

FLYER TO THE LEISURE INDUSTRY

Loss of the yacht *Cheeki Rafiki* and its four crew



Image courtesy of United States Coast Guard

Narrative

On 16 May 2014, an alert was received from the personal locator beacon of the skipper of the United Kingdom (UK) registered yacht *Cheeki Rafiki*, which was on passage from Antigua to the UK, and located approximately 720 miles east-south-east of Nova Scotia, Canada. Despite a major search effort, during which the yacht's upturned hull was located but not recovered, *Cheeki Rafiki's* four crew remain missing.

In the absence of survivors and material evidence, the causes of the accident remain a matter of some speculation. However it is concluded that the yacht capsized and inverted following a detachment of its keel. In the absence of any apparent damage to its hull or rudder other than that likely to have been directly associated with keel detachment, it is concluded unlikely that the vessel had struck a submerged object. Instead, a combined effect of previous groundings and subsequent repairs to its keel and matrix had possibly weakened the vessel's structure where the keel was attached to the hull. It is also possible that one or more keel bolts had deteriorated. A consequent loss of structural strength may have allowed movement of the keel which would have been exacerbated by increased transverse loading through sailing in worsening sea conditions.

Safety Lessons

1. Matrix detachment is possible in yachts where a GRP matrix and hull are bonded together. The probability of this occurring will increase with longer and harder yacht usage. There is therefore a need for regular structural inspection by a nominated competent person as part of a formal verifiable procedure, as well as before embarking on an ocean passage.
2. Owing to the continuous nature of a matrix where solid floors are in place, particularly where the keel is attached to the hull, it may be difficult to readily identify areas where a detachment has occurred. There are differing opinions among surveyors and GRP repairers with regard to what are appropriate methods of inspection and repair, including the circumstances in which the keel should be removed. There is therefore a desire for best practice industry-wide guidance to be developed.
3. Any grounding has the potential to cause significantly more damage than may be subjectively assessed or visually apparent, including matrix detachment. It is therefore important that all groundings, including those perceived to be 'light', result in an inspection for possible damage by a suitably competent person.
4. Ocean passages require comprehensive risk assessment and contingency planning. A compromise needs to be made between planning a high latitude route, to pick up favourable winds and ensure a speedier passage, and a low latitude route, to avoid particularly adverse weather at the expense of a slower passage possibly necessitating additional port calls. Weather routing, vessel tracking and frequent communications from a shore-based support cell can significantly reduce the risks.
5. Attached keels are a feature of modern yacht design. Operators and crews therefore need to be aware of the associated danger of keel detachment, and have preventive procedures in place to reduce the risk, e.g regular inspection of the keel attachment area and checking of keel bolts, and documented actions to take in the event of flooding, including reducing the load on the keel and preparing for the yacht capsizing and inverting.
6. Search and Rescue mid-ocean is hampered both by the time it takes fixed-wing search aircraft to arrive and their ability to assist when on scene. Consideration therefore needs to be given to how the alarm will be raised, both by the quickest means and with an accurate position. Wearing a Personal Locator Beacon provides additional assurance that the alarm can be raised if it has not been possible to deploy the vessel's EPIRB.
7. It is likely to take many hours or even days before SAR assistance can be provided mid-ocean, during which time being able to board a liferaft will be key to survival. In small craft there will be a trade-off between positioning the liferaft so it will deploy automatically in the event of an emergency, and the risk of it deploying accidentally in heavy weather. Whatever solution is chosen, for long passages it might be necessary to make other compromises to ensure that the liferaft is located in the best possible position to ensure its availability in the event of a catastrophic event, such as a sudden capsizing.

This flyer and the MAIB's investigation report are posted on our website: www.gov.uk/maib

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