Anatomy of LNG Shipping & Operations

Part 1
VESSEL DESIGN, TECHNOLOGY AND MARKETS

19-20 October 2020
The M Hotel • Singapore

Organised by

Cambridge Academy of Transport

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Cambridge Academy of Transport

Registration Form

Anatomy of LNG Shipping & Operations

DESIGN, TECHNOLOGY & MARKETS

SINGAPORE • 19–20 OCTOBER 2020

To register for "Anatomy of LNG Shipping & Operations: Design, Technology & Markets" class, complete the form below and send it to Tulika Singh at the fax number or email address given below.

DELEGATE 1: Title _____ First name(s) _____

Family name _____

Company position _____

DELEGATE 2: Title _____ First name(s) _____

Family name _____

Company position _____

DELEGATE 3: Title _____ First name(s) _____

Family name _____

Company position _____

Company name _____

Address _____

_____

_____

Nature of business _____

Tel _____ Fax _____

E-mail _____

❑ Enclosed is a cheque ❑ Please invoice my Company ❑ I wish to pay by Credit Card (details below)

Course Fees: The fee of **USD2,200** includes all documentation, lunch on each day and coffee/tea breaks. Payment can be made by cheque, bankers draft or inter-bank transfer. Cheques should be made payable to Cambridge Academy of Transport in US Dollars drawn on a bank in the United States. Bank details for inter-bank transfers are:

Barclays Bank Plc, 28 Chesterton Road, Cambridge CB4 3AZ, UK
Account Number: 59248155 Sort Code: 20-17-35
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Credit Card Type:		Expiry Date:	
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Tulika Singh, Course Organiser
Cambridge Academy of Transport
48 Whittlesford Road, Little Shelford
Cambridge CB22 5EW, UK

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Course Programme

Anatomy of LNG Shipping & Operations

PART 1: VESSEL DESIGN, TECHNOLOGY AND MARKETS
19-20 October 2020
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Course Leader

Paul Veldhuizen • Independent Consultant and former Head of Global LNG Operations • Shell Gas & Power and Fleet Operations, • Shell Shipping & Maritime (STASCO Ltd)

Monday 19 October

Welcome **0800-0830**

- Welcome
- Introductions
- Housekeeping

Course Overview **0830-0845**

- Expectations
- Course overview

Session 1

LNG: The Basis and the Basics **0845-0915**

- Physical Properties of Natural Gas and LNG
- Liquefaction and Cryogenic Engineering
- Origins of commercial LNG and seaborne transport
- Early LNG projects and their evolution

Session 2

Cargo Containment Systems **0915-1015**

- Containment Systems – past, present and future
- Origins and pioneers
- Principles of liquid gas cargo containment
- Evolution of membrane systems
- Physical challenges
- Capacity trends
- The Moss or Spherical systems
- Who builds what systems
- Future trends

Session 3

Terminal Design and Operations **1030-1115**

- Design Features of Load and Discharge Facilities
- Physical Properties of Liquid Methane
- Cryogenic processes
- LNG Production, Storage and Terminals
- Floating Storage and Regassification
- Land installations
- Hybrid FSU with on-shore regasification

- Floating LNG Production
- The Prelude
- FLNG
- Logistical challenges: Planning and Operations
- Logistical challenges and Ship/Shore interface
    - Ports, Terminals: Size and Planning
    - Annual Delivery Programme and Scheduling
    - Ship/Shore interface: line cooling, vapour return, communications
    - Emergency shut-down systems

Session 4

LNG Cargo Handling **1115-1230**

- Trading and Tank Condition Cycles
    - Nitrogen Purge
    - Drying and Inerting Tanks
    - Cooling-down
    - Gassing-up
- Heel Retention
- LNG Cargo Operations
    - Ship/Shore Check List
    - Pre-Cargo Preparations
    - Cooling down
    - Bulk Cargo Operations
    - Topping Off, End of Discharge, Purging/Draining
- Cargo Handling Equipment
    - Cargo and Engine Control Spaces
    - Gauging Systems
    - Cargo Pumps
    - Compressors, Vaporizer and Oxidizer
    - Ship's Stability Book

Session 5

Propulsion Systems **1330-1515**

- Propulsion Systems – past and evolution to present day
    - Naval Architecture: the Balance between Form and Function
    - Hull Form and impact on Power, Speed and stability
    - Use of Boil-off and achievable speeds
    - Steam, Diesel, Gas Turbine and their evolution into hybrid options
- Propulsion Systems – Future Trends
    - Economic evaluation
    - Key advantages of slow speed 2 stroke Diesel Engines
    - Main Engine with Gas Injection (MEGI)
    - Engine with Gas Injection (MEGI)
    - Further evolution of Main Engine Gas Injection: XDF
    - XDF Technology: Advantages and Drawbacks
    - Comparison of Win XDF vs MEGI (LP/HP) combustion cycles
- Changes to Propulsion Orderbook 2018 vs 2019
    - Market trends in propulsion systems
    - Current trends in LNGC propulsion
- Overview of Natural Gas Compatible Marine Engines (Jargon Buster)

Session 6

Vessel Efficiency, LNG as Marine Fuel **1530-1645**

- Emission Regulations and Pathways to Decarbonisation
- Current MARPOL Annex VI Sulphur Caps
- 2050 MARPOL Emissions Aspiration
- Compliance with 2020 Sulphur Cap
- LNG as Fuel: Enablers, Economics and Concerns
- Decarbonising Shipping by 2050 – Future Pathways
- Slow Steaming and Just-in-Time Arrival
- Energy Efficiency Design Index (EEDI) and Management Plan (SEEMP)
- Alternative Fuels
  - LPG
  - Bio Gas
  - Methanol
  - Ammonia
  - Hydrogen
  - Fuel Cells
  - Electric

Day Round-up and Close **1645-1700**

Tuesday
20 October

Session 7a

Asset Management and Operating Expenses (OPEX) **0830-1015**

- International Maritime Legislative Framework
- NGO and Industry Representative Organisations
- Classification Societies
- Vetting, SIRE Inspections and Terminal Acceptance
- Officer Experience Matrix
- Insurance: H&M, P&I and cargo

Session 7b

Asset Management and Operating Expenses (OPEX) – *Cont'd* **1030-1130**

- Types of Vessel Ownership and control
- Cost Allocation
- Ship vs Crew Manager
- Crew Composition, Recruitment, Remuneration and Retention
- Key components of (LNG) Vessel Operating Costs (OPEX)
  - Repair and Maintenance
  - Other Operating Expense Drivers

Session 8

Supply & Demand and Trade Flows **1130-1230**

- Energy Transition: the Case for Natural Gas
- Natural Gas in the Energy Mix
- LNG vs Pipeline
- Evolution of LNG flows: Europe, Asia and US
- Arbitrage, Optimisation and Trading
- Gas on Gas Competition
- New projects
- Future Projections

Session 9

Small Scale LNG and Bunkering **1330-1445**

- Small Scale: Dimensions and Growth Drivers
- Major players moving into small-scale LNG
- Small Scale and LNG Bunkering across the globe
- LNG Bunkering facilities: Actual and Planned
- Entry into traditional shipping segments: cruise, container, dry bulk
- The Economics / Competitiveness of LNG as Fuel Various
- Various LNG Bunker projects
- Pros and Cons of LNG as fuel

Session 10a

Introduction to Voyage and Deal Economics **1445-1515**

- Core Components of Voyage Economics
- Fundamental Cost & Revenue Criteria
- Deal vs. Voyage Economics (and exclusions thereof)
- Who Pays What in a Ship Charter Party?

Session 10b

Introduction to Voyage and Deal Economics – *Cont'd* **1530-1645**

- Freight Calculations: Unit Cost versus Time Charter Equivalent (TCE)
- Freight vs Hire vs Daily Value (TCE)
- Freight Earning vs TCE (Daily Value)
- Worked example and Case Study

Day Round-up and Close **1645-1700**

<u>Other Lecturers who have contributed to the course previously</u>

Dr John M Doviak, *Managing Director, Cambridge Academy of Transport, Cambridge, UK*

Keith Ghwee, *Managing Director, Hagel Investment, Singapore and Director, Distance Learning, Cambridge Academy of transport*

Alex Pilkington, *Operations Manager, Avenir LNG MS Ltd, London and Commercial Shipping Advisor for STASCO*

Programme subject to change