



Regulatory Aspects of Methanol as Fuel

ZES-Net Workshop, 29 April 2020



Lloyd's Register
Marine

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for a safer world

Introduction

- ZES-Net Zero Emission Shipping Network
 - Workshop 29 April 2020
- Agenda
 - Methanol
 - ShipRight(RBD) Procedures
 - Design Screening Approach
- Lloyd's Register EMEA
 - Marine Classification Society
 - Hamburg office
 - Ship new construction



The network project ZES-Net, Zero Emission Shipping Network, is a cross-border German-Dutch INTERREG-funded project. The project partners aim for developing and building smaller ships and harbor boats that have zero emission propulsion installed. The fuel chosen is a non fossil methanol as it is easy to be produced from renewable sources and handling on board is similar to conventional fuels.

This expert workshop shall focus on methanol as CO₂-neutral fuel for shipping in general and discuss the current regulatory aspects that need to be addressed using methanol onboard ships. Besides this general issues, storing and handling methanol onboard ships and possible energy converters like combustion

engines and fuel cells shall be highlighted.

Each topic will be introduced by short pitches from different stakeholders which are followed by talks and discussions in smaller groups. Important statements and further steps will be documented as outcome of this expert workshop to move on with implementing methanol as fuel for shipping.

The workshop is organized in cooperation with the Kompetenzzentrum GreenShipping Niedersachsen, FME and MARIKO GmbH.

Please register here:
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Methanol as Fuel

- Methanol - Methyl alcohol, wood alcohol, methyl hydroxide
- Liquid fuel;
- Ambient conditions;
- ..

		HFO	MGO	LNG	Methanol
Density at 15°C	[kg/m³]	989	max 900	448 (-160°C, 1 bar)	796
Lower heating value	[MJ/kg]	40	43	50	20
Flash point	[°C]	>60	>60	-175	12
Auto ignition			250 - 500	540	464
Flammability limits			0.3 – 10.0	5 - 15	6 – 36

	
Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH) as amended Material Name: Methanol SDS ID: Methanol-EU	
SECTION 1: Identification of the substance-mixture and of the company/undertaking	
1.1 Product identifier	Material Name
	Methanol
	Names use
	Methyl alcohol, wood alcohol, methyl hydroxide
	Chemical formula
	Alcohol
1.2 Registration status	01-311843107-44-0031 EC # 200-658-6 CAS # 67-56-1
1.3 Relevant identified uses of the substance or mixture and uses advised against	Identified uses
	Industrial use: Manufacture of substances, Distribution of substances, Formulation & reworking of substances and mixtures, Use as a fuel, Use as cleaning agent, Use as laboratory reagent, Where treatment chemicals, maintenance, Professional use, Use as a fuel, Use as cleaning agent, Use as laboratory reagent, Use as oil and gas field drilling and production operations, Common use: Common use of cleaning agent and solvents, Common use of fuel, Use advised against
	Non-identified
1.4 Details of the supplier of the safety data sheet	Methanex Europe SA/ST/1
	Wanloo Office Park - Building P
	Deire Schelle 161 - box 31
	B-1410 Wommel
	Belgium
	Phone: +32 (0) 2 352 06 70
	E-mail: info@methanex.com
	Fax: +32 (0) 2 352 06 99
1.4 Emergency telephone number	+44 (0) 1253 229 676 (24h/7d)
	Member State Official Advisory Body telephone numbers, where applicable
	145 (Dutch local number)
SECTION 2: Hazards identification	
2.1 Classification of the substance or mixture	Classification according to Regulation (EC) No 1272/2008 (CLP)
	Flammable Liquid - Category 2
	Acute Toxicity - Oral - Category 3
	Acute Toxicity - Dermal - Category 3
	Acute Toxicity - Inhalation - Vapor - Category 3
	Specific Target Organ Toxicity - Single Exposure - Category 1 (optic nerve, central nervous system)
2.2 Label elements	Labeling according to Regulation (EC) No 1272/2008 (CLP)
	Hazard symbols

Page 1 of 84 Issue date: 2019-10-31 Revision 1.2 Print date: 2019-11-04

 SOUTHERN CHEMICAL CORPORATION

MATERIAL SAFETY DATA SHEET

METHANOL

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name	Methanol (CH ₃ OH)
Synonyms	Alcohol, Methyl Hydroxide, Methyl Hydrate, Wood Alcohol, Wood Spirit
Product Use	Solvent, Fuel, Feedstock
Company Identification	Methanol Holdings (Trinidad) Limited Atlantic Avenue, Point Lisas Industrial Estate Point Lisas, Trinidad, West Indies
Emergency Contact (24 hours)	CHEMTREC - 1-800-424-9300
North America	Gilbertsonszentrum Nord - 011-49-551-19240
Europe	Industrial Plant Services Limited - 1-868-636-1251
Trinidad	
Non-Emergency Contact	Southern Chemical Corporation - 1-201-799-4416
North America	
Europe	Helm AG - 011-19-40-23750
Trinidad	Methanol Holdings (Trinidad) Limited - 1-868-636-2906

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

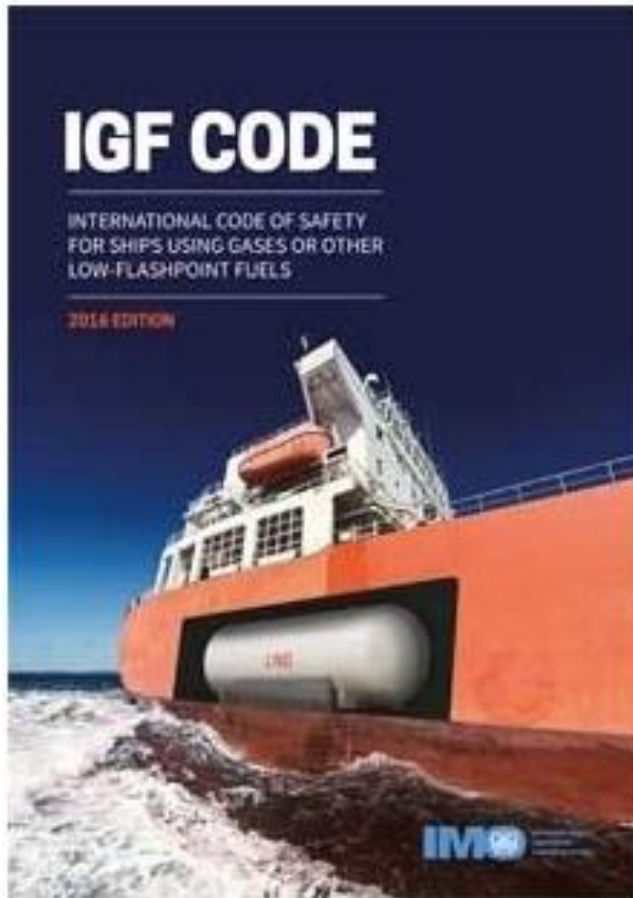
Chemical Name	CAS No.	Percent	EBEC'S / ELBEC'S
Methyl Alcohol	67-56-1	99+	200-658-6

Hazard Symbols: T, F
ACGRN STEL: 250 ppm, skin notation
ACGRN TEL: 200 ppm, skin
OSHA PEL: 200 ppm

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International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels - IGF Code



U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

2703 Martin Luther King Jr Ave SE
Mail Stop 7509
Washington, DC 20553-7509
Staff Symbol: CG-ENG
Phone: (202) 372-1353
Fax: (202) 372-1929

16715
CG-ENG Policy Letter
No. 01-12, CH-1
JUL 12 2017

From: *[Signature]*
J. Hawkins, CAPT
COMDT (CG-ENG)

To: Distribution

Subj: EQUIVALENCY DETERMINATION – DESIGN CRITERIA FOR NATURAL GAS FUEL SYSTEMS (CHANGE-1)

Ref:

- (a) International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels (IGF Code), International Maritime Organization (IMO) Resolution MSC.391(95)
- (b) Commandant (CG-521) Policy Letter 01-12, dated April 19, 2012
- (c) Commandant (CG-OES) Policy Letter 01-15, "Guidelines for Liquefied Natural Gas Fuel Transfer Operations and Training of Personnel On Vessels Using Natural Gas as Fuel"
- (d) Commandant (CG-OES) Policy Letter 02-15, "Guidance Related to Vessels and Waterfront Facilities Conducting Liquefied Natural Gas (LNG) Marine Fuel Transfer (Bunkering) Operations"

1. **Purpose.** This policy letter establishes design criteria for natural gas fuel systems that provide a level of safety that is at least equivalent to that provided for traditional fuel systems required by existing regulations. Change-1 to this policy reflects the January 1, 2017 effective date of the IGF Code, reference (a), as the international standard for design of gas-fueled ships. The IGF Code supersedes the IMO's Interim Guidelines, which were previously used as a baseline standard for equivalency under reference (b). The intent of this policy is to afford an avenue of compliance with regard to obtaining Coast Guard approval for the design of natural gas fuel systems. The Coast Guard fully recognizes that additional alternatives may exist that may be acceptable, and will consider them on a case-by-case basis.

2. **Directives Affected.** Reference (b) is hereby superseded.

3. **Action.** Natural gas fuel systems designed and constructed in accordance with the enclosed criteria may be accepted for use on board U.S.-flagged vessels.

4. **Application.** This policy provides uniform guidance for the inspection and certification of vessels that are seeking to install an LNG fuel system if there are equivalency provisions included in the regulations applicable to the vessel.



Liquefied Natural Gas as Fuel



Sub-committee on Carriage of Cargoes and Containers

CCC 6/WP.3



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SUB-COMMITTEE ON CARRIAGE OF
CARGOES AND CONTAINERS
6th session
Agenda items 3 and 8

CCC 6/WP.3
12 September 2019
Original: ENGLISH

DISCLAIMER
As at its date of issue, this document, in whole or in part, is subject to consideration by the IMO organ to which it has been submitted. Accordingly, its contents are subject to approval and amendment of a substantive and drafting nature, which may be agreed after that date.

AMENDMENTS TO THE IGF CODE AND DEVELOPMENT OF GUIDELINES FOR LOW-FLASHPOINT FUELS

UNIFIED INTERPRETATION OF PROVISIONS OF IMO SAFETY, SECURITY AND ENVIRONMENT-RELATED CONVENTIONS

Report of the Working Group

GENERAL

1 The Working Group on Amendments to the IGF Code and Development of Guidelines for Low-flashpoint Fuels met from 9 to 12 September 2019 and was chaired by Mr. C. Allgeier (Germany).

2 The Group was attended by delegates from the following Member States:

BELGIUM	MALAYSIA
BRAZIL	MARSHALL ISLANDS
CANADA	NETHERLANDS
CHINA	NIGERIA
DENMARK	NORWAY
FINLAND	PERU
FRANCE	REPUBLIC OF KOREA
GERMANY	RUSSIAN FEDERATION
GHANA	SINGAPORE
GREECE	SPAIN
ITALY	SWEDEN
JAPAN	UNITED KINGDOM
LIBERIA	UNITED STATES

by a representative from the following Associate Member of IMO:

HONG KONG, CHINA

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CCC 6/WP.3
Page 3

- .8 consider whether it is necessary for the correspondence group to be re-established and, if so, prepare terms of reference for consideration by the Sub-Committee; and
- .9 submit a written report by Thursday, 12 September 2019.

DRAFT INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING METHYL/ETHYL ALCOHOL AS FUEL

4 As instructed, the Group considered the draft Interim guidelines for the safety of ships using methyl/ethyl alcohol as fuel, based on document CCC 5/WP.3, annex 1 and Corr.1, taking into account the relevant outcomes from PPR 6, SDC 6, SSE 6 and HTW 6.

Provisions for fire fighting

5 In considering the provisions for fire fighting, as proposed by the SSE Sub-Committee in document SSE 6/18, paragraph 17.32, the Group noted the lack of provisions in chapter 14 of the FSS Code regarding methyl/ethyl alcohol fires and agreed to include reference to chapter 17 of the IBC Code.

6 The Group, in recalling the decision at SSE with respect to smoke detectors fitted on open ro-ro decks where detection was more difficult due to the free air inflow and provisions developed to address this special case, amended paragraph 11.6.6 in a similar fashion so as to require that smoke detectors on ships using methyl/ethyl alcohol fuel be augmented with detectors capable of detecting methyl/ethyl alcohol fires.

7 The Group agreed to include the recommendation to carry portable equipment to ease detection of alcohol fires (annex 1, paragraph 11.6.7).

Liquid leakage detection

8 In considering the liquid leakage detection provisions in section 15.3, the Group had a lengthy discussion on how to address the requirement in functional requirement 15.2.1.1 which stated that methyl/ethyl alcohol installations should be so arranged that there was not an unacceptable loss of power in the event of a single failure in the context of a liquid leakage detection.

9 The Group agreed that any leakage detected should only result in a shutdown of the affected fuel supply line, not the entire fuel supply system. After considering the different locations where liquid leakages could occur, the Group amended paragraph 15.3.2 and included new paragraph 15.3.3.

Finalization of the draft Interim guidelines

10 After including some further, mostly editorial, amendments, the Group prepared a final clean version of the Interim guidelines and the associated draft MSC circular, as set out in annex 1, for consideration by the Sub-Committee.

DRAFT INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING FUEL CELL POWER INSTALLATIONS

11 The Group, as instructed, further developed the draft Interim guidelines for fuel cells, based on document CCC 6/3, annex 1.

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CCC 6/WP.3
Annex 1, page 2

ANNEX

INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING METHYL/ETHYL ALCOHOL AS FUEL

1 Introduction

The purpose of these Interim Guidelines is to provide an international standard for ships using methyl/ethyl alcohol as fuel.

The basic philosophy of these Interim Guidelines is to provide provisions for the arrangement, installation, control and monitoring of machinery, equipment and systems using methyl/ethyl alcohol as fuel to minimize the risk to the ship, its crew and the environment, having regard to the nature of the fuels involved.

Throughout the development of these Interim Guidelines it was recognized that the provisions therein must be based on sound naval architectural and engineering principles and the best understanding available of current operational experience, field data and research and development. These Interim Guidelines address all areas that need special consideration for the use of the methyl/ethyl alcohol as fuel.

These Interim Guidelines follow the goal-based approach (MSC.1/Circ.1304/Rev.2) by specifying goals and functional requirements for each section forming the basis for the design, construction and operation of ships using methyl/ethyl alcohol as fuel.

The current version of these Interim Guidelines includes provisions to meet the functional requirements for methyl/ethyl alcohol as fuel.

2 General

2.1 Application

Unless expressly provided otherwise these Interim Guidelines apply to ships to which part G of SOLAS chapter II-1 applies.

2.2 Definitions

For the purpose of these Interim Guidelines, the terms used have the meanings defined in the following paragraphs. Terms not defined should have the same meaning as in SOLAS chapter II-2 and the IGF Code.

2.2.1 Bunkering means the transfer of fuel from land-based or floating facilities into ship's permanent tanks or connection of portable tanks to the fuel supply system.

2.2.2 Fuel means methyl/ethyl alcohol fuels, containing allowable additives or impurities, suitable for the safe operation on board ships, complying with an international standard.

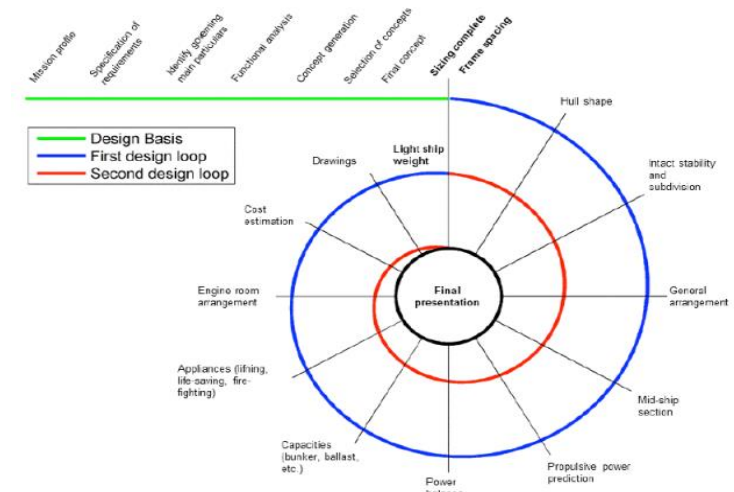
2.2.3 Fuel tank is any integral, independent or portable tank used for storage of fuel. The spaces around the fuel tank are defined as follows:

- .1 **Fuel storage hold space** is the space enclosed by the ship's structure in which a fuel tank is situated. If tank connections are located in the fuel storage hold space, a fuel storage hold space should also be considered as tank connection space. Integral fuel tanks do not have a fuel storage hold space;

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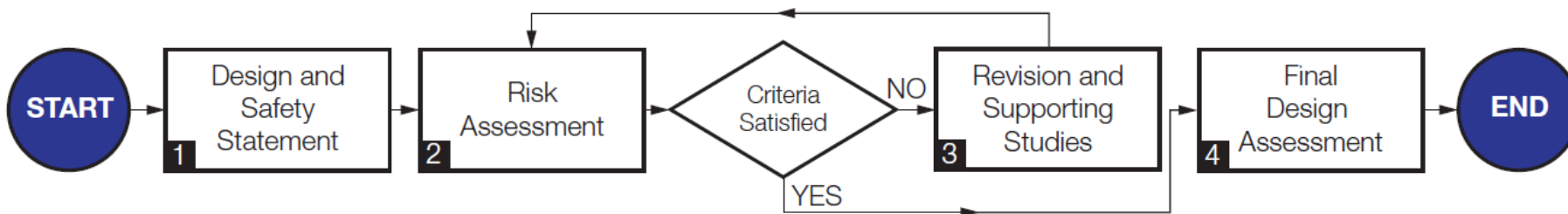
Design Development

- Ship design phases
 - Concept design
 - Initial design
 - Basic design
 - ..
- Stakeholders
 - Naval architectural consultants
 - Shipyards
 - Ship owners
- Classification Rules and Regulations
- Statutory framework
- Process established in various new construction projects and orders



ShipRight(RBD) Procedures

- Stage 1
Appraisal, Design and Safety Statement
- Stage 2
Appraisal, Risk Assessment
- Stage 3
Appraisal, Revision and Supporting Studies
- Stage 4
Appraisal, Final Design Assessment



- Scalable process to reflect degree of novelty and/or deviation(s), design complexity and safety considerations.

ShipRight
Design and Construction

Additional Design Procedures

Risk Based Designs
(RBD)

January 2018



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International Code of Safety for Ships Using Gases or Other Low-Flashpoint Fuels - IGF Code Reference, Part A

4 General Requirements

4.1 Goal

'..The goal of this chapter is to ensure that the necessary assessments of the risks involved are carried out in order to eliminate or mitigate any adverse effect to the persons on board, the environment or the ship..'

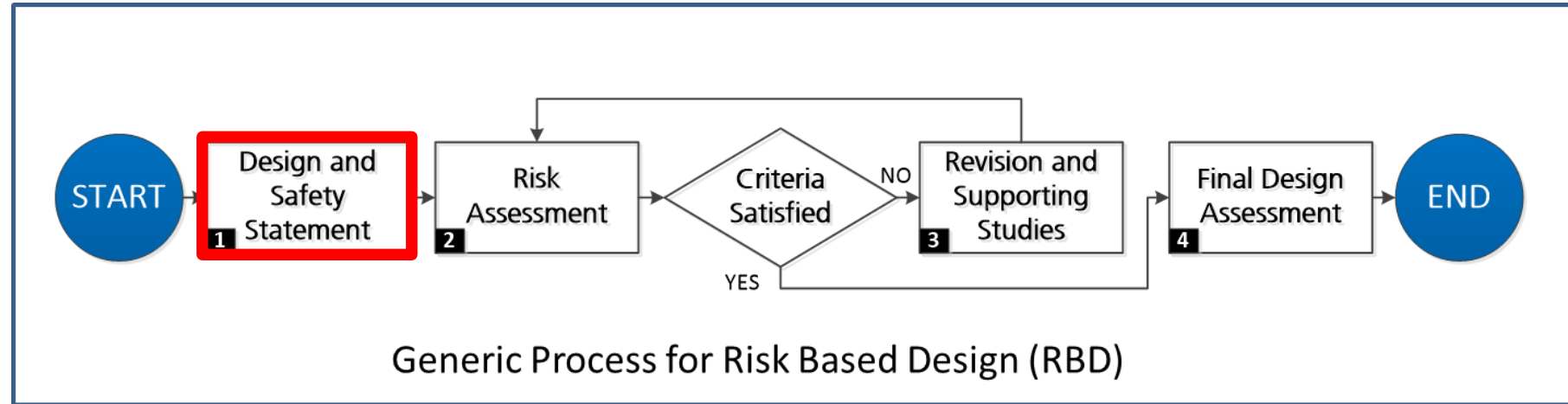
4.2 Risk assessment

'..The risk management process should identify critical hazards resulting from both inherent design, and operational practices, and identify appropriate mitigations..'

'..Typical risk management processes to be carried out

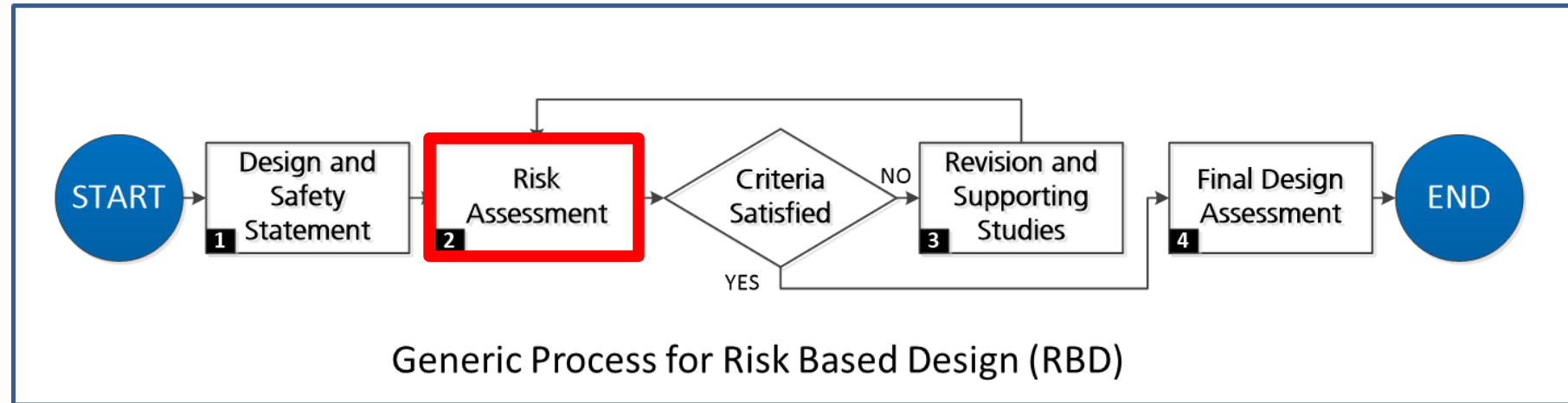
- Hazard Identification Study (HazID),
- Failure Mode and Effects and Criticality Analysis (FMECA),
- Hazard Operability Study (HazOP), and
- Quantitative Risk Assessment (QRA) for the quantification and establishment of Safety Zones and exclusion zones as required by local regulation..'

ShipRight(RBD) Procedures



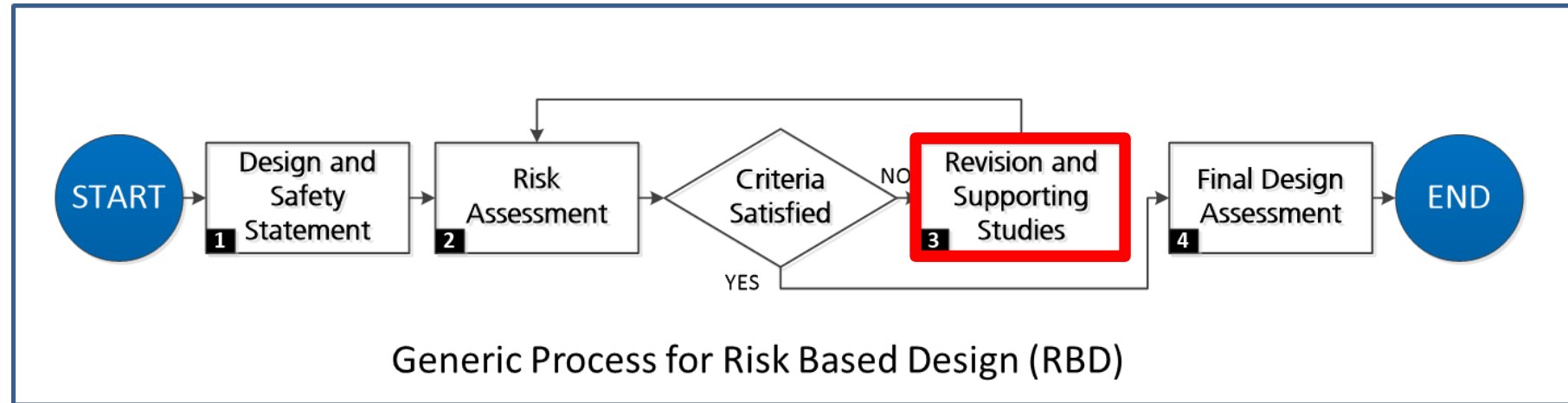
- Define scope of novel or alternative design;
- Identify Classification and Statutory requirements not complied with;
- Determine safety objectives of Classification and Statutory requirements;
- Determine functional requirements to satisfy safety objectives;
- Determine integration requirements to meet safety objectives and functional requirements;
- Describe extent of deviation from Classification and Statutory requirements.

ShipRight(RBD) Procedures



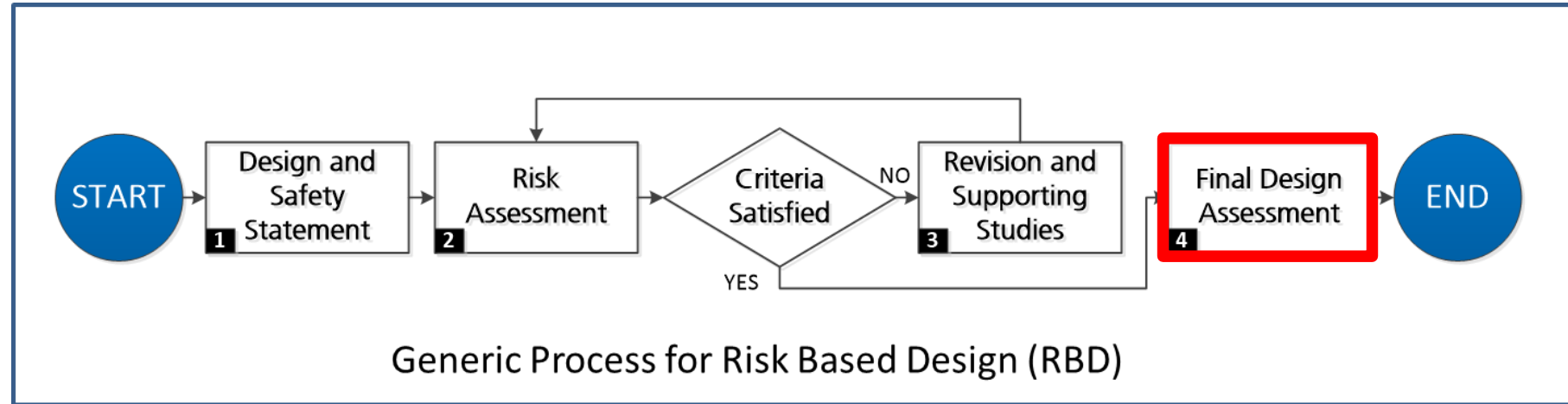
- Form assessment team - expertise, experience, relevance;
- Assessment method and acceptance criteria;
- Identify hazards, how hazards can occur, determine consequences, estimate likelihood;
- Categorise risk, determine if acceptance criteria are satisfied;
- Identify additional measures to satisfy safety criteria, justify safety or need for further assessment.

ShipRight(RBD) Procedures



- Where criteria are not satisfied, a revision of the risk assessment based on revised assumptions, data, input and supporting studies are required.

ShipRight(RBD) Procedures



- Formal review of the final design, with desired outcome to achieve an approved design.
- When Design Team and Lloyd's Register are satisfied that all relevant issues have been addressed and documented, the Flag State Authority gets the recommendation to approve the alternative design and arrangement.
- Ref. MSC.1/Circ.1455

ShipRight(RBD) Procedures

- Alternative design and arrangements are to be approved by Flag State Authorities.
- ShipRight Risk Based Design (RBD) procedure has been implemented to support Naval Architectural Consultants / Shipyards / Ship Owners with their design developments to obtain acceptance and to achieve approval by Flag State Authorities.
- Prior to acceptance the hazards of a design, a technology or a system are to be robustly identified and immediate equipment consequences mitigated to an appropriate level.
- Novelty of Methanol as fuel installations.

ShipRight Design and Construction

Additional Design Procedures

Risk Based Designs
(RBD)

January 2018



Lloyd's
Register

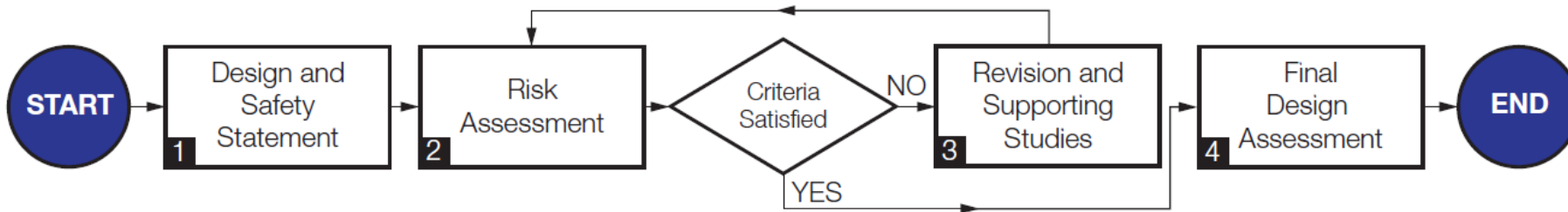
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STENA Line AB

Design Screening

- Design Screening
 - Stage 1
Appraisal, Design and Safety Statement
 - Stage 2
Appraisal, Risk Assessment
 - Stage 3
Appraisal, Revision and Supporting Studies
 - Stage 4
Appraisal, Final Design Assessment



ShipRight
Design and Construction

Additional Design Procedures

Risk Based Designs
(RBD)

January 2018



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Design Screening Procedures

Who

- Design team
- Typically Naval Architectural Consultant / Shipyard / Ship Owner

What

- Joint design screening exercise
- Adopted from established RBD process

When

- Typically at project stage
- Pre-contract exercise

Why

- Confirmation of design concept and proposed arrangements
- Early involvement flag state authority as and if required

Form Rev-02
16 May 20

METHYL / ETHYL DESIGN SCREENING

Please complete this form to screen a 'gas as fuel' design against key items of the AMENDMENTS TO THE IGF CODE AND DEVELOPMENT OF GUIDELINES FOR LOW-FLASHPOINT FUELS, CCC 6WP.3, 12 September 2019, Report of the Working Group, ANNEX 1, DRAFT INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING METHYL/ETHYL ALCOHOL AS FUEL and developing good practice. The screening can be performed as part of LR's Risk Based Design (RBD-1) process, and/or to help gain approval in principal (AIP).

Name of ship (or project) Project ZES-NET

Ship type	PASSENGER SHIP	Ferry	Ro-PAX (Cruise Ship)
Please strikethrough, as appropriate.	Cruise Ship Ro-PAX	PSV	Catamaran
	CARGO SHIP	Car Carrier	Chemical Tanker
	Bulk Carrier	Dry Cargo	Emergency Vessel
	Container Ship	Oil Tanker	Ore Carrier
	Ice Breaker	Ro-Ro Cargo	Tug
	Patrol Boat		

This form is being submitted for Design Screening

Stakeholders Please name stakeholders (e.g. yard, owner, designer, supplier, flag and port authority).

Naval Architectural Consultant - Shipyard - Ship Owner

Form completed by Please state name(s), position, organisation

Naval Architectural Consultant - Shipyard - Ship Owner

Date form completed 20 April 2020

Number of fuel tank(s)	1 / 2 / 3 / more
Type of tank	Independent / Integral / Portable
Overall fuel tank(s) dimensions & volume	L metre x B metre x H metre / m ³

Complete all sections that apply.

For each of question, 'strikethrough' all answers that do not apply. For example: YES ~~NO~~ ~~NA~~.

Unless stated, a YES answer is a move towards meeting LFPF key items (and good practice). Answering NO or NA (not applicable) does not necessarily mean that RBD-1, AIP and/or GR(A) cannot be successfully completed. A NO or NA answer may be due to arrangement specifics requiring further evaluation.

Where appropriate, we will provide feedback on NO and NA answers and guidance on revisions to meet IGF Code/LFPF key items, and successfully complete RBD-1, AIP and/or GR(A).

Please note that Design Screening does not guarantee design approval for classification. There may be technical or regulatory issues that appear when details of the design are subjected to risk assessment (e.g. RBD-2) and full application of the normal rigors of classification approval.

For further information and advice on this form, design screening, RBD, AIP and/or GR(A) contact hamburg-technical-support@lr.org.

Lloyd's Register Marine & Offshore Page 1 of 11

- Joint assessment of a proposed design
- Active stakeholder participation
- Drawings, data, information provided
- Deliverables
 - Screening Report
 - Explanatory design documents
- Flag state Authority

Lloyd's Register EMEA

Design Screening Scope

Aspects being reviewed

- Section 05 Ship design and arrangement
- Section 06 Fuel containment system
- Section 07 Material and general pipe design
- Section 08 Bunkering
- Section 09 Fuel supply to consumers
- Section 10 Power generation including propulsion and other energy converter
- Section 11 Fire safety
- Section 12 Explosion prevention and area classification
- ...
- Section 16 Training, drills and emergency exits
- Section 17 Operation

Form No-02 METHYL / ETHYL DESIGN SCREENING			
Large tanks in the fuel system should not need to be raised off the hull in the machinery space?	8.8.1		100/100/100
Fuel piping within machinery space enclosed in gas and liquid tight enclosure in accordance with CH 8.4?	8.8.2		100/100/100
Fuel piping <ul style="list-style-type: none"> • located not less than 300 mm from ship's side? • not be so directly through accommodation spaces, service spaces, electrical equipment rooms or control spaces? • protected against mechanical damage if not through service spaces, control spaces or other deck? • enclosed in a case or gas and liquid tight bulk if passes through enclosed cases? • not require fuel piping within fuel tank, coefficient, fuel preparation room space containing intermediate fuel tank? • self-closing to a suitable full or collecting tank? 	8.7.1 & 8.7.4		100/100/100
Fuel preparation room located outside machinery spaces of category A?	8.8.1		100/100/100
<ul style="list-style-type: none"> • separated from other large systems? • holding tanks for collecting storage from fuel pumps, valves, pipe rupture tanks, located in enclosed spaces, with safe transfer to ensure no leakage? • for fuel preparation space outside from outside of the fuel preparation space? 	8.8.1 & 8.8.2		100/100/100
Ship tanks <ul style="list-style-type: none"> • provided where leakage or spill may occur large wall pipe connections? • enough capacity for maximum amount of spillage as per risk assessment? • provided with drain and backflow prevention to holding tank, may manually emptied if leakage with bleed? • holding tank equipped with level indicator and alarm? • holding tank vented during normal operation? 	8.10.1 & 8.10.2		100/100/100
Access (meeting CH 8.12) provided for access from a non-hazardous area to a hazardous area?	8.11.1		100/100/100
Isolation access from open deck to fuel preparation room or via duct?	8.11.2		100/100/100
Fuel tank and surrounding coefficients <ul style="list-style-type: none"> • should have suitable access from open deck, where practicable? • without access from open deck the empty space has: <ul style="list-style-type: none"> • mechanical extraction ventilation, if ACH, low trigger alarm and gas detection? • enough open area around fuel tank, both for evaluation and repair? • not be an accumulation space, service space, control station or machinery space of category A? • not be a service space, electrical space 	8.11.2 & 8.11.4		100/100/100
Lloyd's Register Marine & Offshore Page 3 of 11			

Form No-02 METHYL / ETHYL DESIGN SCREENING			
Size of tanks, extent of tanks and no large operation during empty?	8.11.3		100/100/100
Area around independent fuel tank, sufficient to carry out evacuation and rescue operation?	8.11.3		100/100/100
Horizontal volume or openings to or within fuel tanks or surrounding coefficients have a minimum clear opening of 1.8m, vertical opening (clearing 1.8m) height from bottom ventilation, similar openings available provided evacuation can be demonstrated?	8.11.4		100/100/100
Access <ul style="list-style-type: none"> • gas tight bulk head sealing 1.8 x 3 m area, 300 mm clear, self-closing door without fire-back arrangement? • emergency entrance, low pressure release adjacent hazardous space? • bulk head not less than 3 m? • suitable and visual alarm if both doors are moved from closed position? • access restriction, door has of under pressure, suitable and visual alarm given at a marked station to indicate both side of pressure and opening of access door? 	8.12.1 & 8.12.2		100/100/100
Essential equipment required for safety should not be damaged and will be of safe type? <ul style="list-style-type: none"> • technical equipment for propulsion, power generation, manufacturing, anchoring, mooring, emergency fire pumps not of essential safe type should not be in areas to be protected by access? 	8.12.3 & 8.12.7		100/100/100
Section 6 Fuel containment system			
Fuel tanks <ul style="list-style-type: none"> • fitted with a controlled tank venting system? • fuel piping system for gas flaring and safety fitting with fuel from gas flare condition? • prevention the formation of gas pockets? • fitted with pressure and vacuum relief valve? • prevention of flame propagation into fuel containment system? • vent to shut-off (flameproof) valve arrangement upstream or downstream this only with independent secondary containment case or underpressure protection? • independent venting system designed for full flow overpressure and/or vacuum (pressure arrest as secondary containment, opening this not lower 0.207 mPa below atmospheric pressure)? • venting to a safe location on open deck? • vent system designed for summer heat without tank overpressure? • vent system connected to highest point of each tank, vent lines should be self-draining? 	6.2.1 & 6.2.2		100/100/100
Fuel tanks <ul style="list-style-type: none"> • to be vented at times during normal operation? • coefficient arrangement for during or filling with water via non-permanent connection, emptying to a separate draining system? • elimination of potential flammable atmosphere in fuel tanks during emergency change, gas flaring or venting? • suitable ducts and closed arrangement and closing 	6.4.1 & 6.4.2		100/100/100
Lloyd's Register Marine & Offshore Page 4 of 11			

Summary

- Design development support
- Design screening as an introductory step to RBD procedures
- Joint screening exercise
- Review of Methanol fuelled ship designs
- Confirmation of proposed arrangements
- Starting point to involve Flag State Authority
- Transparent documentation
- Co-operative approach

Form Rev-02
18-Nov-20

METHYL / ETHYL DESIGN SCREENING

Please complete this form to screen a 'gas as fuel' design against key items of the AMENDMENTS TO THE IGF CODE AND DEVELOPMENT OF GUIDELINES FOR LOW-FLASHPOINT FUELS, CCC 6/WP.3, 12 September 2019, Report of the Working Group, ANNEX 1, DRAFT INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING METHYLETHYL ALCOHOL AS FUEL and developing good practice. The screening can be performed as part of LR's Risk Based Design (RBD-1) process, and/or to help gain approval in principal (AIP).

Name of ship (or project)	Project ZES-NET		
Ship type <small>Please breakthrough, as appropriate.</small>	PASSENGER SHIP Cruise Ship Ro-PAX	Ferry PSV	Ro-PAX (Cruise Ship) Catamaran
CARGO SHIP Bulk Carrier Container Ship Ice Breaker Patrol Boat	Car Carrier Dry Cargo Oil Tanker Ro-Ro Cargo	Chemical Tanker Emergency Vessel Ore Carrier Tug	
This form is being submitted for <small>Please breakthrough, as appropriate.</small>	Design Screening		
Stakeholders <small>Please name stakeholders (e.g. yard, owner, designer, supplier, flag and port authority).</small>	Naval Architectural Consultant - Shipyard - Ship Owner		
Form completed by <small>Please state name(s), position, organisation</small>	Naval Architectural Consultant - Shipyard - Ship Owner		
Date form completed	20 April 2020		

Number of fuel tank(s)	1 / 2 / 3 / more
Type of tank	Independent / Integral / Portable
Overall fuel tank(s) dimensions & volume	L metre x B metre x H metre / m ³

Complete all sections that apply.

For each question, 'strike through' all answers that do not apply. For example: **YES NO-NA**.

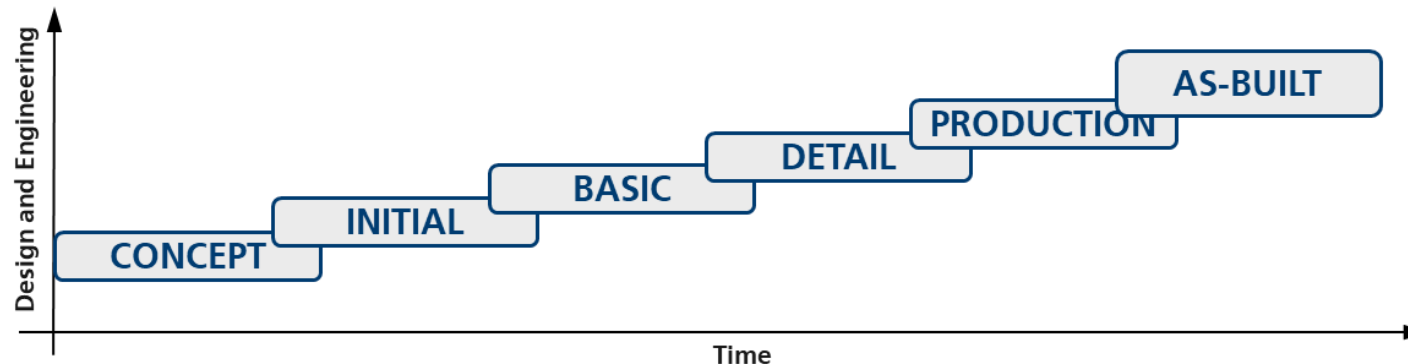
Unless stated, a YES answer is a move towards meeting LFFF key items (and good practice). Answering NO or NA (not applicable) does not necessarily mean that RBD-1, AIP and/or GR(A) cannot be successfully completed. A NO or NA answer may be due to arrangement specifics requiring further evaluation.

Where appropriate, we will provide feedback on NO and NA answers and guidance on revisions to meet IGF Code/LFFF key items, and successfully complete RBD-1, AIP and/or GR(A).

Please note that Design Screening does not guarantee design approval for classification. There may be technical or regulatory issues that appear when details of the design are subjected to risk assessment (e.g. RBD-2) and full application of the normal rigors of classification approval.

For further information and advice on this form, design screening, RBD, AIP and/or GR(A) contact hamburg-technical-support@lr.org.

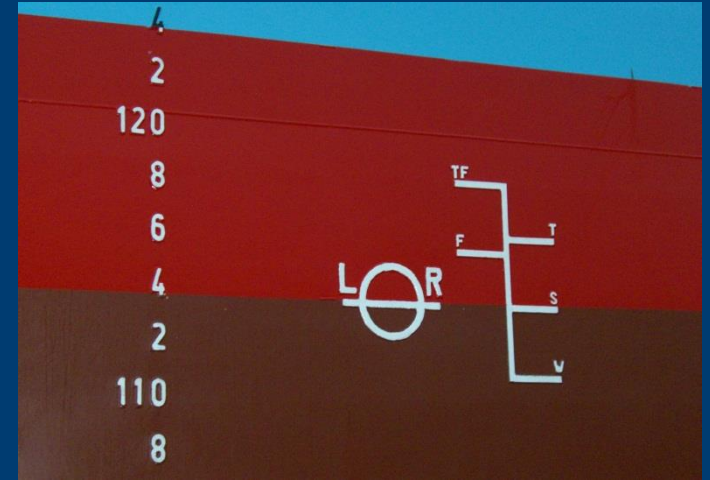
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Working together
for a safer world

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