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Analysis of Evacuation Route Approach of IMO Guidelines Interm MSC/Circ.1238

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ABSTRACT

The emergency conditions in the cruise ship may happened at any time and it results in the form of damage to the vessel and causing lost of life. But these effects can be reduced by preventive effort. The research was conducted on a river boat type LCT 200 GT operated in the Mamberamo River Papua. The Mamberamo Foja has different characteristics from other ferries, which is the LCT form and it has different design in passenger luggage and vehicle deck. This research aims to get a access to the optimum design of the entire system for evacuation of the passengers and crew, to enable then to leave the ship quickly and safely during an emergency condition. The emergency Evacuation System Research was conducted by calculating the escape time in each route, in the deck and outside the deck, by using the IMO Guidelines Intern MSC / Circ. 1238. Result of the optimum evacuation time in each route was calculated and then compared with the IMO Interim Guidelines. Result of the calculation of evacuation time by using the IMO Interim Guidelines in the afternoon was 37.92 minutes, while in the outside, at night these are 42.92 minutes. While the results of using the evacuation route software, in the afternoon was 39.65 minutes, and in the outside, at night was 44.64 minutes. So, it can be concluded that a solution for optimum evacuation in order to optimize the access to the liferaft, the IMO Guidelines Intern MSC / Circ. 1238 should be added to the navigation deck and passenger deck to minimize the risk of lost.

Keywords: *Evacuation, IMO Guidelines Interim, Safety*

INTRODUCTION

During the sailing, ship may find the unpredicted condition. The condition is a state of emergency during the cruise does not operate normally and condition as usual is not working properly. As usual state is a state in which the ship as a whole, the machinery, accommodation services, navigation services, the condition of machinery capable of controlling sail safely, and the crew accordance with the design to be in satisfactory condition. (SOLAS 2004 chapter II)

So that the plan a good ship it not only includes planning the construction, machinery, and electrical ship, but also include the planning of safety for the passengers inside the ship. This is very important because with the planning of safety on board, then the events of emergency at the time of operating the vessel can be anticipated. Ship safety planning in this regard is the plan in case of fire, leakage, and collision.

MATERIALS AND METHODS

IMO Guidelines InternMSC / Circ. 1238

Method of evaluation. The steps in the evacuation analysis specified as below.

Description of the system:

a. Identification of assembly stations.
b. Identification of escape routes.

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Assumptions. This method of estimating evacuation time is basic in nature and, therefore, common evacuation analysis assumptions should be made as follows:

a. All passengers and crew will begin evacuation at the same time and will not hinder each other;
b. Passengers and crew will evacuate via the main escape route, as referred to in SOLAS regulation II-2/13;
c. Initial walking speed depends on the density of persons, assuming that the flow is only in the direction of the escape route, and that there is no overtaking;
d. Passenger load and initial distribution are assumed in accordance with chapter 13 of the FSS Code;
e. Full availability of escape arrangements is considered, unless otherwise stated;
f. People can move unhindered;
g. Counterflow is accounted for by a counterflow correction factor; and
h. Effects of ship's motions, passenger age and mobility impairment, flexibility of arrangements, unavailability of corridors, restricted visibility due to smoke, are accounted for in a correction factor and a safety factor. The safety factor has a value of 1.25.

Performance standard (2) complies with SOLAS regulation III/21.1.4.

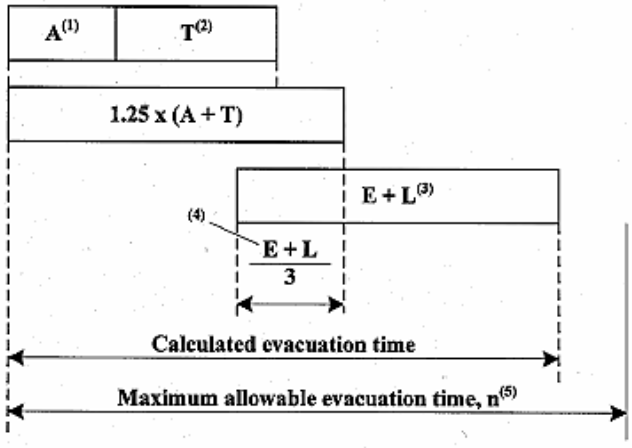

Figure 1. Performance Standart IMO
(Source : IMO's Interim Guidelines MSC/Circ. 1238)

a. 10 min in case 1 and case 3, 5 min in case 2 and case 4
b. calculated as in appendix 1 to these Guidelines
c. maximum 30 min in compliance with SOLAS regulation III/21.1.4
d. overlap time = 1/3 (E+L)
e. values of n (min) provided in 3.5.2

The following performance standards, as illustrated in figure 1, should be complied with:
Calculated total evacuation time:

$$1.25\ (A + T) + 2/3\ (E + L) \leq n \quad (1)$$

$$E + L \leq 30 \text{ min} \quad (2)$$

In performance standard (1):

1) For ro-ro passenger ships, n = 60; and
2) For passenger ships other than ro-ro passenger ships, n = 60 if the ship has no more than three main vertical zones; and 80, if the ship has more than three main vertical zones.

Calculation of E + L

E + L should be calculated separately based upon:

1) Results of full scale trials on similar ships and evacuation systems; or
2) Data provided by the manufacturers. However, in this case, the method of calculation should be documented, including the value of correction factor used.
   For cases where neither of the two above methods can be used, *E + L* should be assumed equal to 30 min.

RESULT AND DISCUSSIONS

Case study. In this study, using case studies drawn KMP ship. Mamberamo Foja to cruise the rivers of Papua Mambramo district with a length of 33.27 meter ship has a passenger capacity 76 people, crew of 8 people, and the charge in the form of trucks 7 units. Location of the lifeboats only on the passenger deck. So that the is necessary to design optimum access and evacuation systems during emergency conditions on the ship. Optimum is meant here is the passengers and crew (ABK) as much as possible can take advantage of a limited time with the distance to the place of work and the evacuation of passengers to muster station room. So that the in time the evacuation is not an obstacle. At the evacuation calculation is based on IMO Guidelines InternMSC / Circ. 1238.

Calculation IMO Guidelines InternMSC / Circ. 1238.

In order to compare the result obtained by the proposed model and IMO Guidelines InternMSC /Circ. 1238.

Night Conditions

Emergency conditions during the night to night case wherein A is 10 minutes with a safety factor of 1.25; According to MSC / Circ.1238 as no data of shipbuilders, the EL assumed to be 30 minutes. So that the travel time can be calculated as follows:

Overall time = A + T + (E+L)
600 s + 175,09 s + 1800 s = 2575,09 second = 42,92 minutes < 60' minutes

Evacuation time required to achieve Muster station located on deck 2 left the ship that is over 42.92 minutes.

Daylight Conditions

The calculation of performance standards as follows:
Overall time = A + T + (E + L)
300 175.09 s + s + 1800 s = 2275.09 second = 37.92 minutes <60 minutes
Evacuation time required to achieve Muster station located on deck 2 left the ship that is over 37.92 minutes.

Route Proposed Model. Viewed from the of evacuation in the first scenario obtained when the total is still very high, and therefore the scenario of evacuation will be divided into two locations: muster station 1 to the deck of the navigation and the passenger deck, and the muster station 2 for passengers on the deck passengers and crew in the room machine.

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Scheme of Hydrolic Alternative to *Muster Station* 1

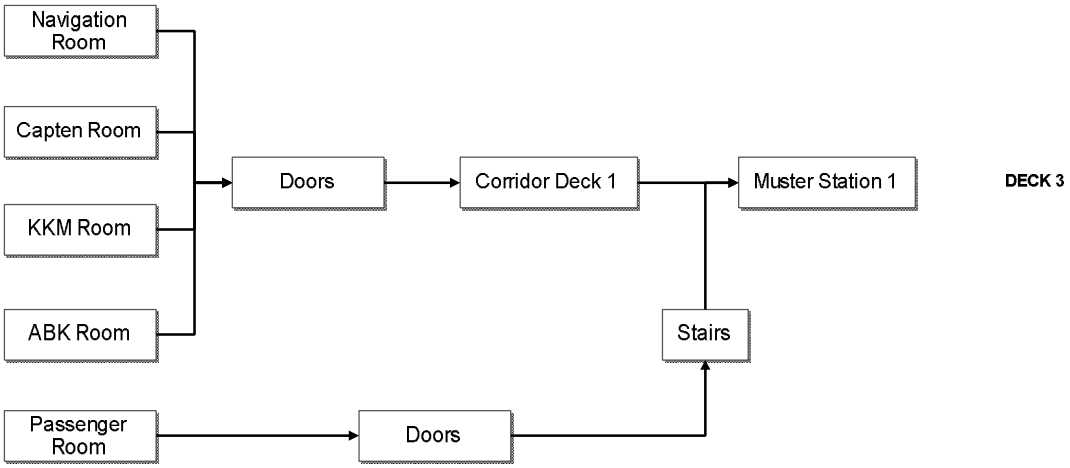

Figure 2. Scheme of Hydrolic Alternative to *Muster Station* 1

Night Conditions

The calculation of performance standards as follows:
overall time = A + T + (E+L)
600 s + 140,76 s + 1800 s = 2540,76 second = 42,35 minute < 60' minute
Evacuation time is needed to reach the lifeboat that was in the passenger deck one left the ship that is over 42.35 minutes.

Daylight Conditions

Overall time = A + T + (E+L)
300 s + 140,76 s + 1800 s = 2240,76 second = 37,35 minute < 60' minute
Evacuation time is needed to reach the lifeboat that was in the passenger deck one left the ship that is over 37.35 minutes.

Scheme of Hydroulic Alternative Route to Muster Station 2

Night Conditions

The calculation of performance standards as follows:
overall time = A + T + (E+L)
600 s + 140,76 s + 1800 s = 2540,76 second = 42,35 minute < 60' minute
Evacuation time is needed to reach the lifeboat that was in the passenger deck one left the ship that is over 42.35 minutes.

Daylight Conditions

Next is the calculation of performance standards as follows:
Overall time = A + T + (E+L)
300 s + 140,76 s + 1800 s = 2240,76 second = 37,35 minute < 60' minute
Evacuation time is needed to reach the lifeboat that was in the passenger deck one left the ship that is over 37.35 minutes.

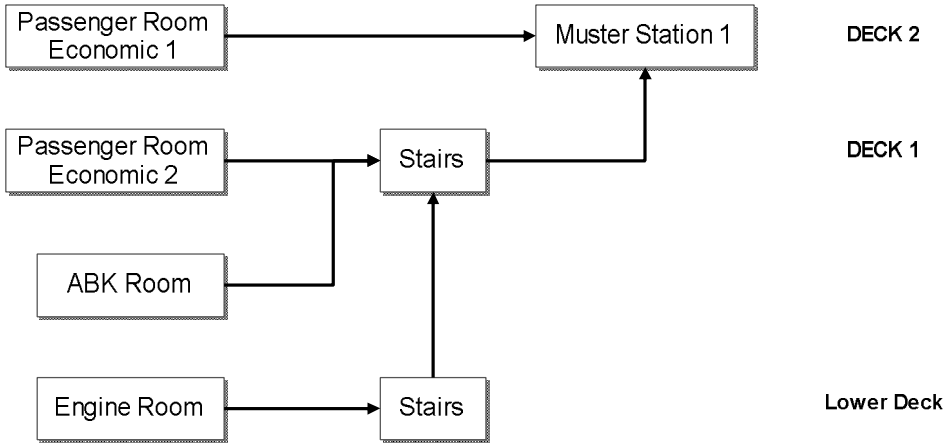

Figure 3. Scheme Hydrolic Alternative Route to *Muster Station* 2

CONCLUSIONS

The time required to reach the muster station crew members for each state meet the standards of the IMO Interim Guideline is less than 60 minutes. So that the difference lies in the awareness of each condition. Here are the results of the calculation of each condition: a. Day = 37.92 min; b. Night = 42.92 min. These optimum evacuation (escape) are using alternative routes 1 and 2 where the two routes that have the same time that the condition of the evening 42.35 and 37.35 daylight conditions, but a different scenario. Alternative route 1 passenger deck and deck navigation supplied to muster station 1 located on the navigation deck. Alternate 2 route passengers who were on the vehicle deck and engine room crew flowed into muter station 2 located on the passenger deck. Muster station 1 is located on the navigation deck, while the muster station 2 located on the passenger deck.

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