



The role of standards in maritime LNG transport

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LNG

LNG is a fuel produced from natural gas by removing impurities and then changing the aggregate state under pressure and very low temperature of approx. minus 160°C (-270°F). After liquefaction, a very pure, colourless and odourless fuel is obtained, which does not possess any toxic or corrosive properties. The LNG is composed of mainly methane and small amounts of other hydrocarbons.



History



1956

First shipment of LNG by the "Methane Pioneer" carrying 5,000 cubic metres of LNG from the Lake Charles, USA to Convey Island, UK.

1960

"Methane Princess" and "Methane Progress" enter service as the first ships to burn cargo boil-off

1965 Gas Transport established

1967 -First Gas transport membrane installation on LNG Carrier "Polar Alaska"

1973

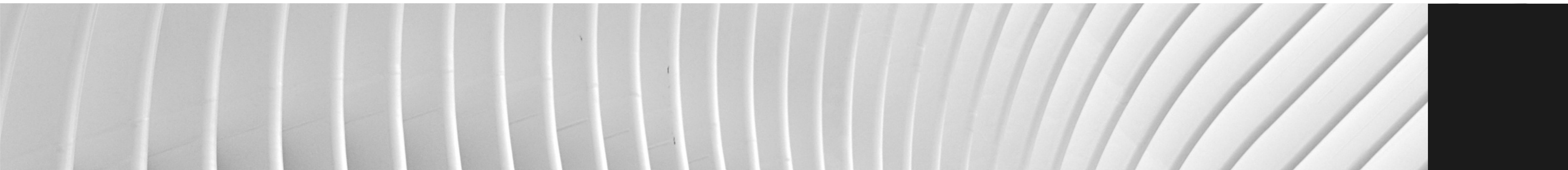
First LNG Carrier with spherical tanks built in the Moss Rosenberg shipyard in Norway "Norman Lady"

1979

SIGGTO established

June - "El Paso Paul Kaiser" runs aground at 17 knots off Gibraltar

July - The cargo from "El Paso Paul Kaiser" is transferred to one of her sister ships- it is the first ship to ship transfer between LNG Carriers



GAS CARRIER

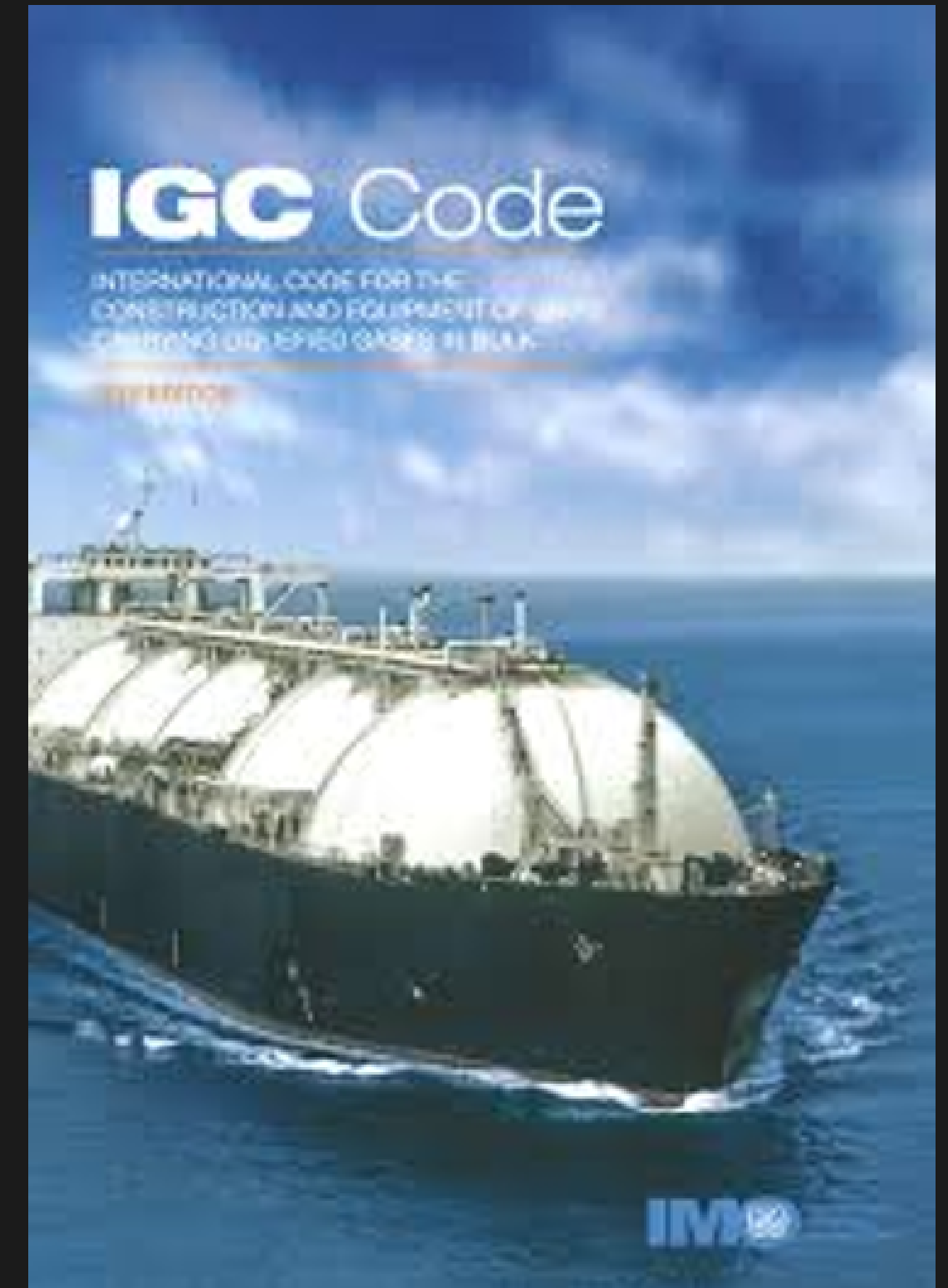
„Gas carrier is a cargo ship constructed or adapted and used for the carriage in bulk of any liquified gas or other products listed in the table chapter 19”

(IGC Code)

Types:

Moss type LNG carrier - Spherical tank- Named after the Norwegian company Moss Maritime that designed them. The most Moss type vessels have 4 or 5 tanks.

Membrane type LNG carrier- two systems differ the construction and material used to built the primary and secondary barrier and the insulation beetwen them



Regulations

International Conventions:

1. International Convention the Safety of Life of the Sea (Solas):

International Certificate of Fitness for the Carriage of Liquefied Gases in Bulk (IGC)

International Fire Safety Systems (FSS Code)

International Safety Management code (ISM Code)

International Ship and Port Facility Security Code (ISPS Code)

2. International Convention on Prevention of Pollution from Ships (MARPOL)

3. International Convention on Standards of Training, Certification and

Watchkeeping – STCW

EU regulations

National regulations

5 MAIN GROUPS:

SHIP CONSTRUCTION AND EQUIPMENT/PORT
INFRASTRUCTURE

ENVIRONMENT

SHIP AND PORT SECURITY

CREW QUALIFICATIONS

PROCEDURES



Soft law

OCIMF International Safety Guide for Oil Tankers and Terminals

SIGTTO Liquefied Gas Handling Principles on Ships and in Terminals

SIGTTO LNG Operations in Port Areas

SIGTTO Guide to Contingency Planning for Marine Terminals Handling Liquefied Gases in Bulk

SIGTTO Training of Terminal Staff involved in Loading and Discharging GasCarrier

SIGTTO Jetty Maintenance and Inspection Guide

SIGTTO Ship Vetting and its Application to LNG

Liquefied Gas Fire Hazard Management

OCIMF Marine Terminal Management and Self Assessment

OCIMF Marine Terminal Particulars Questionnaire

OCIMF Marine Terminal Operator Competence & Training

Bunkering

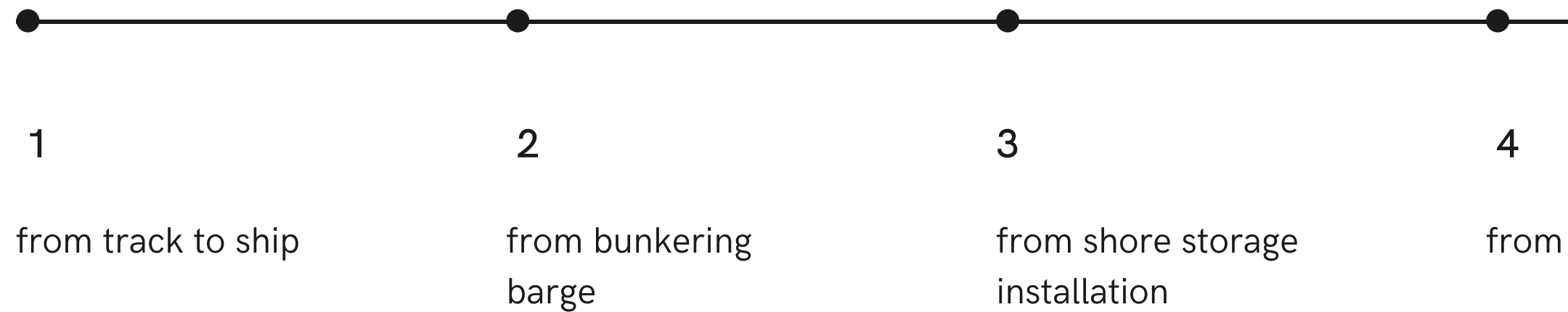
"LNG fuel transfer operation to a vessel. For the purposes of this standard it refers to the embarkation of LNG only.

In the context of this document, bunkering relates to the transfer of LNG from a bunkering facility to a receiving vessel, taking place over a well-defined period of time where the beginning, transfer and end of operations follow a particular specified and documented procedure."

EMSA "Guidance on LNG Bunkering to Port Authorities and Administrations"



Methods in Gdynia, Poland



LNG BUNKERING REGULATIONS

High Level

- IGF Code/ SOLAS/ STCW
- MARPOL - MARPOL Annex VI
- EU Sulphur Directive
- Alternative Fuel Infrastructure Directive

High level instruments are relevant in the definition of the **main drivers for adoption of LNG as an alternative fuel**. Mostly environmental related, globally/regionally binding.

Standards

- ISO Technical Specifications and International Standards
- EN Standards
- Equipment Standardization

Technical Standards are relevant for LNG bunkering operations and equipment, including small scale LNG storage. They are binding through reference to higher level regulatory instruments.

Class Rules

- IACS URs/Recs
- **Class Rules** for Construction
- Guidance Notes
- Guidelines

Class Rules are relevant instruments for Classification Societies to ensure safety, quality and compliance in the application of international regulations, following a common technical interpretation of different provisions.

Industry Guidance

- **SGMF Guidelines**
- Industry Guidance
- Guidance Notes
- LNG Bunkering Check Lists

Industry references are fundamental in definition of the best practices in LNG bunkering, both on equipment, safety, operations and outline of responsibilities. Non-binding set of best practices.

Port Local Regulations/ Byelaws

Port specific regulations

Ports can set rules by themselves, addressing specific operational aspects and their specific context. Port Byelaws often reflect the nature of each port authority management principle. They are of local and limited application, reflecting

CONCLUSIONS

- high level of safety and security
- less accidents, human errors
- prevention effect
- well trained crew
- better safety and security risk management systems
- benefits for the countries, people (crew and society), environment and companies
- modern industry with the best technologies without waiting for the regulation changing



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Thank You for your attention :)