

Subject

Cracking at the Big Ends of Taper Sections of Water Lubricated Propeller Shafts

# ClassNK

## Technical Information

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To whom it may concern

Although cracking at the big ends of the taper sections of water lubricated propeller shafts (as shown in Figure 1) is considered to be rare, it is something which is confirmed from time to time according to survey reports, etc. This kind of damage is usually discovered after a propeller shaft has been withdrawn during propeller shaft inspections and in some cases may require the immediate replacement of the shaft, which is something that will greatly impact the ship's operation. Figure 2 shows a recent example of such cracking that required the immediate replacement of the propeller shaft.

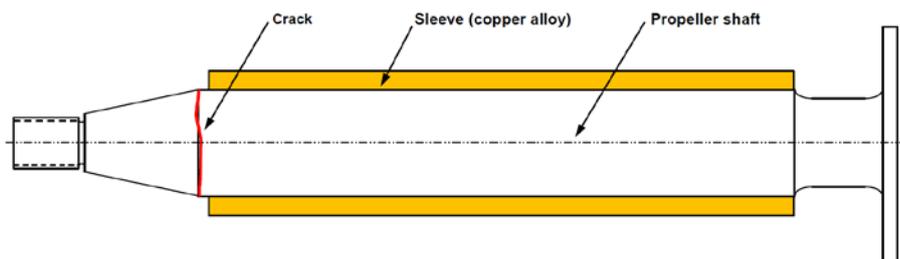


Figure 1 Location where cracking occurs



Figure 2 Recent example of cracking that required replacement of the propeller shaft

(To be continued)

#### NOTES:

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Multiple factors may contribute to the type of cracking shown in Figure 2, but sea water ingress into the propeller shaft is considered to be the dominant cause. When the surface of a steel propeller shaft that is unprotected by a copper alloy sleeve comes in contact with even a very small amount of sea water, the fatigue strength of the shaft will be dramatically reduced due to the corrosive effects of the sea water. The continued exposure to sea water and resulting loss of fatigue strength it causes will over time almost inevitably leads to crack initiations. Therefore, measures to prevent sea water from entering the propeller shaft and coming into contact with the exposed shaft surfaces are vital to avoid this kind of damage.

A two-layer protection strategy (as shown in Figure 3) is an example of such means that is usually employed. The first layer is a properly designed and installed O-ring, while the second layer is a layer of grease that fills up the space between the propeller boss and the propeller shaft. These two layers work together to provide reliable protection for propeller shafts against sea water ingress and thus reduce the possibility of corrosion related cracking occurring.

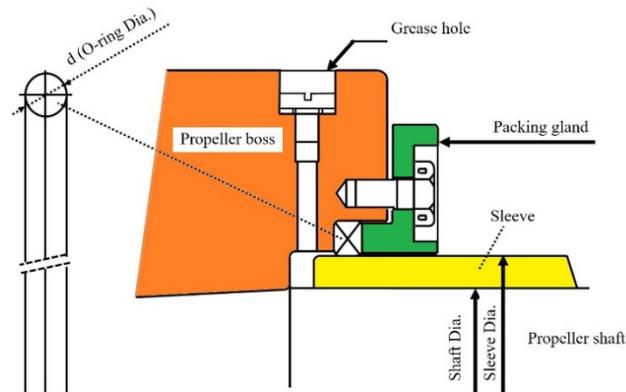


Figure 3 An O-ring and grease layer providing two-layer protection against sea water coming into contact with the unprotected propeller shaft surface.

Based on the above-mentioned points, it is strongly recommended that all concerned parties make sure that the two protection layers are always properly installed and maintained, especially during reinstallation after propeller shaft withdrawal.

For any questions about the above, please contact:

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