
No.21 Guidelines on approval procedure for onboard loading computers

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Preamble

These Guidelines apply to control of onboard loading computers and relevant computer programs used for ship stability calculations, when approved by the Classification Society. If the computer performs also strength calculations the UR S1 "Loading Guidance Information" is to be observed in addition.

1. General requirements

1.1 The onboard computer shall be considered supplemental to the information required by the Flag regulations. These information shall be made available at anytime in case of failure of the computer.

1.2 The onboard computer must be capable of producing print-outs of the calculations. The print-outs shall make clear what items have been checked by the computer.

1.3 The onboard computer is to be capable of checking any specific loading condition to all relevant stability and/or strength requirements within a time interval acceptable to the Society. If any of these items is not checked by the computer, the user should be properly informed when using the computer so that each such item can be checked by other means.

2. Type approval/hardware

2.1 The manufacturer should submit details of the computer to be installed on board. This information will be examined and if found satisfactory the manufacturer will be advised accordingly.

2.2 Environmental testing such as vibration, temperature, humidity etc should be carried out in the presence of the Society Surveyor according to the Society's requirements for type approval of control and electrical equipment.

2.3 For a computer which has already been type approved by another recognised authority, the manufacturer should submit a complete report of performance and environmental testing, and subject to the results being satisfactory, may be accepted in lieu of witnessed tests.

2.4 The Society must be advised of any alteration in the hardware specifications.

3. Type approval/programs to be used with a dedicated approved computer

3.1 Details of program logic should be submitted together with a list of the uses for which the program is intended, e.g. intact and damage stability, longitudinal strength etc.

3.2 The approval consists in running the programs for a certain number of test ships, on the dedicated approved computer. This aims to check at least the ability of the program as to:

- a) correct handling of the mathematic orders in connection with a specific technical problem,

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- b) criteria and minimum values or limits from Codes and Requirements/Administration, Classification, e.g. maximum admissible angle of inclination in case of damage, minimum lever arms for intact stability or maximum admissible shear forces, bending moments and torsional moments,
- c) comparison of results with stored criteria and minimum values,
- d) safeguarding that container stowage places will not be used twice, tanks will not be overfilled,
- e) the correct use of all input data, e.g. ship's body, sub-compartments, etc,
- f) performance of mass and moment calculations with clear numerical and graphical illustration of results like GM, righting arms, areas below lever curves, range of stability etc.
- g) ascertaining that all relevant requirements have been complied with before stating that a condition is acceptable.

4. Specific approval

- 4.1 The specific approval is intended for the association of one onboard computer + programs + one ship.
The decisive reference for all specific approval is to be found in a "mainframe" computer program which is acceptable to the respective Maritime Authority. The approval may be granted when the calculation results submitted by the manufacturer are in close accordance with the results given by the mainframe computer program and in particular close to the stability criteria.
- 4.2 Depending on the use for which the computer is to be approved, i.e. intact stability, damage stability, longitudinal strength etc, specific test conditions will be selected to cover anticipated range of all relevant parameters such as draught, loading arrangement, specific gravity of cargo and trim. The selected test conditions should utilise all the damageable compartments.
- 4.3 Details of the test conditions should be submitted to the Society together with all relevant data concerning hull form definition and compartment definition.
- 4.4 A formal Certificate detailing the uses for which the computer is approved will be given when the Society's representative has checked the instrument after installation, using approved test conditions intended for in-service verification.
The identification numbers of hardware and software are to be recorded in the computer Certificate.
- 4.5 Instruction manuals for hardware and software have to be detailed and understandable.

5. In-service verification

- 5.1 It is assumed that the onboard computer is handled correctly.
- 5.2 At annual intervals, the Society's representative should verify the performance of the computer using the in-service test conditions.

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- 5.3 If the vessel on which the computer is installed undergoes modifications affecting subdivision, lightweight or loading pattern, the existing approval will be considered null and void.
- 5.4 To obtain re-certification of the onboard computer, procedure given in paragraph "specific approval" should be adopted.

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