

DMA RO Circular no. 30

Approval of alternative and/or equivalent energy sources in Danish ships Guidance for Recognized Organizations and Ship owners.

Instruction to RO and Owners

1. Introduction

Due to the increasing wish and requirement to outsource conventional carbon based fuel, reducing CO₂, NO_x, SO_x emissions and other human and environmental harming substances related to the energy consumption and propulsion of ships, alternative or equivalent measures is implemented by the shipping companies on new and existing ships. As the market for these alternatives is new and ever changing, the development of guidelines and regulations for the approval of such has not followed in the same speed.

The purpose of this circular is to enlighten the approval process of alternative or equivalent energy sources on board Danish ships where there is no or minor guidelines and regulations for the design and consists of:

- Page 2, footnotes
- Page 3, a schematic overview and other requirements to the approval process
- Page 4, definitions
- Appendixes, Guideline to a specific system – describing the requirements for approval

The appendixes shall be regarded as dynamic documents that will be revised, updated or deleted when assessed necessary - based on the general development on new regulations, standards etc. and on any new knowledge.

2. Approval process

For the approval of alternative and/or equivalent energy sources, the IMO's MSC.1/Circ. 1455 - GUIDELINES FOR THE APPROVAL OF ALTERNATIVES AND EQUIVALENTS AS PROVIDED FOR IN VARIOUS IMO INSTRUMENTS, must be used. Depending on the complexity - size and type of vessel - amount, size and type of energy source, the guideline and design process apply partly or fully¹ by an assessment of The DMA.

It is the responsibility of the owner to establish and start the approval process according to this circular in the earliest start of the design phase of the vessel or system - with the RO or competent company/person to lead the design team. In addition, an initial start-up meeting with the DMA shall be initiated².

All systems, components etc. of the alternative and/or equivalent energy source on all types of vessels must comply with relevant regulations and standards from a RO if developed.

The DMA shall be invited to participate in the design process and HAZID workshops. As The DMA is the approval part, The DMA can only participate as an observer. The DMA shall be kept duly informed of the design team's work and conclusions of the preliminary risk assessment.

The DMA will by an assessment on basis of the preliminary result of the risk assessment and the leader of the design team's recommendations, approve the further development of the project. The alternative design must be surveyed during implementation and commissioning on board the vessel by either The DMA or the RO.

A final survey and test on board the vessel by either or both The DMA and the RO, for the verification of the full implementation of the result and conclusion of the design team's work shall be done. The DMA or the RO will issue a certificate and a statement of approval³ of the alternative and/or equivalent arrangement after approved final verification and test. Notification of the approved alternative or equivalent design shall be forwarded to the IMO and/or the EU-commission by The DMA.

3. Operation and survey

The conclusion of the risk assessment must include the future scope of survey, maintenance etc. If, during the operation of the alternative system or energy source, it is established that additional measures must be taken to enhance or secure the level of safety, mitigating actions must be taken and the design team must process this in an additional risk assessment. Periodical survey of the system by The DMA or RO shall be according to the relevant regulation and certificate for which the system is equivalent - and what the conclusion in the risk assessment may establish.

Foot notes:

1) Examples of partly process:

- Small installations with some known experience in domestic vessels (cargo and passenger)
- Small installations with some known experience on cargo vessels in international trade
- Case by case assessment

Examples of full process:

- All installations with unknown technology
- Small installations with some known experience in all passenger ships and cargo ships of more than 500 GT in international trade where the purpose is to add power to the main propulsion and/or emergency power and/or main power etc.
- Large installations on all vessels where the purpose is main propulsion and/or emergency power and/or main power etc.
- Case by case assessment

Table 2 in MSC.Circ.1455 can be used as a tool to assess the project category

2) Minimum topics at the initial meeting with The DMA:

- Project presentation, including purpose and description of the installation incl. vessel specifications, area of trade etc.
- Parties involved and presentation of the design team
- A project time table
- Regulations affected
- Preliminary assessment to an agreement of partly or fully process
- Division of approval between The DMA and RO(if any)
- Etc.

3) On board documentation requirements:

Before any trade can commence, all required certificates and documents, according to the MSC.1/Circ.1455, paragraph 7.2, shall be issued - and relevant statutory certificates affected by the equivalent or new installation shall be endorsed with the information of equivalents.

In general, the following documentation should exist:

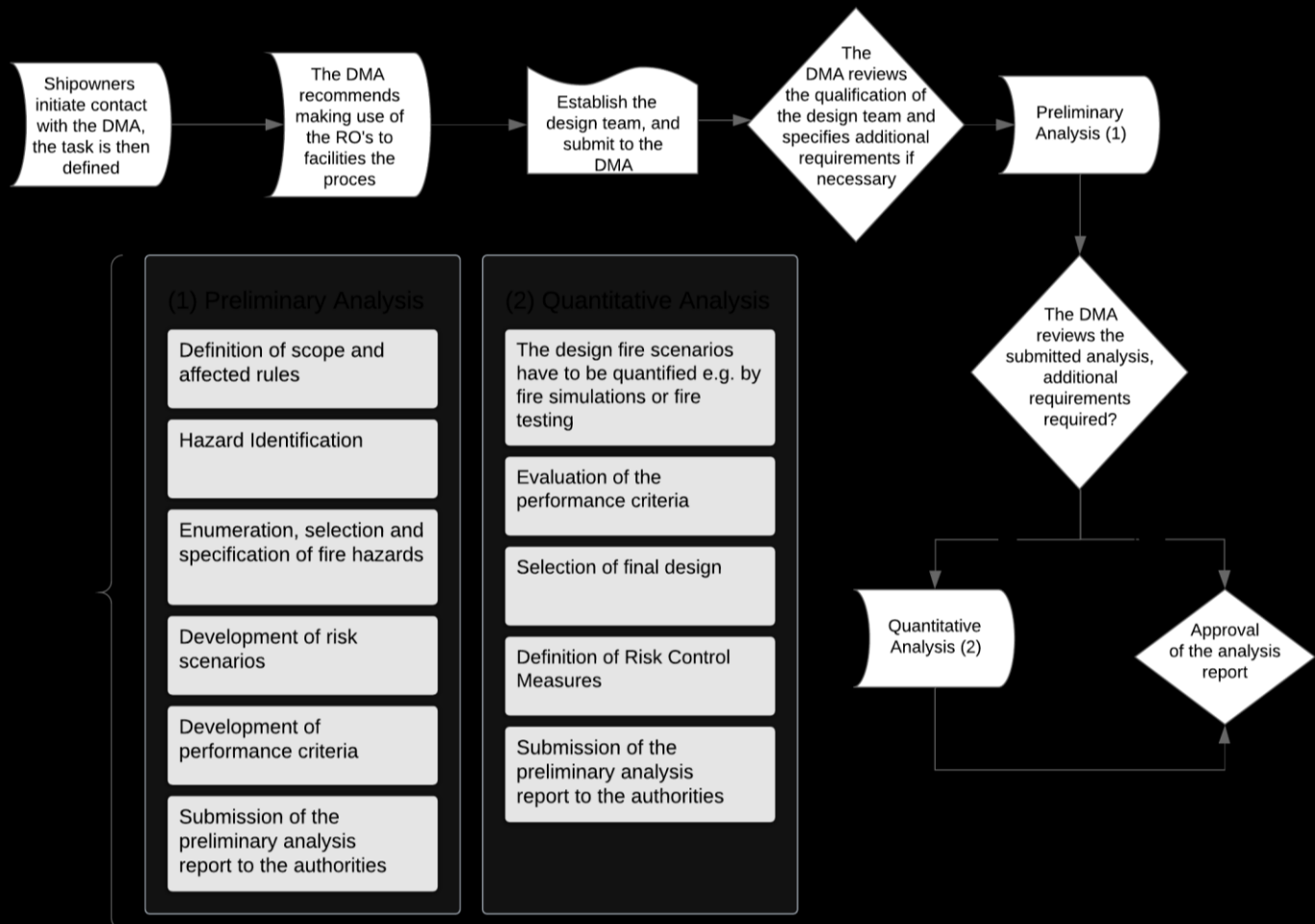
- certificates stating that the ship has an alternative and/or equivalency, including condition of approval, if any; and
- information on the alternative and/or equivalent design, comprising of the following:
 - scope of the analysis or design, including the critical design assumptions and critical design features;
 - description of the alternative and/or equivalent design and arrangements, including drawings and specifications;
 - list of IMO/EU/National regulations affected;
 - summary of the results of the engineering analysis and basis for approval; and
 - test, inspection and maintenance requirements.

When the submitter has supplied the Administration or RO with all required documentation, The Administration or RO delivers the following to the Submitter:

- 1 statement of approval of design basis;
- 2 certificates of approval with conditions as needed; and
- 3 other certificates.

Where appropriate, the details of onboard documentation are to be consistent with relevant Ship Construction File (SCF) requirements.

Schematic approval process for alternative and/or equivalent designs



Minimum requirements and topics to be included in the process

- A ship specific analysis of the effect on the entire vessel and its others systems in case of accidents in the equivalent system (Eg. emergency escape ways, muster stations, LSA equipment, accommodation areas, fire extinguishing and suppression systems, bilge system, emergency power, propulsion and manoeuvring capability, communication, construction and materials, etc.)
- Requirements of crew competence, knowledge and awareness incl. manning of the vessel
- A complete list of regulations affected
- Survey, test, inspection and maintenance requirements

DEFINITIONS

For the purpose of this guideline, the following definitions apply:

- *Design Team*
Design team is a team established by the owner, builder or designer, which may include, as the alternative design and arrangements demand, a representative of the owner, builder or designer and expert(s) having the necessary knowledge and experience for the specific evaluation at hand. Other members may include marine surveyors, ship operators, safety engineers, equipment manufacturers, human factor experts, naval architects and marine engineers.
- *Submitter*
Submitter is an entity seeking approval of an alternative design and/or equivalent from the Administration, responsible for communicating with the administration for the submission and follow-up of the approval process.
- *HAZID*
Hazid. Hazard identification, a process to find, list and characterize hazards.
- *Preliminary Analysis*
Preliminary design is a design developed for the design preview and the first analysis phase. The preliminary design is a high-level design taking into account the general arrangement, major systems, components, etc.
- *Quantitative Analysis*
The quantitative analysis is the most labour intensive. It consists of quantifying the design any scenario, developing the performance criteria, verifying the acceptability of the selected safety margins and evaluating the performance of trial alternative designs against the prescriptive performance criteria.
- *Risk*
Risk is a measure of the likelihood that an undesirable event will occur together with a measure of the resulting consequence within a specified time, i.e. a combination of the frequency and the severity of the consequence (this can be either a quantitative or qualitative measure).
- *Performance criteria*
Performance criteria are measurable quantities stated in engineering terms to be used to judge the adequacy of trial designs
- *Risk control measure*
Risk control measure is a means of controlling a single element or risk; typically, risk control is achieved by reducing either the consequences or the frequencies; sometimes it could be a combination of the two.
- *Approval*
Approval means that the Administration or RO issues an approval certificate as proof of verification of compliance with the regulations, standards, rules, etc. which are aimed at ensuring safety against hazards to the ship, personnel, passengers and cargo, and against hazards to the environment.
- *RO*
The Danish Maritime Authority has authorised a number of Recognized Organisations - ROs to perform various approval and certification tasks on board Danish ships. To find DMA authorised ROs - see The DMA homepage.