

Examples of Proper FRP Repairs

Note 12:1 Ratio Taper of Material

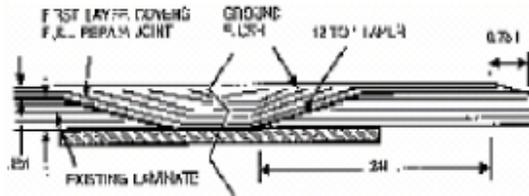
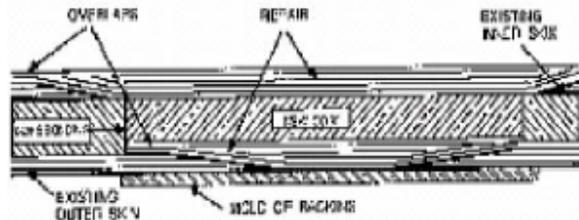


FIGURE 2-2



Blister Repairs

- Blisters should be drained, the damaged gelcoat removed and the area rinsed with fresh water and dried.
- Drying can be done with heat lamps, but not above a surface temperature of 1500F.
- The damaged areas should be ground or sanded away, cleaned and coated with fresh resin.
- Repair as per Edge and Surface Preparation.

SPECIAL NOTES On Fittings

The following deficiencies, most stemming from new construction faults, are possible:

1. The attaching bolts are corroded or broken.
2. Bolt washers or backing plates are too small and the bolts are pulling through the laminate.
3. A flat based fitting is attached to a curved surface. In this case the bedding or sealant has served as a base plate, but has failed because of the improper joint surface.
4. The sealant or bedding has failed.
5. The sealant has failed and the laminate is damaged from water infiltration.
6. The surrounding laminate has failed due to one of the above or was not properly prepared to begin with.

In any case, a suspect fitting should be checked for all of these deficiencies and brought back to the standards for new construction.

On Storage and Lamination Area

Storage:

Storage of resins and reinforcements is to be sealed and maintained at the temperature and humidity limits in a cool, dry, and clean area following the manufacturers recommendations.

Laminating:

The laminating area is to be fully enclosed, shaded from the sun, dry, clean, and adequately ventilated and lighted. The temperature in the area is to be maintained between 60F and 90F.



What to Expect During a Hull Inspection Fiberglass Vessels

Dry Dock or Hauling Out

The vessel is to be hauled out at the owner's expense and the following should be accomplished prior to the Inspector arriving:

- The hull should be clean; NOT freshly painted!
- All of the sea valves should be available for inspection. The inspector needs to examine the valve surfaces and valve seats
 - Ball Valves can usually be examined from the exterior of the boat and do not require to be removed.
- All of the exterior thru hull strainers should be removed for inspection so the spool pieces between the valve and hull can be examined.
- Open and air out all internal spaces.

What The Inspector Will Be Looking For

1. Hull Structural Integrity
46 CFR 176
2. Watertight Integrity
46 CFR 171
3. Rudders, Propellers, and Tailshafts - If single screw, Prop must be removed for inspection of keyway and shaft taper
46 CFR 176
4. Valves and Through-Hull Fittings
46 CFR 176
5. Ground Tackle
46 CFR 184

What to Do if you NEED REPAIRS

1. Contact your Marine Inspector and discuss the repairs **BEFORE STARTING ANY REPAIRS.**
2. All repairs shall be completed using Navigation Vessel Inspection Circular (NVIC) 8-87
3. Send the following documents to your Marine Inspector:
 - A) Plans of intended repairs as original
 - B) Bill of Materials to be used
 - C) Certs of Materials to be used (as applicable)
3. The inspector will examine your proposal
 - A) Approved
 - B) Return for Revision or
 - C) Disapproved
4. Discuss what milestones in the project must be witnessed by the attending inspector.

Edge and Surface Preparation

- The original laminate should be determined from plans, records, damaged material checks or burnout tests.
- Orientation and order of layup of laminates should be duplicated.
- Once the area to be repaired is defined, the shell should be cut open back to good laminate.
- The edges of the sound laminate should be tapered back at a minimum ratio of 1 to 12 .
- The surface of the taper should be prepared by sanding or grinding to produce a roughened area for the secondary bond.

Laminating

- The recommended method is to lay the first layer over the entire joint, including overlap, then build up the required thickness.
- The subsequent layers should be somewhat wider than necessary, then ground smooth after cured for the final layer used to seal the exposed edges.
- The laminating process should be done carefully to ensure that the proper glass content is maintained and the plies are fully pressed into the various breaks in the joint.
- The extent to which additional reinforcement is carried is dependent upon the location of the repair in the vessel, the size of the repaired area and the quality of the repair materials.

Sandwich Construction

- For cored FRP vessels, the extent of damage to the core must be determined when cutting out the damage.
- If both skins and the core are damaged, the layup of each skin can be similar to that for single skin, including additional reinforcement.