STABILITY ASSESSMENT OF HATCHCOVERLESS RIVER-SEA CARGO SHIP

S Anggara, M A Kurniawan, S Rosihan and **D R Mauliani**

Research and Development Division
Biro Klasifikasi Indonesia, Yos Sudarso 38-40, Tg.Priok, Jakarta, Indonesia, 14320
E-mail : sony.anggara@bki.co.id

SUMMARY

Hatchcoverless General Cargo ships is designed to carry exposed cargo while operating due to certain reason. IMO was disseminated the Interim Guidelines for Open-Top Containership by IMO MSC/Circular. 608/rev.1 provided a set of requirement for the design of Open-top Containership. In these Interim guidelines one of the requirement set is related to the stability of the ship in all conditions, intact and damage. Furthermore, in general, the application of these interim guidelines is intended for this type of ship that operate in unrestricted service navigation. The Hatchcoverless General Cargo ship have the same typical design with Open-top Containership, while one or more of the cargo holds need not be fitted with hatch covers. Since, the intended application is generally for unrestricted service navigation, it becomes questionable if applied in restricted service navigation, e.g. river sea service navigation. This work will assess the Hatchcoverless General Cargo ship that has river sea service navigation. This study is working on stability analysis of this chosen type of ship. A sample model was tested by numerical method in intact and damage condition. Dynamic roll response was captured to check allowable downflooding point. The result confirmed and compared with the references regulation. The results found that the model fullfilled criteria in Intact condition, but for flooded cargo hold condition showed an inapropiate result. Furthermore, assessment for this type of ship should be reviews against the damage case.

Keywords *: Stability, Hacthcoverless, River- Sea*

NOMENCLATURE

B	Moulded breadth (m)
D	Moulded depth (m)
LOA	Length overall (m)
LWL	Length of waterline (m)
GM	Metaceneter heigth (m)
GZ	Righting lever (m)
Hs	Significant wave height (m)
T	Draft (m)
Tz	Zero upcrossing period (s)

1. INTRODUCTION

The history of means of maritime transport are evolved as technology development. As well for the type and shape of ship, today it is introduced another change, namely the advent of the open top cargo ship. This type of ship is designed to have large opening without hatchcover above its cargo hold. Thus, the cargo space within the ship is open to the elements. The typical design was actually applied a long time ago in ancient age for carrying stock in mediterranean. Now it is used again with same concept to catch the same advantage. The main advantage claimed for this design are:

- The considerable weight of hatch covers has been eliminated, thus increasing the deadweight.
- since the hatch covers were located high in the ship, their removal (removal of their weight) significantly improves stability.
- The elimination of the hatch covers also excludes the need to open and close same. This speeds up port turn-around time and has the potential for reducing cargo operation costs.
- The maintenance of hatch covers, hatch clamps, coaming gaskets, and other hatch securing gear becomes unnecessary.

Disadvantage of this type of design may coming from high risk while on duty. The cargo may not safe and capable to damage by weather, its main reason for the ships only and commonly used for carrying bulk cargo which is not signifiantly affected by water. The worst risk is that ship may have serious issue in stability, especially when water enter into cargo hold and induce mass shifting and collapze. The risk probably increase when ship operated in oceangoing where environmental condition become more harsh and rainfall become higher.

2. REGULATION OVERVIEW

Explicitely ILLC (International Load Line Convention) does not cover, even does not allow it, but implicitely it offer exemption for unusual design. Chance is opened for every flag adminitration to considered any novel design with emphasize in depth research and serious study to minimize the possible risk. Extensive model test in laboratorium shall be carried out to asses ship behaviour in seaway, particullary for green water phenomena. In addition, the administration which allow the hatchcoverless design shall communicate it to IMO (International Maritime Organization) if the ship has international voyage.

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