



11-12 October 2012, Riga

**Riga Technical University
53rd International
Scientific Conference**

Dedicated to the 150th Anniversary and
The 1st Congress of World Engineers and
Riga Polytechnical Institute / RTU Alumni

DIGEST

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Underwater Survey Future Perspectives

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Keywords – underwater survey, ship's hull corrosion, fouling.

I. INTRODUCTION

Survey of ship's hull underwater part is necessary to provide safe exploitation of ship, to notice hull defects in advance and to give opportunity to plan work, which should be done to underwater part to maintain it in good condition. The process and necessity of this survey is set out in international regulations.

When operating in the water, ship is continuously exposed to both corrosion and fouling, which have a significant impact on fuel consumption costs and ship's safety. Normal procedures for survey of ship's underwater part were dry dock or using divers. But these methods are neither economical nor safe. Survey in dry-dock means considerable cost to ship owner, but survey in water, which is done by divers is not the safest way and not the most economical either.

II. LEGISLATION OF SURVEYS OF SHIP'S UNDERWATER PART

Survey of ship's bottom is survey of ship's underwater part, including underwater elements, to ensure that they are in satisfactory condition and ensure operation of ship.

IMO resolution A.997 (25), which replaced previous resolution A.948 (23) in 2007 determines procedures for ship's hull surveys. Taking into account international legislation, there must be carried out at least two surveys of ship's bottom outer part in every five year period. Period between every two surveys cannot exceed 36 months. This resolution combines requirements about ship's hull surveys of number of conventions, for example, SOLAS-74, MARPOL-73/78 and other laws and regulations. Ship's underwater part survey should include survey of details and places mentioned below:[1]

- ship's hull, including bottom and forepeak,
- keel, stern, frames in the region of rudder, rudder,
- rudder bearing gap measurements,
- propeller, propeller shaft cushion inspection,
- inspection of kingston boxes, lattices.

Classification societies are using possibility, which is made by IMO harmonized survey system (A.997) for several ship types, i.e., to carry out ship's underwater part's inspection in dry dock with time interval of 7.5 years instead of previous 5 years. This innovation is a benefit for ship owners, which now will be able to save money on dry-dock survey. Of course, it will not release the ship from surveys at all, but will provide it with opportunity to carry out the survey in floating condition, and it also does not mean, that ship safety will be in danger.

III. PROBLEMS OF UNDERWATER PART OF SHIP'S HULL

Corrosion causes not only damage to ship's hull, but also to other parts of underwater constructions, for example, propeller, rudder. In the areas, which are subject to corrosion, metal becomes thinner, reduces its resistance, density of constructions and all the ship's hull as whole.

The intensity of corrosion increases metal's abrasion, resulting in probable cracks in metal, which gradually spread to the depth of metal, due to which there could develop damages in ship's hull and underwater constructions, which leads a negative impact on ship's safety. There is loss of metal due to damages caused by corrosion. To remove them, it is necessary to invest economical and human resources.



Fig. 1. Ships hull corrosion [2]

IV. CONCLUSIONS

Corrosion (see fig.1) and fouling of ship's hull have a serious affect on safety and costs of shipping. Due to that there is necessity to do the surveys of ship's hull underwater part. The survey can be carried out by dry-docking, using divers or using unmanned underwater vehicle.

The certification process for ships is combined in IMO resolution A.997 (25). Classification societies, taking into account technological development, offer better survey regulations. The survey in dry-dock must be carried out in interval of 7.5 years instead of previous 5 years.

Latest trend in inspection process of ship's hull underwater part is unmanned underwater vehicle. Most of the work usually carried out during dry-docking can now be done in water. Using underwater vehicle can significantly facilitate work of divers. It will not only be safer (because of no people in water), but also cheaper. The cost of divers is approximately twice as much as costs of using underwater vehicle. However, currently, due to the disadvantages of such vehicle, the complete survey of ship's hull underwater part is not possible by completely replacing divers with underwater vehicle.

VII. REFERENCES

- [1] Marine Guidance Note 217 (2010), Maritime and Coastguard Agency, London, 1-12
- [2] mA "Majori" LSC Management Ltd. Photo by author Kristine Carjova, 2007