

Prefatory Note

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Special Feature Articles on “Activities for Safe Operation of Container Ships”

Revisions of “Guidelines for Container Stowage and Securing Arrangements (Edition 3.0)” and Future Outlook *Research Institute, ClassNK*..... 3

To respond to the continuing upscaling of container ships of recent years and progress in lashing methods, ClassNK developed design loads and calculation algorithms for strength calculations of stowage and securing arrangements, and released “Guidelines for Container Stowage and Securing Arrangements (Edition 3.0)”. This article introduces the technical background of the main revisions of the Guidelines and explains the differences in calculation results from those of Edition 2.0.

Introduction of “Guidelines on Preventive Measures against Parametric Rolling”

..... *Research Institute, ClassNK*..... 13

In recent years, a series of stack collapse accidents involving large container ships and other vessels which are thought to have been caused by parametric rolling has occurred, and countermeasures such as avoidance by utilizing wave radar and weather services, installation of anti-rolling devices, etc. have been applied practically in the related industries. Based on this background, the Society released these Guidelines, which arrange the requirements for application of effective measures, and also describe the basic items for avoiding parametric rolling, the procedure for preparing polar charts, etc. This article introduces the contents of the Guidelines.

Guidelines for Additional Fire-fighting Measures for Container Carriers

..... *Rule Development Department, Rule Development and ICT Division, ClassNK
Material and Equipment Department, Plan Approval and Technical Solution Division, ClassNK*..... 23

Recently, the International Maritime Organization (IMO) reviewed the requirements for fire-fighting equipment for container carriers to respond to multiple fire accidents on vessels and ensure safe transportation of cargos with properties, etc. different from those of the past. On the other hand, there have been moves among ship owners and others to promote a voluntary response in advance of discussions in the IMO. Based on such moves, the Society released guidelines summarizing these additional fire-fighting measures in order to evaluate fire-fighting measures for container carriers which are added optionally. This article presents an overview of the additional fire-fighting measures specified in the said guidelines.

Structural Strength Rules Applied to Container Ships

..... *Research Institute, ClassNK*
Rule Development Department, Rule Development and ICT Division, ClassNK..... 29

In 2022, the Society carried out a comprehensive revision of Part C of the ClassNK Rules for the Survey and Construction of Steel Ships. By introducing original structural requirements for container ships, which have become progressively larger in recent years, the revised Rules make it possible to conduct safe and rational strength evaluations. This article explains the outline of the comprehensively revised Part C of the Rules from the perspective of container ships, and also explains the content, history and technical background of the original ClassNK strength requirements which are applied only to container ships.

Simplified Operational Guidance for Preventing Parametric Rolling

..... *Osaka University Naoya UMEMA, Yuta UCHIDA*..... 39

Recently, loss of onboard containers due to parametric rolling has been reported occasionally. To prevent such accidents, a methodology for developing simplified operational guidance that can take into account realistic short-crested irregular waves is provided by extending Grim's effective wave concept, which is also used in the IMO Second Generation Intact Stability Criteria, to this purpose. Numerical examples of this approach are also presented.

Technical Topics

Damage of SOx Scrubber Discharge Water Lines

..... *Machinery Department, Plan Approval and Technical Solution Division, ClassNK*..... 49

The MARPOL Convention strengthened regulations on the sulfur content in fuel oil used on board ships, and in response, use of compliant fuel and adoption of SOx scrubbers have increased. However, the Society received several reports of seawater leakage from corrosion-damaged distance pieces fitted to hull structures on SOx scrubber discharge water lines. Although we requested that those concerned take measures (e.g., ensuring necessary treatment prior to coating) to prevent this type of damage, similar incidents are still being reported. Therefore, we are publishing this Technical Journal article to share the results of statistical evaluations of the factors presumed to be responsible for this damage and the countermeasures to be taken.

Update of Wave Statistics Standards for Classification Rules

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Michael JOHNSON, Tingyao ZHU..... 55

Modern classification rules, that are used to assess the safety of hull structure of ships, are heavily based on direct calculations, i.e. numerical simulations. The range of waves that a ship should withstand, together with the operational profile (speed and heading), is a crucial input to those calculations and is currently provided in the IACS "Rec. No. 34". This is used as a basis for the designs of almost all of the world's commercial shipping. IACS has recently undertaken significant work to update this standard to reflect technical advances and knowledge accumulated over the last decades. An updated wave scatter diagram of wave height and period is now proposed, together with a slightly narrower spectral shape and directional spreading. The recommended heading and speed profiles remain mostly the same. This paper presents the technical justification for those changes.

Studies on In-Engine Combustion of Low and Zero-Carbon Fuels

..... *Kyushu University Koji TAKASAKI*..... 71

To achieve a substantial reduction in emissions of GHG (greenhouse effect gases) from international marine shipping, marine engines that can burn hydrogen and ammonia are currently under development. There is also a possibility that synthesized methane and methanol can also be regarded as virtually net-zero carbon fuels, in the same way as biofuels. This article explains the status of development of hydrogen engines and ammonia engines, and the combustion of the 5 above-mentioned types of alternative fuels in engines.

Recent Topics at IMO *External Affairs Department, Rule Development and ICT Division, ClassNK*..... 81

This article introduces recent topics discussed at International Maritime Organization (IMO). At this issue, a summary of the decisions taken at 79th Marine Environment Protection Committee (MEPC 79) and 106th Maritime Safety Committee (MSC 106) is provided.

