

Anatomy of LNG Shipping & Operations

**Part 1**

**VESSEL DESIGN, TECHNOLOGY  
AND MARKETS**

**6-7 December 2020**

**Park Regis Kris Kin Hotel • Dubai**

**Organised by**



*Cambridge Academy of Transport*

**48 Whittlesford Road • Little Shelford • Cambridge • CB22 5EW**

**Tel: +44 (0)1223 845242 • Fax: +44 (0)1223 845582**

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## Cambridge Academy of Transport

### Registration Form

## Anatomy of LNG Shipping & Operations

# VESSEL DESIGN, TECHNOLOGY & MARKETS

DUBAI • 6-7 DECEMBER 2020

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

<b>DELEGATE 1:</b> Title _____ First name(s) _____ Family name _____ Company position _____
<b>DELEGATE 2:</b> Title _____ First name(s) _____ Family name _____ Company position _____
<b>DELEGATE 3:</b> 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**  
**IBAN: GB21 BUKB 2017 3559 2481 55                      SWIFTBIC: BUKBGB22**

Alternatively you can pay by Visa, MasterCard or American Express by completing the form below:

Credit Card Type:	_____	Expiry Date:	_____
Card Number:	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □		
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Signature:	_____	Date:	_____

**Return this form to:**

**Tulika Singh, Course Organiser**  
**Cambridge Academy of Transport**  
**48 Whittlesford Road, Little Shelford**  
**Cambridge CB22 5EW, UK**

**Tel: +44 (0) 1223 845242**  
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# Course Programme

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## Anatomy of LNG Shipping & Operations

### PART 1: VESSEL DESIGN, TECHNOLOGY AND MARKETS

6-7 December 2020

Park Regis Kris Kin Hotel • Dubai

#### Course Leader

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

<b>Sunday 6 December</b>	<b>Welcome</b>	<b>0800-0830</b>
	<ul style="list-style-type: none"><li>– Welcome</li><li>– Introductions</li><li>– Housekeeping</li></ul>	
	<b>Course Overview</b>	<b>0830-0845</b>
	<ul style="list-style-type: none"><li>– Expectations</li><li>– Course overview</li></ul>	
	<b>LNG: The Basis and the Basics</b>	<b>Session 1 0845-0915</b>
	<ul style="list-style-type: none"><li>– Physical Properties of Natural Gas and LNG</li><li>– Liquefaction and Cryogenic Engineering</li><li>– Origins of commercial LNG and seaborne transport</li><li>– Early LNG projects and their evolution</li></ul>	
	<b>Cargo Containment Systems</b>	<b>Session 2 0915-1015</b>
	<ul style="list-style-type: none"><li>– Containment Systems – past, present and future</li><li>– Origins and pioneers</li><li>– Principles of liquid gas cargo containment</li><li>– Evolution of membrane systems</li><li>– Physical challenges</li><li>– Capacity trends</li><li>– The Moss or Spherical systems</li><li>– Who builds what systems</li><li>– Future trends</li></ul>	
	<b>Terminal Design and Operations</b>	<b>Session 3 1030-1115</b>
	<ul style="list-style-type: none"><li>– Design Features of Load and Discharge Facilities</li><li>– Physical Properties of Liquid Methane</li><li>– Cryogenic processes</li><li>– LNG Production, Storage and Terminals</li><li>– Floating Storage and Regassification</li><li>– Land installations</li><li>– Hybrid FSU with on-shore regasification</li></ul>	

- 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

### **LNG Cargo Handling**

**Session 4  
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

### **Propulsion Systems**

**Session 5  
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  
1530-1645****Vessel Efficiency, LNG as Marine Fuel**

- 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****Monday****7 December****Session 7a  
0830-1015****Asset Management and Operating Expenses (OPEX)**

- 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

**Asset Management and Operating Expenses (OPEX) – Cont'd****Session 7b  
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

**Supply & Demand and Trade Flows****Session 8  
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  
1330-1445****Small Scale LNG and Bunkering**

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

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

- 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****Other Lecturers who have contributed to the course previously**

**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***