



LNG Bunkering and Technology. Codes, Practices, ISO, Operations and Safety

Why Choose this Training Course?

Led by a highly experienced and skilled Offshore LNG Project and Marine Engineering expert for multinationals worldwide. This course provides students an in-depth understanding of approaches to LNG bunkering, codes, operations, safety and claims management in the maritime industry.

It is an advanced course, appropriate for Port Operators and those seeking PSA or MPA's endorsement/ licensing as Bunker Surveyors and Cargo Officers. Other members of the industry seeking to increase their knowledge including LNG suppliers, bunker craft operators, LNG and bunker traders, shipping agents, insurance agents, craft management staff; as well as any interested participants seeking to have a better understanding of the processes particularly those considering diversifying into and entering the commercial bunkering industry supply space.

Key topics Covered

- Reinforce knowledge about operations that are carried out in accordance with relevant national and international Law maritime legislation, ISO, local regulations, and industry best practices.
- Evaluate the different procedures and factors affecting cost of the operation
- Ensure overall safety for any LNG Bunkering operation on the use of correct size and number of fenders and certified tested hoses.
- Become familiar with LNG vessels, operations and LNG equipment
- Enhance understanding of Bunkering transfer equipment, design, maintenance - and training methods.
- Familiarise the differences of Person in Overall Advisory Control, Mooring Master and Master of the Ship
- Establish a useful methodology in reducing risk
- Understanding environmental challenges
- Recognise and understand differences in operations and hazards between oil and gas vessels.
- Understand requirements for LNG vessel compatibility and Optimoor studies and follow an LNG spill response case study

What are the Goals?

The training course is designed to provide either non-practicing or practicing bunker operators, crew, infrastructure project managers, project engineers, planners, technical leaders or Bunkering owner/sponsors. As such, delegates will:

1. Ensure overall safety for any LNG/Oil Bunkering operation on the use of correct size and number of fenders and certified tested hoses.
2. Become familiar with LNG vessels, operations, bunkering and LNG equipment
3. Enhance understanding of Bunkering transfer equipment, design, maintenance - and training methods.
4. Familiarise the differences of Person in Overall Advisory Control, Mooring Master and Master of the Ship
5. Establish useful methodologies in reducing risk
6. Users of TR 56 [Singapore] TR56 is applicable to bunkering of both ocean-going vessels and harbour craft.
7. Scope of TR 56 - Singapore the technical reference covers LNG delivery from LNG bunkering facilities (i.e. trucking, shore, terminal, shipping and ISO tankers lifting facilities) to receiving ships through four modes of transfer (truck-to-ship, shore-to-ship, ship-to-ship and LNG cassette bunkering)



8. Understanding the environmental challenges and reduce your exposure
9. Recognise and understand differences in operations and hazards between oil and gas vessels.
10. Understand requirements for LNG vessel compatibility and Optimoor studies and follow LNG spill response and catastrophic bunkering incident case studies from around the globe.

How will this Training Course be presented?

Challenging Tutored Marked Assignments and in-depth Case Studies are presented to students through the duration of the course. Factual case studies and exercises along the way cement participants newly acquired skills and help them apply them to real situations. Equally as important, a look at the mind-set of LNG/Oil operators, bunker surveyors, ship and bunker vessel manufactures, MPA's, naval architects - ship designers, project managers, and marine engineers is given through the discussion; giving student participants an additional boost in anticipating potential problems and correcting them beforehand. The training methodology will incorporate both theory and skill training components, utilizing both traditional lectures, as well as hands-on exercises, group discussions and case studies.

Who is this Training Course for?

This course is suitable to a wide range of professionals but will greatly benefit:

- 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
- STS 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

Marine LNG Institute - Course Director.

- One of the world's leading Liquid and Gas STS Experts with 27 years of experience
- Engaged as an IMO expert on Liquid and Gas STS, Cargo's, terminal, vessel and offshore platforms, STS – ports and harbor infrastructure, safety; LNG Cargo and propulsion and vessel component integrity and failure
- He lectures in the field of marine LNG Ship and Terminal survey engineering, LNG and STS engineering, auditing and safety throughout South East Asia, UK, New Zealand, Australia and the US



- Advises the world's leading multinational participants in the oil and LNG/STS and the geotechnical LNG drilling sector in areas regarding offshore LNG, and FLNG, Terminal, platform installations in Australia, USA, Korea, Europe and throughout South East Asia Professional membership: Member International Institute of Marine Surveyors (MIIS) & Member Forensic Engineers Society of Australia (FESA). Former IMO Advisor - Liquid and Gas Technical advisor.
- 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 (FLNG) 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)
- KOGAS Lead project management research and development and feasibility expert Liquid and Gas infrastructure – Ship to Shore interface Korea/Japan
- QATAR LNG Construction Technical Advisor Ship to shore interface
- LNG - CHEVRON GORGON Ship to shore interface - Independent Technical Expert - \$54 Billion USD Liquid Natural Gas [LNG] - Project LNG/SIMOP/HSE/IMO/ILO
- Liquid and Gas Port Lead Infrastructure management and Safety. LNG - Chevron Gorgon STS Facility Safety Compliance - SIMOP/LNG -HSE/IMO/ILO
- Former C. Eng., Fleet Superintendent, Class Surveyor, PMA Surveyor, Marine LNG Engineering Class Surveyor, LNG POAC and LNG/STS technical Expert Shipping.
- Former IMO technical Liquid and Gas advisor – transport, ship and terminal logistics.
- Technical Independent Expert: United States America Navy and Royal New Zealand Navy WARSHIP - RNZS Combat Supply and Multi Role War Ship - HMNZS War Ship 'Canterbury'

Alumni Testimonials:

"Lecturer is very knowledgeable and conduct himself and the course very well. A very interactive communication with clear and easy to understand, on machineries like switchboard, engine control room, ballast systems, fire system, portable water system, cargo pumps, propulsion."

Daewoo Technologies – South Korea

"Hybrid technology and regulations and current topics in marine industry such as renewable energy...great. Lecturer really expanded on marine engineering technologies also very good."

Ship management and Procurement – Wilhelmsen Vessel Management

"Great expert, very professional and a key Lecturer. Only 10 students on the course allowed is great for asking questions in small groups of the Lecturer."

Senior Base Manager – Icon offshore Malaysia

"I'm going to go to do another of the informative courses. Very interesting and is well and truly a great Lecturer. Very informative."

~ Business Manager, Sembmarine International

"I got so much out of it. From an Oil and Gas perspective, I have never been or listen to a world leading expert in this technical Oil and Gas - Maritime field."

~ Senior Manager, KSDC Brokers Singapore

"I have done several courses and this one was the best I have attended so far. Very technical and informative, very approachable and professional."

~ Woodside Australia (Oil and Gas - Gorgon Project)

"Excellent Speaker and held in high regard in the Oil and Gas industry. All the executive management got a great presentation and seminar over the three days, terrific."

~ KSDC Oil/Gas Brokers Malaysia

"We learnt a lot about the current marketplace and 2017 – 2018 forecasts in Asia, Qatar and the Middle East. The need for this course is essential if you are engaged in the industry." ~ Chevron Gas and Oil [USA]

"Useful and interesting. Topic related to my job scope."

~ Inter-Continental Oils & Fats Pte Ltd

"Instructor was good at presentation of the material. Topics are directly related to my current job scope. Case studies ensured equal and sufficient interaction and tested our understanding of the topics"



~ Navig8 Asia Pte Ltd

"Good case studies and knowledge from law perspective. Adequate number of participants"

~ PT Chandra Asri Petrochemical Tbk

"Lots of interaction between trainer & delegates. Informative on certain topics."

~ Nova Carriers (Singapore) Pte Ltd

"Trainer is very experienced and knowledgeable. Coursework/material were adequately sufficient."

~ Total Oil Asia Pacific Pte Ltd

"Speaker able to deliver clearly. Lots of case studies covered."

~ Ace Oil Pte Ltd

Course Syllabus.

DAY 1

0900 – 0920

Introduction

- Introduction to Virtual Learning
- Introduction of Lecturer and student attendees
- Basic outlines of the 3-day course contents and schedule

9.20 – 1000

LNG Markets

- Current world energy supply
- Trends in LNG and New Energy development
- Technology Development in LNG
- Market drivers for LNG

1000 – 1100

What LNG Bunkering Facilities are currently available?

- Existing infrastructure and locations
- Potential future development by regions
- Standardisation of facilities and procedures, is there any?
- What would be the best infrastructure in region and else where

1100 – 1115

Coffee Break and Virtual Networking

1115 - 1200

Delegate Exercise & Case Study - Comparison Analysis

- The commercial arguments for and against LNG as marine fuel



- LNG and Low-sulphur fuels LSFO – explained. LSFO vs. LNG as alternative fuel sources
- Recent Developments in LNG Bunkering Procedures and Standards
- Applicable Codes
- International Safety Management (ISM)
- Tanker Management Self-Assessment (TMSA)
- International Ship and Port Security (ISPS)
- Users of TR 56 [Singapore] TR56 is applicable to bunkering of both ocean-going vessels and harbour craft.
- Scope of TR 56 - Singapore the technical reference covers LNG delivery from LNG bunkering facilities (i.e., trucking, shore, terminal, shipping and ISO tankers lifting facilities) to receiving ships through four modes of transfer (truck-to-ship, shore-to-ship, ship-to-ship and LNG cassette bunkering)
- International code safety of ships using gases as fuel (IGF)

1200 - 1300

LNG Bunkering Operations and Procedures for various delivery methods

Bunker Barge

- Key principles of LNG Bunkering
- Parties involved, pre planning and equipment
- Mooring, Operations and Maneuvering
- Cargo Transfer Operations

Land to Ship

- Truck to Ship (TTS) and Loading Arm options
- Parties involved and roles in preparedness
- Equipment and compatibility
- Key steps in preparation
- Operations

Terminal pipeline

- ISO standard (28460-2010)
- Pilotage and vessel traffic services (VTS)
- Tug and mooring boat operators
- Terminal layout and operations
- Terminal and ship operator collaboration

1300 – 1400

Luncheon

1400 - 1500

LNG Custody Transfer, Measurement and Calculations

- System setup parameters
- Ship and surveyor roles
- Certificate of Loading
- Bill of Lading issuance and presentation for certain receiving countries
- Types of Custody Transfer Measurement



- Systems and Equipment
- Liquid form measurement
- Volumetric measurement
- Temperature measurement
- Custody Transfer Measurement system
- (CTMs) testing and checks
- LNG Custody Transfer Procedure

1500 – 1520

Coffee Break and Virtual Networking

1520 - 1600

Bunkering LNG and transfer Inspections

- In Service Inspections
- Service Leak Testing
- Hose Ops and Vessels Procedures
- Color coupling indexes
- Operational risk profiles in Bunkering
- Inspections and Audit – Rigging
- Inspections and Audit – Wire Ropes
- Inspections – Handling and Chains
- Inspection - Shackles and hardware

1600 - 1700

Case Studies & Delegate Exercises

- LNG Transfer Failures - Investigation and Root Cause Analysis - Diagnosis, Analysis and Planning

End of Day 1

0900 - 1000

Introduction to LNG Properties and LNG Science

- LNG properties
- LNG Science and Chemical composition
- General and Specific Risks
- Risk Assessments – Operations, People and Training
- Risk Control measures

1000 - 1100

LNG Bunkering Safety and Risk Management

- Risk Analysis and Job Safety Analysis objectives
- Technical characteristics of LNG
- Handling, storage and spill risk.
- Volatile cargo and gas vapors leak from ruptured tanks, Hoses and pipelines, causing oxygen deficiencies



- Gas Hazard Monitoring Equipment for JSA
- Adverse Weather Working – Guidelines examples for JSA
- Approach to LNG and Installations
- Hose construction and length
- Hose quality and identification

1100 – 1120

Coffee Break and Virtual Networking

1120 - 1200

The 'Golden' Safety Rules - LNG Port and Vessel Bunker Operations

- Confined space entry
- Process and Mechanical isolations
- Electrical isolation
- Working at Height
- Ground disturbances
- Lifting Operations
- Driving Safety
- Management of Change in Organization, Equipment, Plant, Standards or Procedures that have a Health, Safety, Integrity and/or Environmental impact
- 'Step back' 5 x 5 procedures

1200 - 1300

LNG and Offshore Installation and Safety Management Practices

- OIM - Operations inside 500m safety zone;
- Manoeuvring; safe approach, weather monitoring,
- LNG and Bunkering Cargo handling and Planning
- LNG Installation Data Cards
- Accidental causes - fire on board ships.
- LNG, Bunkers and Mechanical energy
- Liquids and gas
- Bunkers, Fire and the Fire Responses safety
- Investigation priorities upon arrival due to Bunkering failure
- Determining the point of origin
- Reconstruction of Fire and LNG - Fire Science
- Documentation, sketches, sketching systems plotting methods

1300 – 1400

Luncheon

SWP/JSA Delegate Exercise - HSE Health and Safety Workplace Practices SWP/JSA for end to end Bunkering LNG

1400 - 1500



LNG 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

1500 – 1520

Coffee break and Virtual Networking

1520 - 1620

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

1620 - 1700

LNG Port and Vessel Planning – Considerations

- 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

End of Day 2

0900 - 1000

LNG Trading route developments

- New production facilities and locations
- New trading routes and hubs developing
- Off-shore industry expansion options for LNG as fuel
- On shore development of infrastructure
- Remote supplies and disaster recovery, portable LNG

1000 - 1100

LNG as a Fuel and Ship Design Configurations

- Current LNG Propulsion Options
- LNG Fuel Tanks
- LNG Storage
- LNG Fuel System
- Impacts on Ship Configurations and Operation



- Suitable Ship Types
- LNG and other Ship design efficiencies
- New LNG Fuel Containerships
- Retro fitting of existing vessels with LNG technology

1100 – 1120

Coffee Break and Virtual Networking

1120 - 1230

Vessel LNG Technology and Operations

- Vessel operational preparedness for LNG bunkering
- Measures to reduce energy consumption in ship applications
- Cut operating costs while, at the same time, reducing emissions
- Technological efficiencies to reduce energy Consumption in all ship application
 - Tankers and Bulker
 - Containership
 - RORO
 - Ferries
 - OSV

1230 - 1300

LNG for Marine Engineers and Tech Superintendents – Wear down, Fatigue and Failure Management Practices and planning for LNG Fuel 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

1300 – 1400

Luncheon

1400 - 1500

LNG and other Advanced Technologies

- Future: LNG Test and Technology Centre - Liquid Natural Gas (LNG) has characteristics that impacts on ship design and operation
- LNG Fueled Propulsion for Ships
- Innovative LNG transfer systems
- Development of offshore LNG Transfer

1500 – 1530

Coffee Break and Virtual Networking

1530 - 1650



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

1650 – 1700

Course Assignment completion and Assessments.

End of Course

Note:

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

