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LNG SHIPPING ESSENTIALS

Understanding and Developing Fundamental Operational Methods and Handling for the LNG Shipping Industry



About the Course

This intensive Marine LNG Institute 'Flagship' course will equip you with a detailed practical grounding in the fundamentals and advanced LNG SHIPPING AND OPERATIONS. You will learn the practical tools and techniques that can be utilized to manage risk more effectively and make better practical operational decisions while handling.

1. Reinforce knowledge about operations that are carried out in accordance with all relevant national and international maritime legislation, local regulations, and industry best practices.
2. Evaluate the different procedures and factors affecting cost of the operation
3. Ensure overall safety for any LNG SHIPPING AND OPERATIONS operation on the use of correct size and number of fenders and certified tested hoses.
4. Become familiar with LNG vessels, operations and LNG SHIPPING AND OPERATIONS and equipment
5. Enhance understanding of Ship-to-Ship transfer equipment, design, maintenance - and training methods for LNG SHIPPING AND OPERATIONS and LNG SHIPPING AND OPERATIONS.
6. Familiarize the differences of Person in Overall Advisory Control, Mooring Master and Master of the Ship
7. Establish a useful methodology in reducing risk
8. Understanding environmental challenges
9. Recognize and understand differences in operations and hazards between oil and gas vessels.
10. Understand requirements for LNG SHIPPING AND OPERATIONS vessel compatibility and Optimoor studies and follow an LNG spill response case study
11. What Regulations and Guidelines are Governing LNG SHIPPING AND OPERATIONS Transfer Operations?
12. Master the Parties Involved in the Transfers and their Relationship to One Another

There is nearly unprecedented record for growth of LNG Transportation. Spot Charters, Emergency Charters, and alternatives to crude oil from sanctioned countries have been some of the drivers for surge in demand. However, the interim factors may appear to be of some significance, but the key drivers are global movement towards clean energy and reduction of GHG Emissions. The surge in Floating LNG Terminals (FSRUs and FSUs) by conversion and new building projects has created more destinations for LNG Shipping.

After the completion of this course, the participants will be able to: **Key Topics Covered.**

1. Gain world leading advance techniques concerning the entire Liquid/Gas and LNG SHIPPING and terminal process chain
2. Understand the leading advances in LNG SHIPPING AND OPERATIONS cargo transfer operations from both a Liquid and Gas ship management and terminal/Facility perspective.
3. Consider and select the best options for LNG SHIPPING AND OPERATIONS Liquid and Gas vessel types, terminal and containment systems
4. Make accurate measurements and calculations of all liquid and Gas LNG SHIPPING AND OPERATIONS custody transfers, and product quality accuracy. Including the advanced systems available on the market today and in the future from around the globe
5. Examine the impact of various design codes and guidelines on Liquid and Gas ship and shore transfer management
6. Better select, understand and manage supply chain transportation contracts in the Liquid and Gas industry from around the world
7. Examine many real Case Studies from around the Globe concerning Liquid and Gas incidents and evaluate tanker/terminal safety, commercial liability, associated risks and requirements to better manage and safe guard your liquid and Gas operations
8. Learn in detail about the liquid and Gas business and operations from one of the world's leading industry
9. What Regulations and Guidelines are Governing LNG SHIPPING AND OPERATIONS Transfer Operations?
10. Master the Parties Involved in the LNG SHIPPING AND OPERATIONS Transfers and their Relationship to One Another
11. LNG SHIPPING AND OPERATIONS Transfer Operations Best Practices Oil and LNG comparisons
12. Emergency Response and Contingency Planning
13. LNG SHIPPING AND OPERATIONS Industry and Future LNG Developments
14. Case Study: Liquefied Natural Gas Ship to Ship Transfer Operations to Floating Structure regasification Unit
15. Case Study: LNG Spill Response during Cargo operations
16. Case Study: LNG Fuel spill failures from around the Globe

Course Duration

This 3 full-day Instructor Led Online or In House course and workshop are exclusively developed for the management and professional. **Exclusive opportunity for Consultative Session** with industry expert.

- **Generate Options** for Optimum ROI across the fleet
- **Explore Strategies** for Balancing Risks and Opportunities
- **Get Involved in a Brainstorming Session with Peers**
- **Get acquainted with Contemporary LNG Tankers Specifics**
- **Explore Potential** for Chartering LNG Bunker Vessels
- **An Opportunity to be involved in Comprehensive Risks Identification, Evaluation and Mitigation Strategies Workshop**

Who should attend this Training Course?

This course is intended for the following LNG professionals:

- ❖ Maritime Lawyers and consultants to the LNG industry
- ❖ Ship owners, operators, surveyors and LNG managers
- ❖ Marine engineers and technical superintendents
- ❖ Bunkering companies and fuel suppliers
- ❖ Port and terminal operators
- ❖ Classification societies and regulatory bodies
- ❖ Maritime consultants and surveyors
- ❖ Equipment manufacturers for marine fuel systems
- ❖ Energy and shipping traders
- ❖ Environmental compliance officers
- ❖ Ship Owners and Managers
- ❖ Offshore Vessel and FPSO Owners and Operators
- ❖ Oil Majors, NOCs and Independents
- ❖ Ship Superintendents and Safety Officers
- ❖ Ship Officers and Crews (Master, Chief Officers, Chief Engineers etc)
- ❖ Bunkering industry Personnel including Loading and Mooring Masters
- ❖ LNG SHIPPING AND OPERATIONS Service Providers
- ❖ Liquid Cargo and Bunker Surveyors
- ❖ Ports and Terminal Operators
- ❖ P&I Inspectors and Executives
- ❖ LNG FSU Owners, Managers, Operators
- ❖ Company Assurance Managers and Superintendents
- ❖ Project Directors
- ❖ Asset Managers
- ❖ Project Managers
- ❖ Project Planners
- ❖ Cost Estimators
- ❖ Quality Assurance Managers
- ❖ Contract Managers
- ❖ Procurement Managers
- ❖ Project Engineers
- ❖ Discipline Engineers
- ❖ Technical Assistants

Other useful information at a glance:

Course level:	Basic to Intermediate
Maximum number of participants:	10

More testimonials from past participants about the Marine LNG Institute Courses:

We have utilised this training for our crew and LNG Tech Superintendents for several years," **Tech Superintendant China Shipping Lines (CSL)**

"In this technical LNG Maritime field particularly in the future - this course is of great benefit to our teams," **Senior Manager, CMA CGM Group**

"Marine LNG Institute Courses are very technical and informative, very approachable and professional". **Corporate Strategist Evergreen Marine Corp**

"To have this training at our disposal. When we want is terrific. The Corporate In House Trainer was a key element to this course' **Onshore DPA - Maersk Lines**

"The offshore technical aspects to the trainer's seminars are excellent," **Offshore Manager, OOCL Lines**

"Technology develops quickly. I really enjoyed the course elements and its delivery" **Chief Technology Officer [CTO] - RIO TINTO PLC**

FULL COURSE AGENDA.

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Course Syllabus

DAY 1

Introduction to Course

Introduction of Lecturer and student attendees
Basic outlines of course contents and schedule

Introduction to LNG TRADE, ROUTES, EXPLORATION AND PRODUCTION

Onshore and offshore

- Upstream
- Downstream
- Midstream
- New Trends
- FPSO, FSRU, FLNG and STS Hose designs

LIQUIDEFACTIONS, STORAGE AND TRANSPORTATION

- Pipeline
- Marine transportation
- Distribution to energy grids
- LNG storage containment capability and redundancies
- Classification of storage tanks and design developments
- Introduction to LNG Quality and quantity calculations, calibrations OEM's, tools and measurement's

LNG SHIPPING AND OPERATIONS

Optimisation of vessels

- Harbour draught / berth limitation
- Emergency transfer work
- Class issues of vessel for trading regions
- Commercial reasons, multiple vessels and receivers
- LNG FSU Tandem off-loading and FSRUs

Regulations and Guidelines Governing LNG SHIPPING AND OPERATIONS and Transfer Operations

- MARPOL Annex 1, Section 8 about Oil Tanker
- Latest on transfer Guides for Crude, Products and Liquid Gasses
- International Safety Guide for Oil Tankers and Terminals (ISGOTT)
- Oil Companies International Marine Forum (OCIMF) Guidelines
- LNG Vessel operations in port guidance and LNG SHIPPING AND OPERATIONS configurations
- LNG Bunkering guidelines (SGMF)

Parties involved in LNG SHIPPING AND OPERATIONS and their Relationship to One Another

• How Parties involved (Oil/Gas Majors, Charterers, Service Provider, Cargo Surveyors, POAC, Ships' masters and Mooring Master) work harmoniously to attain operational efficiency and safety

LNG SHIPPING AND OPERATIONS Ship Management and receiving terminal

Preparation of Cargo Cycle – LNG and Liquid/Gas Terminal Compatibility Studies

Codes applicable to bunkering of both ocean-going vessels and harbour craft

- Technical reference covers LNG delivery from LNG SHIPPING AND OPERATIONS and bunkering facilities (i.e., trucking, shore, terminal, shipping and ISO tankers lifting facilities) to receiving ships through four modes of transfer (LNG SHIPPING AND OPERATIONS, truck-to-ship, shore-to-ship, ship-to-ship and cassette bunkering)
- Roles and responsibility of terminal in LNG SHIPPING AND OPERATIONS cargo transfer
- LNG SHIPPING AND OPERATIONS Terminal loading and discharging
- Ship-to-Shore operations interfaces
- Compatibility forms

Person in Overall Advisory Control

- Qualifications and Training of POAC
- POAC performing different roles at particular point of the LNG SHIPPING Operations
- Liquid/Gas Operations -Tanker Loading and Discharging Operations and Preparations
- Arrival preparations and checklist LNG SHIPPING AND OPERATIONS
- Loading Arms – Technology, vendors and designs
- Cryogenic Hoses, testing and type 8 inch and 6 Inch
- Dynamic Positioning
- Manoeuvring with and without tug assistance or DP
- Jetty Approaches: Finger or Face Terminal Design Interface Pre-loading procedures alongside. Ramp up, loading and ramp down, actions and precautions

Pre-planning and Risk Assessment Considerations – FSRU/FLNG LNG SHIPPING AND OPERATIONS

- What is LNG? Hazards and Risks vs. Oil
- Screening / Compatibility Studies of participating vessels
- Ship compatibility, and OPTIMOOR
- Criteria in selecting transfer area and Approval from the authorities
- Security issues
- Preparations
- Risk Assessments and Management, Helicopter operations, Cargo Hazards, weather conditions, personnel injury, mooring unmooring operations
- Oil v/s LNG any differences? LNG and Liquid/Gas Transfer System Architectures and available technologies

- Ship to Ship to shore
- Ship to Platform
- Ship to Ship
- Barge to Ship
- LNG SHIPPING AND OPERATIONS and FSRU
- Ship connected transfer systems and tandem configurations
- System Uptime considerations of effective operations

LNG SHIPPING AND OPERATIONS Planning and Equipment

- Plan format and information to include
- Joint operations plan
- Who prepares the plan?
- Supply of equipment, fenders, hoses
- Equipment and Locations
- ISM and Training requirements – Timelines for Compatibility

Plan and Review LNG SHIPPING AND OPERATIONS Exercise

- Plan review and discuss LNG SHIPPING AND OPERATIONS and equipment items required
- Confirm any training requirements
- Simulation training and bridge team resources management

Day 2

LNG SHIPPING AND OPERATIONS Mooring Operations Manoeuvring and Risks

- Underway and Anchored operations
- Navigation signals
- Tug and Tender assistance
- Carriage and Delivery of Fenders and Equipment
- Communications
- Mooring operations, weather limitations for operations.

LNG SHIPPING AND OPERATIONS Safety and Risk Management

Recent industry incidents highlighted

- Common causes of these incidents
- ESD 1 and 2 Design Codes and Operations Alarm settings ESD Actions
- Required crew training and preparations
- Hazards and Risks moving forward
 - Geographical hazards
 - Crew factor
- Water Curtain Operations
- Theory and Potential Damages

Ship and shore requirements

- Preparing for the future incidents
- Contingency planning
- Salvage of an LNG vessel
- Considerations for cargo recovery
- Environmental impact
- Technical equipment development
- Risk profiling of your operations
- What response is required?

Case Study - Spill Responses

LNG SHIPPING AND OPERATIONS and Cargo Transfer Operations

Introduction to LNG vessel types

- Personnel transfer
- Pre- Cargo Transfer meeting
- Checklist and communications confirmation
- Custody Transfer measurement
- Emergency Shut Down LNG SHIPPING AND OPERATIONS, Shore ESD 2 and LNG SHIPPING AND OPERATIONS ESD 2 difference
- Cargo operations and monitoring
- Differences for operations between oil and LNG

CASE STUDY - LNG SHIPPING AND OPERATIONS

- Compatibility study and meeting
- OPTIMOOR study
- Simulator training and LNG SHIPPING AND OPERATIONS equipment
- Cargo discharge considerations

LNG SHIPPING AND OPERATIONS - Best Practices Oil and LNG comparisons

- Discuss main considerations
- Best practice any real differences between oil and gas?

Emergency Response and Contingency Planning - LNG SHIPPING AND OPERATIONS

- Things to do in case of emergency
- General Emergency Response Management
- Contingency equipment
- Oil spill and LNG leak,
- SOPEP use
- Fire or Structural damage
- Poor weather and mooring failures
- Precautions against piracy
- Media management and communications, parties involved.

CASE STUDY LNG Spill Response during Cargo Transfer Operations

- Immediate response and notifications
- Effects and consequences of the spill
- Contingency considerations after spill
- Investigation and Cause

Industry and Future of LNG SHIPPING AND OPERATIONS and LNG Developments

- New Technologies and Future Developments

Vessel Design, Technology and Operations - LNG SHIPPING AND OPERATIONS

Fuel systems for LNG powered Vessels

- Measures to reduce energy consumption in ship-to-ship applications
- Cut operating costs in LNG SHIPPING AND OPERATIONS while, at the same time, reducing emissions
- Ship design efficiencies
- Technological efficiencies to reduce energy Consumption in all ship application
- Tankers and Bulker
- Containership
- RORO
- Ferries
- OSV

LNG SHIPPING AND OPERATIONS Failures Investigation and Root Cause Analysis - Case Study & Delegate Exercise – LNG Failure and Diagnosis, Analysis and Planning

LNG Operations

Arrival preparations and checklists

- LNG Loading Arms – Technology, vendors and designs
- Cryogenic Hoses, testing and type 8 inch and 6 Inch
- Dynamic Positioning
- Manoeuvring with and without tug assistance or DP
- Jetty Approaches – Finger or Face Terminal Design Interface
- Pre-loading procedures alongside
- Ramp up, loading and ramp down, actions and precautions
- Ramp up, increasing loading rate
- Tank loading procedures
- Ramp down and the topping off tanks process
- Vapour pressure control
- Post loading operations
- Commencement of gas burning and line disconnection
- Pre-arrival preparations, terminal requirements and ship line cool down
- Discharging and ramp down, heel options
- Overview of standard discharge operations
- Ramp down for heel distribution

LNG Large and Small Scale Infrastructure decisions, location, designs, equipment

- Optimum location and equipment required
- LNG supplier contract and bunker cost to vessels
- Equipment types, storage tanks, pumps, Road rail requirements
- Emergency response facilities

LNG Project Facility Development

- Decide on location and facilities
- What bunkering operations will we do and how
- HAZID, what are the project risks
- Costing, development time, personnel
- Technical issues in LNG Bunkering Facility Development
- Feasibility assessment for a small scale LNG bunkering project

LNG Facilities Port and Vessel Planning – Considerations, Consultations

- Market assessment – demand
- Port and Vessel operations, emergencies, mooring systems
- Other options road tankers, ship to ship, alongside jetty
- Public relations, environment, jobs, education
- Risk Assessment, Operational and Safety benchmarks for LNG Bunkering Facilities

SIMPOS – Simultaneous Operations (Transfers and Operations) during LNG SHIPPING Operations

- Considerations when performing SIMPOS
- HAZARD and Risk when performing LNG SIMOPS
- Ship to Ship operations
- 24 Hr LNG operations
 - Where do SIMPOS operations occur?
 - Why are SIMPOS performed?

DAY 3

LNG SHIPPING AND OPERATIONS Examination of all Custody Transfer Measurement and Calculations

- System setup parameters
- Sampling and Certification Custody
- LNG Quality controlled transfers – Forensic and laboratory analysis
- Quality Management systems for LNG transfer and analysis
- LNG probes, equipment and software infrastructure to ensure quality control between vendors and buyers
- Ship and Terminal LNG Quality Control
- Transfer Guidelines of Terminals Ship and surveyor roles
- Certificate of Loading
- Types of Custody Transfer Measurement
 - Liquid/Gas Quality and Management during transfers
 - Quality Management Systems for Liquid/Gas
 - Terminal and ship systems and Equipment
- Inerting
- Aerating
- (CTMs) testing and checks

Detailed analysis of Custody Transfer Procedures, Flow Metering and design for LNG SHIPPING AND OPERATIONS by system and type

- OEM Studies - Technological developments in CT
- Flow measurement and custody transfer flow metering, types
- Coriolis Flow mechanisms, design, metering and performance
- Thermal Flow mechanisms, design, metering and performance
- Differential Flow mechanisms, design, metering and performance
- Ultrasonic Flow mechanisms, design, metering and performance
- Vortex Flow mechanisms, design, metering and performance
- Applications of flow meters, calibration, calculations, transfer principles Safety

Case Study - Liquid and Gas CARGO SPILLS/ESDAND RELEASES - Protocols and how the systems are used

LNG SHIPPING AND OPERATIONS and New developments for Marine Engineers and Tech Superintendents

- Wear down,
- Fatigue and
- Failure Management Practices and planning

LNG Fuel, LNG SHIPPING AND OPERATIONS and Bunkering

- Overview of SMS & PMS
- Discuss onboard planned maintenance systems – PMS
- Discuss Trend analysis – T.A
- Analysis of Condition monitoring technical - CME
- OEM Main Engine component failures relevant to engine performance

LNG Trends and Demand

- Green LNG
- Blue LNG
- Gray LNG
- Hydrogen
- Government Incentives
- Commercial perspectives Long term and Short term 'Spot'
- Market Realities and global demand

Allocation of Risk in the Carriage, transfer and Bunkering of LNG

- Claims for Shortage of Oil/LNG Cargo – Statistics
- Overview of LNG Supply Chain
- 'Boil-Off' During the Voyage and Bunkering
- Owners' Warranted Performance
- Charterparties for the Carriage of LNG Cargo
- Examination of the Contractual Allocation of Risk under LNGVOY
- Controls to Prevent LNG Cargo and Bunkering Shortage

Commercial and Insurance aspects of LNG SHIPPING AND OPERATIONS Carrier General Average and how it affects all participants in the LNG SHIPPING AND OPERATIONS Shipping Industry

- What is G.A – why does it affect all participants commercially?
- G.A – LNG Carriers concerns
- G.A – LNG Charterer concerns
- G.A – LNG Facilities and Operators concerns
- G.A – LNG SHIPPING AND OPERATIONS, Bunker Handlers & Bunker Operators concerns
- Commercial Contracts and the effects on all parties
- Technical nature of NG G.A
- Rights and Obligations of all participants in the event of LNG G.A

LNG SHIPPING AND OPERATIONS Safety and Planning

- SWP/JSA Delegate Exercise - HSE Health and Safety Workplace Practices SWP/JSA for end-to-end Bunkering
- Bunkering Safety and Risk Management
- LNG Risk Analysis and Job Safety Analysis – OBJECTIVES
- Technical characteristics of LNG
- Handling, storage and spill risk.
- Volatile cargo and gas vapours leak from ruptured tanks, Hoses and pipelines, causing oxygen deficiencies
- Gas Hazard Monitoring Equipment for JSA
- Adverse Weather Working – Guidelines examples for JSA
- LNG SHIPPING AND OPERATIONS Approach to Installations
- LNG SHIPPING AND OPERATIONS Hose construction and length
- Hose quality and identification
- The 'Golden' Safety LNG SHIPPING AND OPERATIONS Rules Operations
- Confined space entry
- LNG Process and Mechanical isolations
- Electrical isolation
- Lifting Operations

LNG SHIPPING AND OPERATIONS and Offshore Liquid transfer Inspections

- In Service LNG Inspections
- LNG SHIPPING AND OPERATIONS Service Leak Testing
- LNG SHIPPING AND OPERATIONS Hose Ops and Vessels Procedures
- COLOUR COUPLINGS INDEXES
- Operational risk profiles in Bunkering
- LNG SHIPPING AND OPERATIONS Inspections and Audit – Rigging

Case Studies and Delegate Exercise - Spill Response during LNG Operations

Immediate LNG response and notifications

- Effects and consequences of the LNG spill
- Contingency considerations after LNG spill
- Investigation and Cause

LNG Crisis Response and Emergency Management systems

- LNG Crisis response procedures. Step-by-step procedures for LNG crisis response for category of situation for which an organization wishes to be prepared.
- The three Phases; Pre-Crisis, Crisis Response and Post Crisis planning
- Initial LNG crisis response. Define a LNG Crisis?
- Company Reputational Repair and Behavioural intentions
- LNG Crisis management-related policies. For example, who is an authorized spokesperson? What is required in terms of information security? What are employees allowed to share on social media?
- Development of Holding statements – LNG Crisis
- Notification and response protocols for the LNG Crisis Response Team. Who does what in a crisis, and when should they be informed/brought in?
- LNG Emergency notification procedures. How will we talk to our stakeholders, both internal and external, during a crisis?
- Spokesperson and Communication resources. What should spokespeople be doing from minute one of a crisis event?
- Key messaging for internal and external audiences. A framework and fill-in-the-blank messaging to allow almost-instant response to breaking issues.
- Company-specific LNG scenario planning.
- Additional crisis-response support tools. Helpful checklists and other time-saving resources that are built to help in the midst of the panic that often arises when a LNG crises emerge.
- Crisis Stakeholder identification

LNG Operations and the core crisis management team

- Ensuring their organization has proper planning and training in place.
- Monitoring for potential crises before they create lasting damage.
- Overall organization and execution of crisis response.
- Protecting the safety of all employees.
- Protecting the reputation of the company and its leadership.
- Assisting legal counsel in litigation prevention measures.

Note:

- (1) There will be a Question and Answer throughout the duration of the sessions and after each module.

About the Marine LNG Institute - Course Director [LNG SHIPPING AND OPERATIONS]

- One of the world's leading Liquid and Gas LNG SHIPPING AND OPERATIONS Experts with 30 years of experience
- Engaged as an IMO expert on Liquid and Gas LNG SHIPPING AND OPERATIONS, Cargo's, terminal, vessel and offshore platforms, LNG SHIPPING AND OPERATIONS – ports and harbour infrastructure, safety; LNG Cargo and propulsion and vessel component integrity and failure

Partial list of clients includes: Qatar Energy, IMO, US NAVY, BHP Australia Pty Ltd (Australia and London), Woodside, Samsung Heavy Industry – Korea, Royal Dutch - Shell (LNG SHIPPING AND OPERATIONS) Construction, Singapore LNG, KOGAS - Korea, TOTE USA, Total Oil Asia, Chevron Gorgon, Shell - (Prelude), PETRONAS - Malaysia, Offshore Marine Service Alliance (Malaysia), Hans Ship Management (Singapore), Chevron Oil and Gas (U.S.A - GULF)