

Danish Yachts A/S

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Ship Survey and Certification

/KLK/nbn/tol

Status report (Draft Version) - Regulation 17 Assessment for the Eco-Island ferry

Initial general reference is given to correspondence, meetings etc. as carried out by the participants involved with the 'Eco-Island ferry project' ('Øko-Ø færge projekt').

With regard to evaluation of fire safety the following report, prepared by SP Technical Research Institute of Sweden (SP), has been forwarded to the Danish Maritime Authority (DMA):

- **Engineering analysis report – Eco-Island ferry**
Date: 2013-07-25
Reference BRd6035

The report has also been sent to the Swedish Administration for their review.

After review of the report the Danish Maritime Authority shall inform you as follows:

Conclusion

As a part of the 'Eco-Island ferry project' an evaluation of fire safety was to be carried out. The required procedure was to perform a fire safety analysis as per SOLAS Chapter II-2 Regulation 17 and MSC/Circ.1002 – Guidelines on alternative design and arrangements for fire safety.

The DMA highly appreciate the dedicated efforts, initiatives and performances resulting in this report, and believe that very serious and comprehensive work has been carried out for this project.

In the opinion of the DMA the performed assessment is in compliance with a fire safety analysis as per SOLAS Chapter II-2 Regulation 17 and MSC/Circ.1002. However, the DMA is also of the opinion that some elements need to be further evaluated. (See below item '3 Engineering analysis')

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MINISTRY OF BUSINESS AND GROWTH

Subject to further evaluations the DMA believe such an analysis could lead to a formal approval for building a passenger vessel of alternative fire safety design and arrangements.

However, at this time the DMA cannot exclude that additional factors or risks can be found at a later stage, which could affect the outcome of an approval process.

With regard to this report the DMA has carried out a general review, but not a detailed investigation into the stated hazards, estimations, assumptions, failure rates, frequencies, probabilities, calculations, tests, etc.

It is noted that this analysis is of a highly complex nature and that it is challenging a basic fire safety concept of using non-combustible materials.

It is also noted that, with regard to the effects on fire safety, there still is limited field history for FRP composites.

More detailed comments and conditions for a possible full approval of a specific project is given in the below.

DMA comments and conditions

The following items (1 to 7) are given with reference to section numbers in the Annex to MSC/Circ.1002.

1 Application

The use of these guidelines has been accepted for this project. However, the development in 'guidelines for alternative and/or equivalent design' (not only for fire safety) should be noted. E.g. MSC.1/Circ.1455. (See further DMA comments at below item '3 Engineering analysis')

2 Definitions

The engineering analysis report has applied the definitions of the guidelines.

3 Engineering analysis

The engineering analysis is based on an approach as stated in the guidelines, with given reference to engineering textbooks and technical literature and resources, fire tests, calculations, correlations and computer models etc.

In addition to the approach as outlined in the guidelines, a more elaborate risk assessment (revised approach) has been used in this analysis. The revised approach takes into account relevant issues, which the DMA welcomes.

However, the DMA would prefer MSC.1/Circ.1455 as this takes into account "*Boundary conditions incl. physical boundaries and interfaces (e.g. 4.5.1 and 4.6.7)*". To the understanding of the DMA this means that it has to be verified that the alternative design does not affect the function

of other parts of SOLAS. E.g. structure, damage stability, arrangement of life saving appliances, provisions of dangerous goods etc.

The DMA would require such verification in addition to this report.

Elements which should be further evaluated could be examples such as:

- The report mentions a fully redundant extinguishing system in section 4.12.1. It is not clear whether this redundant system is independent from the original extinguishing system or if it's connected to the original extinguishing system.
- Since some RCO's concern fire extinguishing systems to compensate for combustibility of the composites, should the reliability of a sprinkler system be required higher for a composite vessel, than for a steel vessel?
- A concern is given to the event where a fire occurs in multiple compartments. How will this affect the longitudinal strength and subsequently the stability of the ship? On page 63 (129) it is stated that load-bearing capacity on the ro-ro deck may be lost 5 min after a fire is initiated. Again how could this affect the strength and stability of the ship?
- On page 3 (12) in Appendix E it is stated:
"Intrinsically this consequence of affecting the fire growth potential is not as relevant of a problem in external areas where smoke management is not critical."
 Could the close positioning of the life rafts to the ro-ro deck and exterior surfaces combined with a fire in one of these areas result in passengers sitting in the life rafts being exposed to dense, toxic smoke?
- How will the drencher system on exterior surfaces work in windy conditions? The influence of wind on exterior surfaces is mentioned on page 60, but only in relation to fire development and not in relation to the effectiveness of fire extinguishing by the external drencher system.
- Possible effect on hull structure in case of fire. Could there be a risk of water ingress due to structural collapse affecting e.g. damage stability?
- Arrangement of evacuation ways and assembly areas. E.g. escape from one side of a burning accommodation via the ro-ro deck back to the other side of the accommodation, to get access to life-saving appliances.
- Could it be relevant to apply operational requirements similar to the High Speed Code? Because the time you can stay on board will be shorter for a composite vessel compared to a steel vessel.
- Could it be relevant to apply additional external preparedness (search and rescue)? Because the time you can stay on board will be shorter for a composite vessel compared to a steel vessel.
- Further examination of risks, uncertainties and sensitivity analysis, e.g. to evaluate that a confidence of 90 % is sufficient.

The DMA cannot rule out that other elements than the above should be subject to further evaluation.

4 Design team

An acceptable design team has been established.

It is noted that full documentation, specifications, operation and maintenance manual etc. has not been prepared (4.3.6). This would be required for an actual vessel.

5 Preliminary analysis in qualitative terms

As part of the process a preliminary analysis report (Date 2012-08-31) has been prepared by SP and approved by the DMA (E-mail 2012-11-08 and 09).

6 Quantitative analysis

The quantitative analysis is based on an approach as stated in the guidelines.

As mentioned above the DMA would prefer the use of MSC.1/Circ.1455, hence require approach as stated in this circular for an actual vessel.

The estimated probabilities and consequences are noted, but no specific control of estimated values or calculations has been part of this review.

7 Documentation

It is noted that full documentation has not been prepared. This would be required for an actual vessel.

The DMA review is limited to the Eco-Island ferry being part of a research project, and not being a specific and fully documented vessel.

As it is a review and not an approval no reporting etc. will be submitted to the IMO.

Further DMA comments and conditions

The following items are given with reference to the forwarded report.

1. It is noted that particular systems has not been specified for the research project. (E.g. water mist system, page 96 (129))
2. On page 112 (129) section 4.11.1 the following is stated: *'The open deck, illustrated in Figure 4.36, is not supposed to be occupied during journey'*.

The DMA do not agree to this statement, as the open deck will be available for passengers all year.

The number of passengers expected to be carried is 200. 100 passengers inside the accommodation (all year) and additional 100 passengers on the open deck (summer period May 1 to September 30).

In case of a specific future project, possible consequences with regard to this statement are to be further evaluated.

3. On page 112 (129) section 4.11.1 and Appendix G page 5 (25) an emergency generator is mentioned.
No emergency generator is shown on layout of the Eco-Island ferry!
4. On page 115 (129) and Appendix G page 24 (25) the abbreviation LEO is used.
It is not clear what LEO is the abbreviation off?
5. Other minor discrepancies have been noted in the report. (E.g. reference given to wrong table(s) in the report)
6. It is noted that a certain number of crew members is expected with the stated design and arrangements. This DMA review has not involved considerations with regard to Safe Manning of the vessel.
7. It is noted that a certain number of passengers is expected. This DMA review has not involved detailed considerations with regard to compliance with e.g. area requirements for passenger accommodation.
8. On our own behalf the DMA may forward the report for review by external experts (e.g. Classification Society) on such an analysis and approval process.

With reference to the above minor discrepancies etc. have been noted in the report. Attached please find an extract where some of these have been 'high-lighted'.

With regard to the Eco-Island project and the 'Regulation 17 assessment' the DMA consider the job as finalized, and require no further update of the report.

This letter and enclosed extract will be forwarded by e-mail.

If you have any questions regarding the above, you are welcome to contact the Danish Maritime Authority.

Yours sincerely,



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Enclosures: Engineering analysis report_DMA remarks_18072014.pdf

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