DNV·GL

Certificate No:
TAA00002CW

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Loading Computer System

with type designation(s)
Ship Manager 88, Ver.5

Issued to
TECHMARINE S/W CO., LTD.
Busan, Republic of Korea

is found to comply with
DNV GL rules for classification – Ships and offshore units

Application :

Type approved for calculation and control of loading conditions with respect to requirements for:

Check of shear force and bending moments against limit curves * Correction of shear force * Check of intact stability, damage stability and grain stability by direct calculation * Check of intact and damage stability against limit curve

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.
Blank Control of Shear Force and Bending Moments against Limit Curves *Correction of Shear Force for Bulker* Intact Damage and Grain Stability

Issued at **Høvik** on **2019-06-13**
This Certificate is valid until **2024-06-30**.
DNV GL local station: **Busan**

for **DNV GL**

Approval Engineer: **Nils Heimvik**

Inge Seglem
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Product description

Available Options of the Software:

Based on the stored characteristic data and stored**3D**model and loading data given by the user, the following functions are performed onboard monohull vessels:

Hull Strength:

For prepared loading conditions;

- Calculation of still water bending moment and shear force, and control against limit values.
- Correction of still water shear force for bulk carriers.
- Correction of still water shear force for tankers (applicable for pre 2006 DNV Rules only).
- Check of longitudinal strength of the hull girder for flooded cargo holds (previous IACS UR S17).
- Check of allowable mass in holds as function of draft

Stability:

For prepared loading conditions;

- Calculation of draft, trim, righting levers (GZ) and metacentric height (GM)
- Calculation and check of the intact stability criteria of 2008 IS Code Part A Ch.2.2 and 2.3
- Calculation and check according to the damage stability criteria of MARPOL 73/78 Annex I Regulation 28, IMO IBC Code Ch.2, and IMO IGC Code Ch.2
- Calculation and check of the grain stability requirements of SOLAS-74 Reg. VI/Part C and MSC 23(59), (International Grain Code) including A.10.3

Approval conditions

1. The loading computer is considered as supplementary to the approved stability booklet and/or loading manual onboard.

2. Specific approval and certification is required for each vessel at which the program is installed. Documentation to be submitted for approval is listed in DNV GL Rules for Ships Pt.6 Ch.4 Sec. 6. The identification of software will be recorded in the certificate.

3. The program is either to be installed on one approved hardware (type approved or case-by-case approved), or it is to be installed on two nominated computers. If two nominated computers are available, approval of hardware may be waived (Ref. DNV GL Rules Pt.6 Ch.4 Sec.6).

Type Approval documentation

The type approval is based on the following selected test ships

Intially:

- SPP Shipbuilding Co., Ltd. Hull No. H1005 (DNV GL Id. 26220)
- Hyundai Mipo Dockyard Hull No. H0406 (DNV GL Id. 26418)
- Hyundai Heavy Industries Co., Ltd. Hull No. H1703 (DNV GL Id. 25642)
- Hyundai Heavy Industries Co., Ltd. Hull No. H2211 (DNV GL Id. 29839)
- Hyndai Samho Heavy Industries Co. Ldt Hull No S571 (DNV GL Id 31430)
- Hyundai Mipo Dockyard Hull No. 2175 (DNV GL Id. 28533)

Strength rules and Grain stability:

- Samho Heavy Ind.Ltd. S189 (DNV GL Id.24518)
- Chengxi Shipyard CX4222 (DNV GL Id.27179)

Damage stability (software rev.5)

- LEONIDAS (DNV GL Id. 27798)
- GAN-TRIUMPH (DNV GL Id. 28533)
- MILITO (DNV GL Id. 31430)

The approval is based on the following documentation:

- Test conditions
- Basic data
- User's manual
- Programme description

Limitation

The type approval is valid only for the calculation results. I.e. the type approval is a confirmation that the software is able to give correct results provided that the stored characteristic data of the vessel and the user's input is correct.

Renewal assessment

The scope of the retention/renewal assessment is to verify that the conditions stipulated for the type approval is complied with and that no alterations are made to the product or software design.
The main elements of the assessment to be dealt with:

- Ensure that documentation for the type approval is available.
- Ensure that the type approved software complies with the referenced documents and specifications.
- Review of possible changes in design and performance of the type approved software version.
- Ensure traceability between manufacturer’s product marking and the DNV GL Type Approval Certificate.

The assessment is to be performed only upon renewal, and by the unit issuing the type approval certificate.