

**Extracts from
The United Kingdom
Merchant Shipping
(Accident Reporting and
Investigation) Regulations
2012**

Regulation 5:

"The sole objective of a safety investigation into an accident under these Regulations shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of such an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

Regulation 16(1):

"The Chief Inspector may at any time make recommendations as to how future accidents may be prevented."

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NOTE

This bulletin is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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Keel failure and capsizing of the commercial yacht

Tyger of London

1 nautical mile south of Punta Rasca, Tenerife

on 7 December 2017



MAIB SAFETY BULLETIN 3/2018

This document, containing safety lessons, has been produced for marine safety purposes only, based on information available to date.

The Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 provide for the Chief Inspector of Marine Accidents to make recommendations at any time during the course of an investigation if, in his opinion, it is necessary or desirable to do so.

The Marine Accident Investigation Branch (MAIB) is carrying out an investigation into the keel failure and capsizing of the commercial yacht *Tyger of London*, while on passage from La Gomera to Tenerife on 7 December 2017.

The MAIB will publish a full report on completion of the investigation.



Andrew Moll
Chief Inspector of Marine Accidents

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This bulletin is also available on our website: www.gov.uk/maib

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BACKGROUND

The MAIB is investigating the keel failure and capsizing of the UK registered commercial yacht *Tyger of London* (**Figure 1**) while on passage from La Gomera to Tenerife, on 7 December 2017. The five persons on board were rescued from the water by the crew of a nearby yacht.



Figure 1: *Tyger of London* post-capsize

INITIAL FINDINGS

Tyger of London was a Comar Comet 45S designed by Vallicelli & C and built in 2007 by Comar Yachts s.r.l, at Fiumicino, Italy. In common with other vessels built by the shipbuilder, the Comet 45S could be fitted with a choice of two keels:

- A 3200kg, 'deep draught bulb keel', consisting of a cast iron fin with a lead bulb fixed to its base (**Figure 2a**); or,
- A 3700kg 'shallow draught, lead keel', consisting of a fabricated rectangular stainless steel top plate and frame, onto which lead was cast to form the keel (**Figure 2b**).

Tyger of London was fitted with the 'shallow draught, lead keel', which is the subject of this safety bulletin.



Figure 2a: Deep draught bulb keel not affected by this safety bulletin

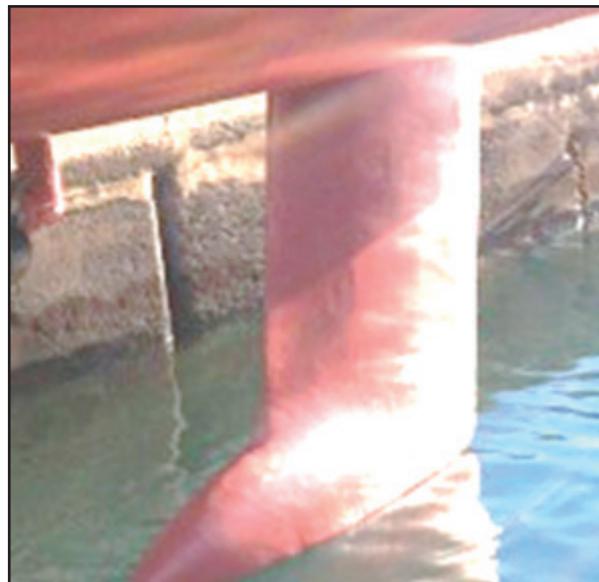


Figure 2b: Shallow draught, lead keel, fitted to *Tyger of London*, subject of this safety bulletin

The post-salvage inspection of the yacht identified that the keel's stainless steel top plate was still attached to the hull (**Figure 3a and b**). The MAIB recovered the top plate to the UK for technical assessment. The lead section of the keel sank in deep water and could not be recovered.

The technical assessment of the top plate revealed that the keel had not been manufactured in accordance with the designer's drawing or intent. Specifically, the stainless steel rods forming the frame and their interconnecting plates had been only partially welded to the underside of the top plate. As a result, the joints progressively failed over time (**Figure 3c**). The final joints failed while the yacht was underway, causing the lead keel to separate from the keel plate, following which the yacht quickly capsized and inverted.

Tyger of London had been employed as a charter vessel since 2013. It is estimated that the yacht had sailed approximately 29,000nm since build. The MAIB has been informed that prior to the accident the yacht had grounded on a number of occasions, all reportedly at slow speed and onto sand or mud.

The yacht's manager had removed the yacht from the water 22 months before the accident, for maintenance, during which paint and filler were removed to allow the keel plate and lead keel to be inspected. The securing arrangements between the keel and the hull matrix were found to be in good condition, however the lead casting prevented the inspection of the welded joints between the keel's fabricated frame and top plate.

YACHTS FITTED WITH SIMILAR KEELS

The MAIB understands that there are likely to be between 50 and 100 yachts fitted with keels fabricated in a similar manner to the 'shallow draught lead keel' fitted to *Tyger of London*. The majority of these yachts were built between 2003 and 2011 and include the Comar:

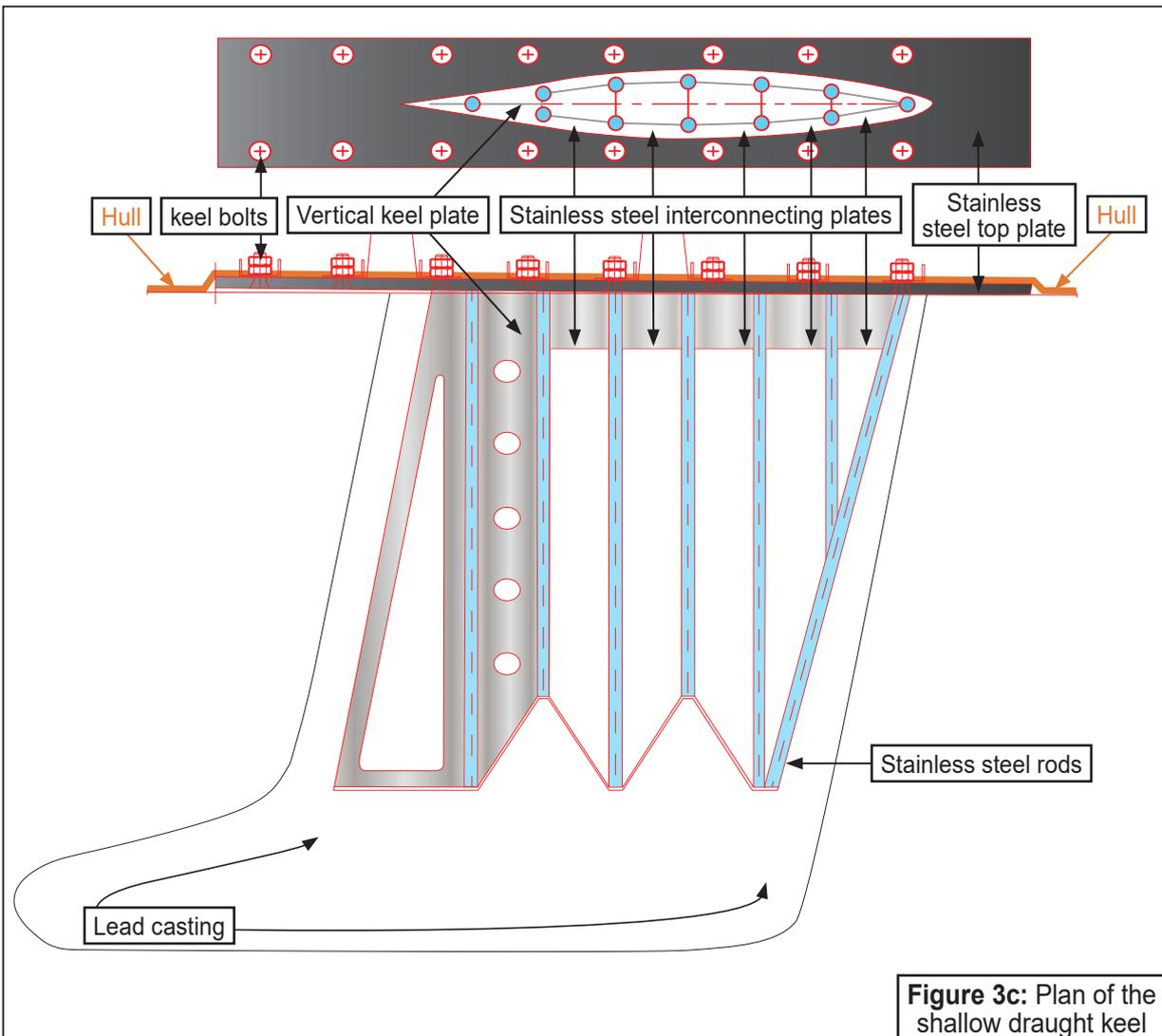
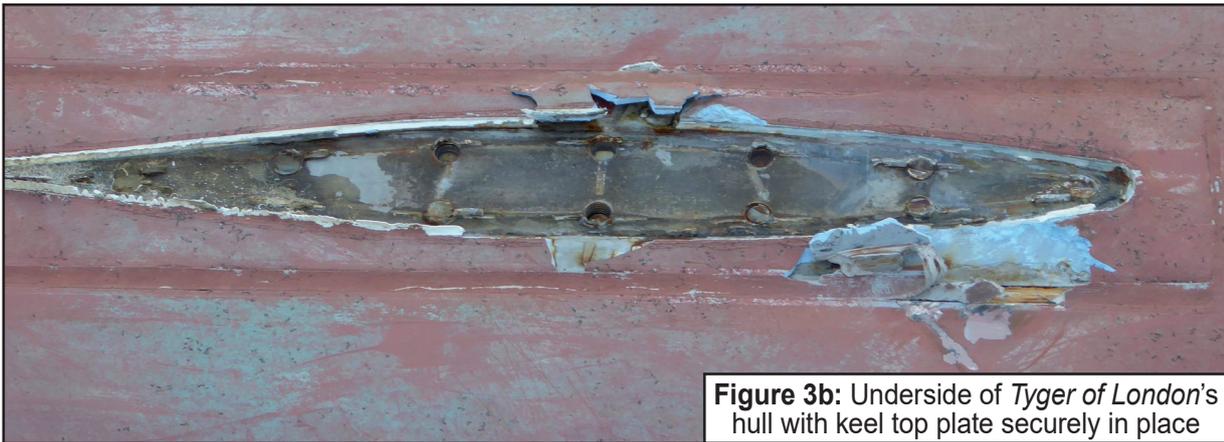
- Comet 41, 45, 50, 51, 52rs, 54, 62ed; and,
- Genesi.

SAFETY LESSON

The MAIB is not aware of any similar keel failures in yachts of a comparable design. However, owners should be aware that the 'shallow draught, lead keels' fitted to the yachts listed above might not have been fabricated in accordance with the designer's drawings. Where this is the case, the connection between the stainless steel keel plate and rods will not be as strong as intended. Furthermore, the condition of the connection cannot be inspected or assessed using traditional survey methods.

To prevent a similar accident, owners are recommended:

- To note that the securing bolts within the bilge of their boats, for this type of shallow draught lead keel, connect the top plate to the hull. The condition and tightness of these keel securing bolts do not indicate the true condition of the keel's internal frame structure.
- To arrange for an out of water inspection of their vessel by a suitably qualified yacht surveyor at the earliest opportunity if the yacht has grounded, been heavily used, or if they have any concern whatsoever as to the condition of the keel, noting the difficulty of inspection of the junction between lead keel and top plate.



- To note that although the manufacturer, Comar Yachts s.r.l, has ceased trading, technical advice may be sought from **Gesti Nautica s.r.l**, a ship repair yard that has experience of these vessels. Their contact details are:

Gesti Nautica s.r.l
Via Fulco Ruffo dia Calabria snc
00054 Fiumicino (RM)
www.gestinautica.it
Tel: +39 066506752

The MAIB's investigation is ongoing and it is intended that a full report will be published later in the year.

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