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## **Trampoline Removal Tips for Nacra Catamarans**

Applies to: Nacra 5.0, 5.2, 5.5, 5.7, 5.8, 6.0. May apply to some other Nacra boats.

These are general tips to help you remove the existing trampoline on your Nacra, and prepare your boat to receive a replacement trampoline. For installation you will need to reference the Nacra assembly manual for your boat, there may be more than one manual relevant to your boat. It is helpful to reference multiple manuals as you may find more complete information. Feel free to contact SLO Sail and Canvas for manuals and parts lists for your Nacra. There are references to a number of problems below that you may encounter. The internet is also a great resource for other specific problems you may have.

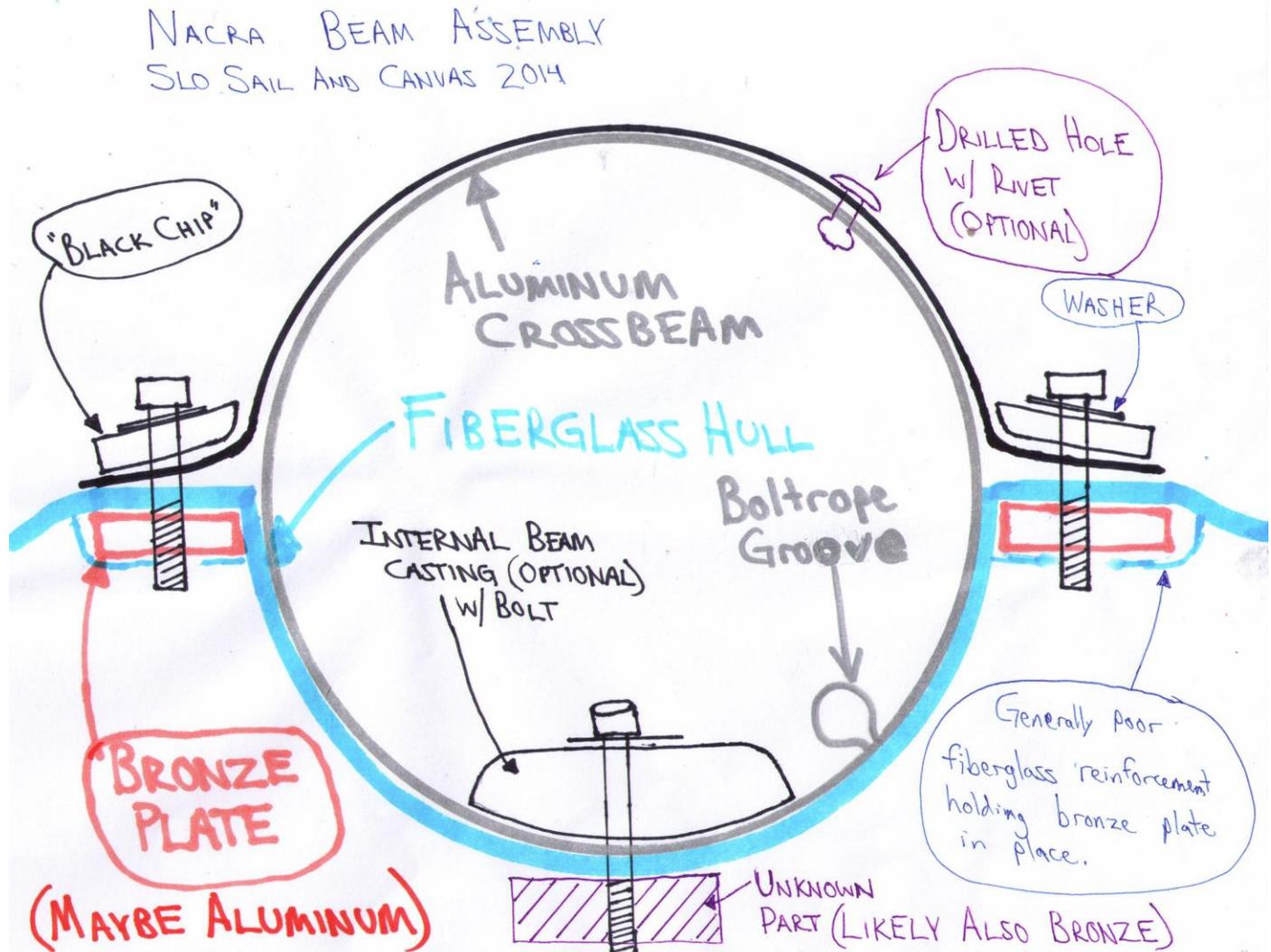
In general, boats that see freshwater use will be easy to disassemble, and boats that see saltwater use will be more difficult. If you have a boat that is used in saltwater be prepared for some work.

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### **Tools and Supplies:**

- Penetrating lubricant (PB Blaster, Kroil, Liquid Wrench, etc...)
- Replacing the old bolts with new ones is recommended if they are difficult to remove, and if the boat has been used in saltwater. It is only a few dollars per bolt and it will provide good peace of mind. If you break or damage any bolts you'll need new ones anyhow.
- Waterproof grease for assembly
- ¼" Allen wrench or hex bit for socket head cap screws on beam for stock 5/16" bolts.
- Torque wrench with appropriate hex bit. Suitable for under 16 ft-lbs (192 in-lbs).
- Channel Lock pliers to keep chips from turning.
- If you have other problems you may need some more advanced tools and techniques. Taps for threading holes, drill, drill bits, Dremel tool, epoxy kit, boroscope, inspection mirror, spare bolts, etc...

## Beam cross-section



## Trampoline removal steps:

1. You'll need to remove the mast and trapeze shock cord for the trampoline removal/installation process.
2. Lubricate the forward beam strap bolts from the top and bottom if possible with penetrating lubricant. If your boat has inspection ports you will be able to lubricate from the bottom in addition to the top. As far as we know Nacras did not come stock with inspection ports, so if you see inspection ports on a Nacra, it is likely that it was repaired or altered at some point.
3. Gently try to loosen the strap bolts on the forward beam only. Be very gentle, if you break a bolt you are in for a long process. For reference the 'standard dry torque' for a 5/16" 18-8 Stainless Steel socket head capscrew is only 13 ft-lbs. Even though you shouldn't use a torque wrench for loosening bolts it may be prudent here as you definitely don't want to break the bolt head off.

4. If the bolts do not loosen under gentle pressure keep applying penetrating lubricant over several days. Take it slow and try again. If you do break a bolt off in the hull be ready for some hard and careful work.
5. The threaded plates in the hull can tend to come loose inside of the hull so don't get too aggressive with them. The few boats we have repaired have had poorly bonded plates, treat them gently and don't hit the bolts with a hammer. If the plates are loose you'll want to re-bond them to the hull with epoxy or 5200. Be sure to degrease the parts with brake cleaner before trying to bond.
6. You can replace the trampoline with only removing one side of the forward beam. You will want to do this with multiple helpers and just lift enough to expose the boltrope track so you can slide the trampoline out between the beam and hull. Some will prefer to remove the entire beam. If you are using the one side only method you'll want to lift the minimum amount possible (2" or less) to not stress the bolts or hull on the opposite side. We will gently try the bolts on both sides of the boat to see which side will be the easiest to remove to minimize the risk of a broken bolt.



If your boat has inspection ports (as shown) you can easily access the inside of the hull for lubricating the bolts from the inside, and ensure the plates on the inside of the hulls are solidly in place.

### **If you have stuck or broken bolts:**

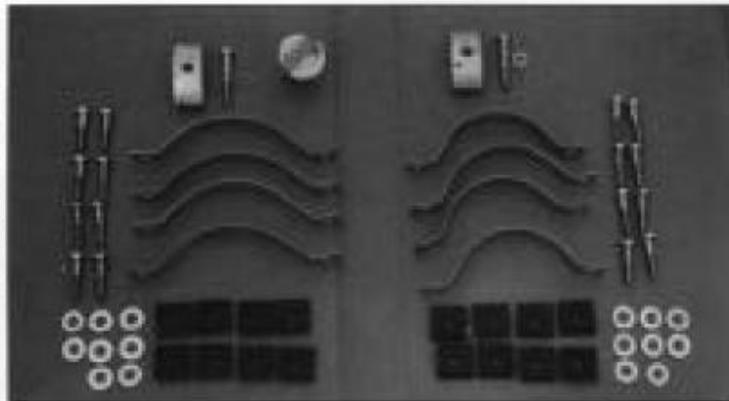
- Use lots of penetrating lubricant. Try different types over a period of many days and try gently to unscrew the bolts.

- If you can drill out and remove the existing bolt there are several options without having to cut in an inspection port: Heli-Coil kit, or drilling and tapping to the next size up. A good tip: instead of using a center punch to center a hole for drilling is to use a Dremel tool to mark your center point. You can mark with more precision and you won't work harden the bolt. You can also use the Dremel or other tool to sculpt the bolt head to make it easier to drill. The one threaded plate we have seen out of the boat was definitely bronze and was about 5/16" thick. We have heard from others that the plates are aluminum. Nacra may have used different materials for these plates at different times.
- If all else fails you'll need to cut in an inspection port and you can tackle the problem from the top and bottom.
- The non-skid deck plates forward of the forward beam are put on over the top of the hulls and there may be access holes to the inside of the hull underneath these non-skid plates. One Nacra 5.2 we dealt with had one of these deck plates that was partially coming off and we were able to use a razor knife to gently separate it away from the hull to gain access to the forward beam bolts through this very large hole. This is probably only an option if your non-skid portions are already separating from the hull; otherwise you'll need to install an inspection port.
- If the bolts are stuck on both sides of the beam you'll likely have to pick which bolts to break off. Pick wisely.

## Tightening the straps:

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6. Arrange the 16 bolts, black chips, washers and main and aft beam straps so that the 4 main beam and the 4 rear beam straps are separated.



Note: Boardless Boats straps - 8 3/4" (all straps)

Daggerboard boats main beam straps - 8", Rear beam straps - 8 1/2".

Note: The note above references different strap lengths for different boats and the above lengths may not be entirely correct, see Performance Catamaran parts manual. (Photo from Nacra 5.2 and 5.5 assembly manual 1991)

The Nacra Manual recommends torquing bolts to 16-18 ft-lbs which is actually more than the standard dry torque of an 18-8 5/16"-18 stainless steel cap screw which is only 13 ft-lbs. The torque value for a greased screw is even less than the dry torque, so the torque value can be less to achieve sufficient clamping force. Typical grease or anti-seize will reduce the necessary torque by about 20% which would be only 10.4 ft-lbs of torque. Others online have recommend using low torque values like 12 ft-lbs which is likely prudent. **DO NOT OVER TIGHTEN THE STRAP BOLTS.** This may crush the crossbeam at the trampoline boltrope groove. **ENCAPS MUST BE INSTALLED BEFORE TIGHTENING THE STRAPS TO PREVENT CRUSHING!!!**

## Keeping the beams from rotating:

Your boat will need something to keep the beams from rotating while sailing. There are three different things that were done to prevent the beam from turning, some boats may have more than one of these, others may have none. You can pop off the endcaps for a quick check.

1. Internal beam casting with bolt inside of the crossbeam.
2. Center tube running along the boat centerline from the forward beam to the aft beam (Knee Knocker).
3. A drilled hole with a rivet through the straps to prevent turning.



Photos: No Internal Beam Casting or bolt (Left). With Internal Beam Casting and Bolt (Right).

## Preparing to install the new trampoline:

- Clean side tracks and beam. A pencil or pen with a light cloth wrapped around it can be slid through the tracks to remove stubborn grit. Check the tracks for damage. It is common to see the ends of the tracks bent in or out, you may want to gently bend the track back to its original shape.

- For trampoline installation you may want to use soapy water, or a PTFE lubricant like McLube, to help the new trampoline slide through the side tracks.
- During re-assembly you may wish to seal the bolt holes with wax or silicone to prevent water intrusion and corrosion between the stainless steel bolts and the bronze plates in the hull. Be sure to add grease or anti-seize to the bolts prior to re-assembly. As part of a regular maintenance program you may want to consider removing bolts on an annual basis to check the torque and re-apply grease to the threads to prevent corrosion.

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