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Review

Case study of masts damage of the sail training vessel POGORIA

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ABSTRACT

The paper presents description and investigations related to an accident of the Polish barquentine “Pogoria” with 50 crewmembers onboard during Tall Ships Race in the first half of July 2009, when all three masts were broken and destroyed.

Fundamental circumstances of the occurred accident – the process of the mast destruction, the analysis of the mast crack places, and the structural and technological causes of the mast weakening are presented. Strength analysis of the applied model of destruction is used for explanation of the failure reasons.

Macroscopic analysis of destroyed parts of masts revealed significant local corrosion losses and – as a result – reduction of effective load carrying section. Such corrosion was a result of bad welding procedure applied. Strength calculations confirmed an increase in critical stress level of almost 10 times in corroded regions. Presence of founded local, deep corrosion places require of the new surveying approach of the steel masts during exploitation.

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1. Introduction

At the entrance to the Gulf of Finland (the Baltic Sea), a Polish barquentine Pogoria with 50 crewmembers onboard had an accident during Tall Ships Race in the first half of July 2009. All three masts were broken and destroyed both the running and standing riggings (Fig. 1). Any significant consequences for the crewmembers did not come into existence.

Nevertheless, the accident focused considerable attention of the people and media interested in sail training. They formulated the following questions related to causes of mast fracture:

- source of releasing such huge destructive loads,
- factors triggering off the ‘domino effect’,
- damage explanation of all mast which should be the strongest in the entire chain of sail propulsion: sails-running riggings-standing riggings-mast.

To explain all the aspects of the mentioned accident an investigation was conducted by Marine Chambers in Gdynia. It is the Polish legal institution to carry out monitoring and analyzing marine accidents from the navigational safety point of view. Its verdict laid the blame neither on the crew nor on the ship-owner.

Nevertheless, answers for such formulated questions became important and urgent for persons, who are permanently involved in the field of sail training. Therefore, attempts have been made to try and explain all aspects of the aroused doubts.

The paper deals with fundamental circumstances of the occurred accident. Particularly, the process of the mast destruction, the analysis of the mast crack places, and the structural and technological causes of the mast weakening are presented.

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