UNITED STATES COAST GUARD

INVESTIGATION INTO THE S/V NAHOKU II DISMASTING AND FATALITY

ON 12/01/2006

MISLE ACTIVITY NUMBER: 2833864

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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23 April 2009

INVESTIGATION INTO THE S/V NAHOKU II DISMASTING AND FATALITY ON DECEMBER 1, 2006

ACTION BY THE COMMANDANT

The record and the report of the investigation into the subject casualty have been reviewed. The record, including the findings of fact, analysis, conclusions, and recommendations are approved subject to the following comments.

COMMENTS ON ANALYSIS

Section 2.0 – Rigging report (page 27): As stated in the Vessel History (section 1.2.1), the rigging survey stated that the NAHOKU II's rig was satisfactory. The complete report was as follows:

> I visually inspected the rig on your catamaran on April 26, 2006 at Ala Wai Marine and found no obvious problems. The cable was clean and smooth and the terminals and turnbuckles appeared to be in good shape.

No additional documentation was submitted in support of the report, which the Coast Guard apparently accepted as evidence of the satisfactory condition of the rigging. According to the owner, the ANS rigging manager who performed this survey also designed the modifications to the rig that used a Harken jib furling system as a mainsail furler in 2000. The ANS rigging manager disputed this claim, indicating that the owner gave him the design plans, while also explaining that the use of the jib-furler as a mainsail furler "is done all the time." There is no dispute that the owner initiated the foregoing alterations to the vessel's rig.

Comment: We do not concur with the rigger's comment that jib roller furlers are used on masts all the time. While it may be common in Hawaii, discussions with riggers and experienced designers outside Hawaii indicate otherwise.

ACTION ON RECOMMENDATIONS

Recommendation: National Standards for Standing Rigging
Recommend that Coast Guard Marine Safety Center partner with industry to develop a national minimum standard for masting and rigging of sailing vessels, or to incorporate by reference an existing rigging standard. This can be augmented with guidance via Navigation and Vessel Inspection Circulars and the Marine Safety Manual. In addition, develop a standard time interval for the un-stepping of the mast for inspection and third party surveys.

Action: We do not concur with this recommendation. We do not believe there is justification for the establishment of a national minimum standard for masting and rigging of sail vessels. In this incident, the vessel employed a non-standard sailing rig that had been significantly altered without the required review and approval by the Officer in Charge, Marine Inspection (OCMI) or the optional evaluation by the Marine Safety Center (MSC). We believe existing industry standards and references for rig design and construction, if properly applied, and the current marine inspection requirements for small passenger sail vessels, if properly complied with, would have identified safety concerns associated with this vessel's sail rigging so that they could have been properly addressed.

Recommendation: Sail Plan Review
Recommend that a regulations working group be chartered to investigate and, as appropriate, propose the establishment of uniform design and construction standards for mast and rigging equipment on inspected sail vessels. Pending completion of the project, the Coast Guard should consider requiring the submission to MSC of a naval engineer's or marine architect's report certifying that the proposed sail plan and rigging configuration have been reviewed and that they are appropriate for the proposed service. The report should identify with particularity the methodology used to ascertain the mast and rig's suitability.

Action: We partially concur with this recommendation. We do not believe there is justification for the establishment of uniform design and construction standards for mast and rigging equipment on inspected sail vessels. In this particular incident, the vessel employed a non-standard sailing rig that had been significantly altered without the required review and approval by the Officer in Charge, Marine Inspection (OCMI) or the optional evaluation by the Marine Safety Center (MSC). We believe existing industry standards and references for rig design and construction, if properly applied, and the current marine inspection requirements for small passenger sail vessels, if properly complied with, would have identified safety concerns associated with this vessel's sail rigging so that they could have been properly addressed. We do believe it may be warranted to change the submission of the detailed calculations on the strength of the mast, post, yards, booms, bowsprits, and standing rigging on all sail vessels to the MSC for evaluation under 33 CFR 177.330 from an optional requirement imposed by the cognizant OCMI to a mandatory requirement imposed on all small passenger sail vessels, and will consider seeking this change to the regulations. In the meantime, we will remind all OCMIs that they have this option under 33 CFR 177.330 and that they should use it any time they are concerned with the suitability of the rig design for the vessel's intended service.

Recommendation: Rigging Surveys
Due to the complexity of modern sail boats, the Coast Guard must continue to rely on third party-prepared surveys, furnished at owner expense, to assist in determining the material condition of the mast and rig equipment during periodic inspections. In order for the Coast Guard to perform its oversight function, standards should be developed that will enable the OCMI to critically evaluate the survey against objective criteria. Recommend that the Coast Guard publish uniform minimum standards for rig surveys. An abbreviated example of a qualitative and quantitative rigging survey should include the following parameters"

- Initial review of the rigging system and comparison to the original sail plan;

- Inspection of all fittings and terminals (with magnification where appropriate);
- Inspection of chain plates, clevis pins, toggles, terminals and wires for corrosion and wear;
- Measurement and recording of rigging tension of all stays and shrouds;
- Inspection of mast column and comparison to previous surveys;
- Inspection of spreaders and their alignment;
- Inspection of gooseneck and fittings;
- Inspection of mast step, including Magnaflux dye penetration.

Action: We partially concur with this recommendation. We note that Sector Honolulu issued Inspection Note #13, "Inspection of Sail Rigging and Masts on Inspected Small Passenger Vessels," on September 11, 2008. This inspection note was developed with the assistance of a Senior Traveling Marine Inspector from Commandant (CG-546), the Marine Safety Center, and the local passenger sailing vessel industry. The note establishes a rigging examination regime with inspection and documentation requirements that is developed for each small passenger sailing vessel operating within Sector Honolulu. We are aware that other Officers in Charge, Marine Inspection (OCMIs), with the assistance of the Traveling Marine Inspection staff, are in the process of developing similar policy guidance tailored to the specific issues associated with small passenger sailing vessels in their areas of responsibility. We will pass Sector Honolulu's inspection note on to other Officers in Charge, Marine Inspection, and provide them with assistance in developing and implementing similar, local regimes for the small passenger sailing vessels in their areas of responsibility. Once local regimes have been established and a knowledge and experience base has been developed, we can revisit this recommendation and evaluate whether a national set of minimum standards for rig surveys are appropriate.

Recommendation: Marine Inspection Training
Existing guidance in the Marine Safety Manual, Volume II, requires marine inspectors to carefully review the vessel's case file, all associated paperwork, surveys, and all pertinent vessel plans and photos for comparison purposes prior to conducting a vessel inspection. In addition, existing guidance instructs marine inspectors to be especially alert for unauthorized alterations that may adversely impact vessel safety. Although faithful attention to these best practices helps to ensure the safety and suitability of the inspected sailing vessel fleet, these practices failed to produce the identification of the serious hazards aboard the NAHOKU II before the mishap, most probably because marine inspectors did not have the specialized training in sail rigging to know what to look for. As indicated above, the ability to identify an improperly configured or mis-tuned rig often turns on the inspector's ability to look beyond the material condition of the vessel and its equipment and to pick up highly subtle warning indicators of a potential hazardous condition. Accordingly, it is recommended that Headquarters review the existing rigging inspection component of the marine inspection training program at RTC Yorktown, and develop an advanced curriculum addressing the unique requirements of sail configuration, rigging design, and rigging maintenance and inspection. Job aids and checklists based on peer-reviewed best practices should also be developed for distribution to marine inspectors in the field. In addition, program managers should consider establishing a sailboat rigging Course of Excellence or a third party training center for marine inspectors assigned to ports with auxiliary sail vessels. Successful completion of an appropriate rigging course should be required for any inspector conducting inspections of sail vessel rigging systems. Any such course should include a case

study of the NAHOKU II mishap, including a technical analysis of the mishap and potential warning indicators for the marine inspector. Sectors with auxiliary sail vessels assigned should periodically review the results of this investigation report and incorporate the lessons learned in their local training program.

Action: We concur with this recommendation. With respect to improving the level of training and knowledge of our marine inspectors, we will work with the Marine Safety School at the Coast Guard's Training Center in Yorktown, Virginia, to incorporate portions of the Small Passenger Plan Review Course's curriculum related to sailing vessels into the Basic Marine Inspector Course. In addition, we will pursue development of a third party advanced training course, similar to the current Wood Boat and Composite training course, addressing the unique requirements of sail configuration, rigging design, maintenance and inspection. We also intend to publish guidance, possibly in the form of a Navigation and Vessel Inspection Circular (NVIC), specifically covering these same issues that can be used by our marine inspectors and members of the maritime industry to work through the marine inspection process for passenger sailing vessels to ensure that sail riggings are safe and suitable for use in passenger service.

//s//
M. P. RAND
By direction

5. My point of contact is Commander Randall Farmer at (808)535-3421.

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Enclosure

Copy: CG PACAREA (Pp)
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