



UNITED STATES COAST GUARD

U.S. Department of Homeland Security

MARINE SAFETY ALERT

Inspections and Compliance Directorate

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Safety Alert 01-98

REPOWERING WOOD BOATS



Upon return from a routine day fishing trip in November 1997, the operator of an inspected wood small passenger vessel reported that his vessel was taking on water at the dock after discharging passengers. Preliminary investigation indicated that the starboard chine log and outside starter plank of his 41 ft cross-planked Chesapeake deadrise hull were fractured.

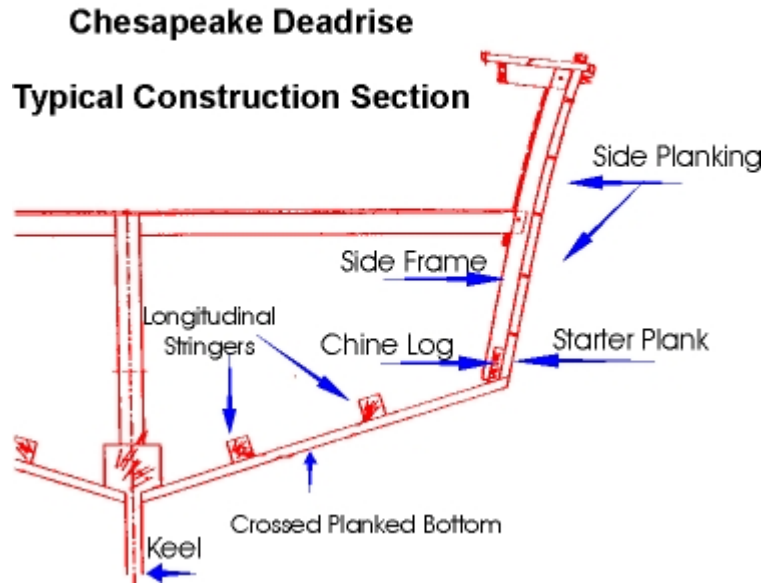
Further investigation revealed that the 28 year old vessel had replaced the existing and original twin gasoline engine installation with twin diesels at the beginning of the season. Although the diesels were of comparable horsepower, they were double the physical size and weight of the original installation, with an available peak torque of over twice the existing gasoline engines. For details, see [Traveling Inspection Report](#) dated January 15, 1998 and [Safety Alert](#) message dated February 5, 1998.

Diesel technology has advanced rapidly in the last ten years, with engines becoming increasingly efficient for their size. These mechanical advances coupled with already proven planing hull designs may result in combinations which drive existing wood hulls harder than envisioned by their original builders and or designers. Some already optimized designs may not have sufficient structure to survive such a re-powering without additional hull strengthening or careful engine choice.

CROSS-PLANKED HULLS

Cross-planked hulls are a type of vee-bottom construction unique to the Chesapeake Bay, although Coast Guard records indicate that these vessels are operating throughout the country. Their construction is unique in that the side planking above the chine is run fore and aft with vertical side frames at regular intervals, while the bottom planks run perpendicular to the keel instead of fore and aft. The side frames end at the chine, and do not extend to the keel. The bottom structure consists of longitudinal stringers or "sister keels" run fore and aft at regular intervals between the keel and the chine. Transverse strength is via strategically placed "strongback" timbers which run chine to chine and are generally tied into the side planking with sizeable brackets. (See [NVIC 7-95](#) and BOATBUILDING by Howard Chappelle)

When these hulls are loaded, the chine log and starter plank will give the first indication of structural failure. The construction detail in these areas may also contribute to the hull failure mechanism, whether brought on by natural aging or exacerbated by increased propulsion power installation. The direction of the wood grain selected in order to bend the chine and starter planks in place runs fore and aft. The side frame heels are generally bolted from the outside in, through the starter plank and face of the chine log to pick up the frame. These frame bolts are generally in a line horizontally with grain of the chine log.



Initial indications include shallow checking of the face of the chine log on the inside or on the face of the starter plank on the outside "bolt to bolt."



As the hull continues to work, these checks can widen into fractures, with the worst case of both the chine log and the outside starter plank fracturing all the way through.

The chine log and starter planks on all cross-planked hulls should be inspected closely at each scheduled drydock inspection for early signs of deterioration. When inspected underway, leakage on the top of the chine log may indicate a split starter plank, versus leakage on the bottom of the chine which is an indication of the condition of the bottom planking to chine connection. These areas should be looked at closely before re-powering schemes are approved, so that any preliminary indications can be fully documented and watched over time

OTHER WOOD HULLS

Although the above casualty and discussion are specific to Chesapeake cross-planked deadrise hulls, the issue of re-powering and its impact on existing wood hulls is applicable regardless of design. This is particularly important when the conversion is made from gasoline to diesel engines. Because of the inherently higher torque available from diesels, they will allow an operator to drive the hull harder in sea conditions where a gasoline engine would load down and automatically force a reduction in speed. Lightly built planing hulls that will continue to perform with increased power should be targeted and examined closely both before and after modification for any adverse effects to the hull structure. Field offices should not hesitate to involve the Hull Division of the Marine Safety Center (202-366-6481) when existing inspected wood hulls are re-powered, or require owners to prove structural sufficiency by utilizing the services of a qualified naval architect. The G-MO-1 Traveling Inspection staff (202-267-1080) is available to assist in the field evaluation of existing installations showing signs of structural deficiency.

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