down (see Figure 4). This will provide some additional room for the boat to flex under heavy transient loads without forcing the horizontal brace up against the bottom of the deck. The old stiffening plates (of soft 2024 aluminum) were discarded, and two new and somewhat larger plates made of stronger, stiffer 6061-T6 aluminum were installed. The forward one between the forward chainplate and the plywood bulkhead was 6 inches wide by 19 inches high. The aft plate, installed between the bulkhead and the aft chainplate was 4 inches wide by 19 inches high. Both new stiffening plates were $^1/_4$ inch thick. The idea of the new plates was to broaden the load-carrying area as much as possible and to eliminate a potential “hinge point” at the bottom of the forward chainplate. The dimensions of these new reinforcing plates were, basically, as large as could be managed *without* requiring surgery on the nearby fiberglass liner to gain more access. The $^1/_4$ inch displacement of both chainplates (one forward, one aft) caused by insertion of the new reinforcing plates was no problem because the deck repair (described above) closed both chainplate holes; new chainplate holes through the deck were cut where needed. But if the chainplate modifications had been done *without* the concurrent deck repair, it would have been a simple matter to enlarge the holes through the deck to allow for the chainplates’ displacement of $^1/_4$ inch, and then patch the holes with a little fiberglass resin to reduce them to the desired size.