PrimeShip
Total Ship Care

SHAFT
Shaft Alignment Analysis Program

HULL

PrimeShip
Total Ship Care

ENVIRONMENT

MACHINERY

OPERATION & MAINTENANCE

Key Features

◆ **Guidelines and software for shafting alignment**

◆ **Shaft bearing positioning optimization software**

Based on ClassNK's expertise in machinery surveys and an in-depth analysis of machinery damage reports, ClassNK developed and released its new Guidelines on Shafting Alignment. ClassNK's PrimeShip-SHAFT service provides clients with shaft alignment calculations based on these Guidelines. Which serves as the cornerstone of the PrimeShip-SHAFT service. Based on these Guidelines, ClassNK provides a Shafting Alignment calculation system.

Guidelines on Shafting Alignment

In recent years ship hull structures have become more likely to deform as result of reaching size and design limitations. At the same time, propulsion shafting is being made increasingly stiff for use in larger and lower-revolution main engines. The combination of these factors is reported to be the main cause of alignment related main bearing damage seen in ships with large differences in draught. Based on a thorough analysis of these alignment related problems, ClassNK has released the new Guidelines on Shafting Alignment in order to help prevent such damage from occurring.

GUIDELINES ON SHAFTING ALIGNMENT

GUIDELINES ON SHAFTING ALIGNMENT

Part A   Guidelines on Shafting Alignment
          Taking into Account
          Variation in Bearing Offsets while
          in Service

Part B   Amendment of the Guidance to
          the Rules and its Explanatory
          Notes

June 2006

ClassNK
NIPPON KAIJI KYOKAI

PrimeShip-SHAFT calculation software

Based on these Guidelines ClassNK has developed the new PrimeShip-SHAFT calculation software tool which enables users to easily determine optimized positions for shaft bearings.
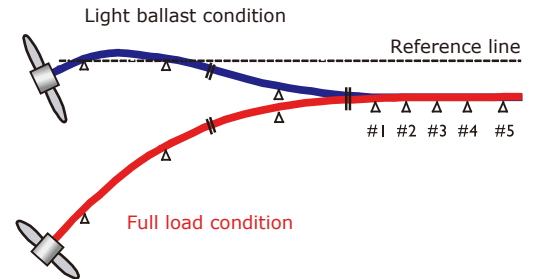
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Causes for engine bearing failures

There have been a growing number of incidents of engine bearing damage reported in recent large two-stroke cycle main engines. Among the various cases of bearing damage reported, there have been several cases in which engine bearings have become unloaded due to the effects of changes in temperature and hull deflection.
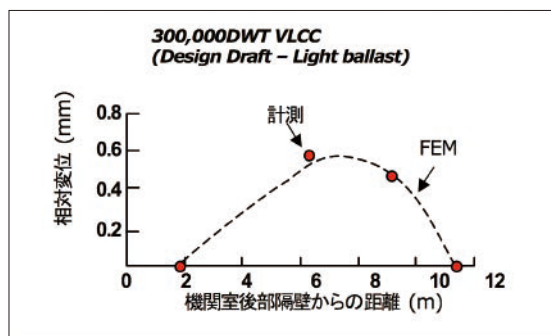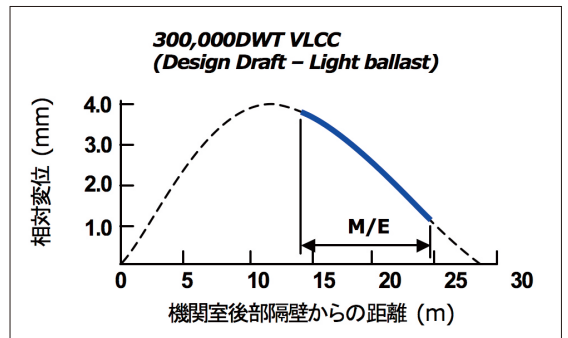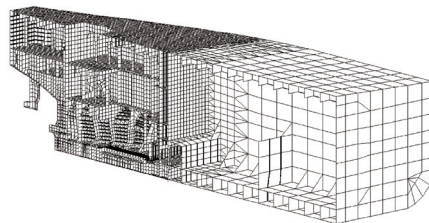
Temperature Changes

Hot condition
0.24mm
#1 #2 #3 #4 #5
Cold condition

Hull Deflection
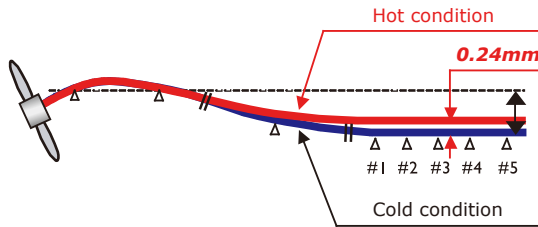
Light ballast condition
Reference line
#1 #2 #3 #4 #5
Full load condition
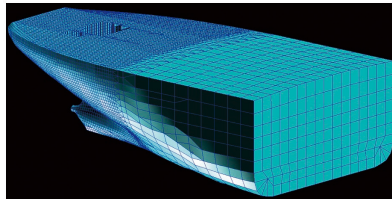
Validation by analysis and testing

The accuracy of these guidelines has been validated by both Finite Element Analysis and full-scale measurements.

Finite Element Analysis

300,000DWT VLCC
(Design Draft – Light ballast)
相対変位 (mm)
M/E
機関室後部隔壁からの距離 (m)

Measurement of Hull Deflection

300,000DWT VLCC
(Design Draft – Light ballast)
相対変位 (mm)
計測
FEM
機関室後部隔壁からの距離 (m)

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