



ASSESSMENT OF DAMAGE TO INTEGRAL FRP WATERTANK

Problem:

During a routine inspection / cleaning of inside a locker, the crew of a high-value sailing yacht (3 month old) noted some water oozing out of a small hairline crack of the tabbing of an integral FRP water-tank.

The tank was made of E-glass with Vinylester resin and tabbed along the tank-top and the tank-sides into the hull with chopped strand mat; no internal tabbings were used.

NDE Solution:

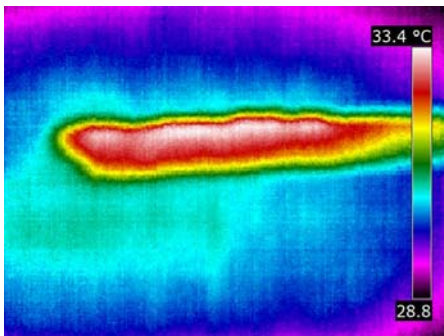
The visual inspection revealed an approx 670mm long hairline crack along the top edge of the tabbing. Hammer sounding revealed that the area (tabbing) directly (approx.10mm) below the above mentioned crack was delaminated / debonded. All other areas appeared to be free of anomalies.



Visual hairline crack at the upper end of the tank-tabbing.

Infrared Thermography revealed a large disbond between the pre-moulded hull shell and the tabbing for the tank (secondary bonding).

Ultrasonic Flaw Detection not only confirmed the disbond but revealed that the area affected was extending largely beyond both the visible anomaly and the area detected by Infrared Thermography.



The Infrared picture shows the area affected to be considerably larger than visual inspection and hammer tapping indicated.



Actual area affected by debonding as indicated by Ultrasonic Flaw Detection

Due to the position of the tank in the forward part of the vessel, and its purpose as replacement for a longitudinal reinforcement, the extent of the damage was deemed to be structurally critical.