

This document supports a complete article on the building, by GMT Composites of Bristol, Rhode Island, of a mast for the sailing vessel *Morgan's Cloud*. It should be read in conjunction with the article, available at:

http://www.morganscloud.com/gear_failures_fixes/gfmast.htm

To learn more about *Morgan's Cloud* and her owners, Phyllis Nickel and John Harries, go to:

www.morganscloud.com

From: Steve Koopman [steve@sdkstructures.com]

Sent: Wednesday, October 04, 2006 7:17 PM

To: John Harries & Phyllis Nickel

Hello John,

I have spent some time on how to best word an addendum to our analysis report. In hindsight the concluding paragraph should have read something like the following:

There is nothing in our analysis that indicates that this mast is not suitable for use under normal sailing conditions so far as the overall global structure is concerned, with this statement predicated on the tube laminate being properly applied, consolidated, and cured. There are features that could clearly be improved upon and optimized, but it is likely that the mast will prove acceptable for typical yacht service once the issues of local hardware attachments and rigging details are properly attended to. The additional structural requirements for a rig intended for sailing in the often adverse conditions of the high latitudes as compared to a rig intended for more normal sailing are highly subjective. SDK Structures was asked to provide an objective analysis of how the scantlings of the GMT supplied rig compared to our normal design standards and we have determined that the mast tube inertias are in excess by a factor of approximately 1.06 over what we would normally specify. Any additional margin needed to ensure "bullet-proof" operation in the high latitudes is best decided by mutual discussion between the yacht owner and the rig designer, with the decision being made factoring in the trade-offs between strength, weight, stability, and cost.

I was not involved in any of the initial discussions between you and David Schwartz, so I cannot comment on what you two may have discussed or agreed on for reasonable additional structural margins for your intended use of the boat.

It seems to me that the major problems with the GMT rig are:

- 1) the mast is twisted
- 2) there are indications of local weakness in way of the fitting attachments and these attachments appear to be under-built
- 3) the cost of the rig seems to have been high given the relatively simplistic laminate and construction
- 4) despite the relatively thin walls and light tube, the all-up weight of the rig is not as light as would be expected, which may be due to non-structural filling & fairing
- 5) because of 1 & 2 the insurance company will no longer insure the boat

All of these items are very valid complaints, but are outside the scope of our analysis. There really

has never been an indication that the mast tube is not sufficiently stiff or that the walls are in danger of buckling. I am not in any way saying that you were well treated by GMT or that the rig that they provided was a good value, however from a structural point of view, it is difficult to say that the mast is definitely undersized.

Steve Koopman

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