2024년도 제1차 해외전문교육 개요

1. 교육 개요

o **일시/장소** : 2024. 4. 22(월)~4. 25(목), 09:30~17:30 / 재단 강의실

o **개　　최** : 재단-포스코인터내셔널

o **기관/강사** : PetroEdge / Tony Teo(강사 이력 [첨부1] 참고)

o **주　　제** : The LNG Value Chain & Operational Risk Management

o **분야/수준** : Commercial / 중급

2. 주요 교육 내용 (상세 내용 [첨부2] 참고)

o LNG 밸류체인의 구조를 학습하여 시장 전반에 대한 이해를 제고하고 FSRU*의 구조 및 기술, 액화·기화 프로젝트의 특징, 수송선 운영 기술 및 적용 사례 등을 통해 위험요소 관리 및 대처 방법 학습

* 부유식 액화천연가스 저장·재기화 설비

<일별 교육 커리큘럼>

구분	4.22(월)	4.23(화)	4.24(수)	4.25(목)
내용	• Registration & Trainer's Introduction • Global LNG Trade and Stock Management • LNG Shipping, Global gas and trade, Custody Transfer	• LNG Shipping and Technology • Technological Development and Floating LNG	• Floating LNG / Small scale technology / LNG bunkering	• Operational Risk Management • Historical incidents and lessons learnt

3. 교육생 모집 및 대상

o **교육생 모집** : 8명

o **교육대상** : 자원개발 업계 직원 및 관련 학과 교수, 대학원의 박사 과정 학생 등

- 단, 1개 기관에서 다수의 인원이 신청하여 정원 초과 시, 인원 제한 가능

첨부1	강사 이력서

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Company Registration No. 200710561C

TRAINER'S PROFILE

About the Expert Course Director: Tony Teo

Tony is a seasoned professional with over 40 years of international experience in Maritime, LNG and Alternative fuels technology. In 1979, he graduated from the University of Glasgow, UK with 1st class honours degree in Naval Architecture & Ocean Engineering and was awarded the Reid Birrell prize in Naval Architecture. He also received further education in International Business Management at the world renowned IMD Business School in Switzerland. Tony has worked with two leading ship classification societies, ABS, DNV and two major shipyards, Keppel Offshore & Marine and Sembcorp Marine now merged as Seatrium Ltd.

His expertise in promoting LNG as a marine fuel predates the IMO regulation on the International Gas Fuel (IGF) Code. Since year 2000 he was already actively advocating for LNG as a marine fuel in the Middle East and USA when DNV first published its guidelines and regulations approved by the Norwegian Maritime Directorate (NMD), well before IMO adopted it in June 2015 and which later came into force on 1st January 2017.

Through his career, Tony has presented technical papers on various LNG technologies and moderated discussions at major maritime gas conferences such as Gastech and other LNG seminars. His extensive knowledge in LNG and alternative fuels in Ammonia, Hydrogen, Methanol and Biofuels led him to actively conduct training programs. These programs cover topics ranging from LNG and alternative fuels, LNG bunkering, The A to Z of LNG carriers, FSRU & Receiving terminals, FLNG and Ship Energy Efficiency technologies.

Additionally, Tony has been serving as the chair of the sub-committee on LNG as Marine Fuel for the Society of Naval Architects and Marine Engineers (SNAME) since 2011. His contributions to the field of LNG are evident in his articles on LNG containment systems, LNG opportunities in the Caribbeans and Considerations in the design and operation of LNG bunker vessels published in SNAME's Maritime Technology (MT) magazines.

Furthermore, Tony's involvement with the Chemical Transportation Advisory Committee (CTAC) has allowed him to provide recommendations to the U.S. Coast Guard (USCG) on their small-scale LNG policies. Notably, Tony led a workgroup within CTAC which resulted in the publication of the ASTM F3285-18 Standard Guide for the installation and application of Type C portable tanks for marine service.

With his wealth of hands-on experience and expertise, Tony is the go-to professional in the LNG and Maritime technology industry. His contributions, leadership, experience and technical prowess make him an invaluable resource for organizations and participants seeking to expand and gain further knowledge of the Maritime LNG technology and seek the opportunities that it offers.

첨부2	강의 계획서(교육기관 제공)

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DAILY LESSON PLAN – DAY 1: LNG VALUE CHAIN & OPERATIONAL RISK MANAGEMENT

Day	Topic	Activity/Methodology	Time
1	**Global LNG Trade and Stock Management** • Key Trends and LNG Fundamentals • LNG Properties and Facts • Ignition temperature, density, flammability and calorific values compared to conventional fuels. • Critical temperature and pressure compared to various substances. • Methane number and knocking, Rich and lean gas • LNG and gas interchangeability • LNG Compositions and Quality considerations • Fire, Safety and Hazard management • Hazardous Area Classification • Materials for LNG • Stratification • Rapid Phase Transition • Trade consideration / Trade route • LNG Price Trend, international Prices and Volatility • Top Ten Reserves and Producing countries • Gas and Market development	Training to introduce and understand the current and future LNG market. • Videos	9.30AM-13.00pm AM BREAK

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DAILY LESSON PLAN – DAY 1: LNG VALUE CHAIN & OPERATIONAL RISK MANAGEMENT

Day	Topic	Activity/Methodology	Time
		LUNCH	13:00-14:00
1	**LNG Shipping, Global gas and trade, Custody Transfer** • Global LNG supply and Demand • Supply outlook • Development of LNG trade and shipping • LNG carriers' construction • Evolution in LNG carriers, growth, rates volatility • Spot charter rates • LNG carriers demand forecast • LNG carriers newbuilding costs • Liquefaction capacity versus Fleet growth • Top owners by fleet and surge in new orders • Import capacity under construction and proposed • View of current tonnage / Custody transfer • Stock reconciliation	**Case Study and Exercise:** • How to operate in different market conditions?	14:00- 17:30pm PM BREAK

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DAILY LESSON PLAN – DAY 2 : LNG VALUE CHAIN & OPERATIONAL RISKS MANAGEMENT

Day	Topic	Activity/Methodology	Time
2	**LNG Shipping and Technology** • Development in containment systems • LNG Containment systems and technology • IMO classification of tanks • Type A • Type B • Membrane • Type C • New developments in containment systems • Evaluating and choosing the right systems for your operations • View of current tonnage / Custody transfer • Stock reconciliation	Lecture and group discussion on LNG carriers development • Videos	9.30AM-13.00pm AM BREAK
	LUNCH		13:00-14:00
2	**Technological Development and Floating LNG** • Regulatory Requirements, Hull Design Considerations • LNG transfer, Reload and trans-shipment operations. • FSRU technology, site evaluation, commercial viability, marine infrastructure, construction, constructability. • FSRU Regas types	Lecture and group discussion on LNG technological development and floating LNG • Videos • Quiz	14:00- 17:30pm PM BREAK

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DAILY LESSON PLAN – DAY 3: LNG VALUE CHAIN & OPERATIONAL RISK MANAGEMENT

Day	Topic	Activity/Methodology	Time
3	**Floating LNG / Small scale technology / LNG bunkering** • FLNG technology and design considerations • Overview of FLNG in operation, under construction and consideration • FLNG Liquefaction Processes Technologies • Mooring systems design, SURF and subsea interfaces • LNG Cargo Operations • Small scale LNG and regulatory development • Key technical and commercial considerations for using LNG as a fuel. • Design consideration in the fuel gas supply system • Low and high pressure systems	**Lecture and group discussion on Floating LNG / LNG as a marine fuel and LNG bunkering** **Case Study and Exercise:** • Choosing the right containment system for Floating LNG projects • Gas freeing a LNG tank • Videos	9.30AM-13.00pm AM BREAK
	LUNCH		**13:00-14:00**
3	• LNG bunkering and methods • Design and consideration for LNG bunkering • Control of operation, safety and communication, cryogenic protection, leak prevention, vapor management, fuel quantity and quality, filling limits and procedure. • Quantitative risk assessment model, of LNG fueled ships	**Case Study and Exercise** • Hazardous Zoning a Fuel Gass Supply system • Quiz	14:00- 17:30pm PM BREAK

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DAILY LESSON PLAN – DAY 4 : LNG VALUE CHAIN & OPERATIONAL RISKS MANAGEMENT

Day	Topic	Activity/Methodology	Time
4	**Operational Risk Management** • Operational hazards / Risk quality / Benchmarking of risk • Assessing risks with LNG projects • Hazards of LNG carriers, FSRU and FLNG operations • Risk rating and mitigating measures examples • Mitigating risks, key considerations for floating LNG risk management, cargo transfer considerations	Lecture and group discussion on LNG Risk **Management, Procedures and Techniques** **Case Study and Exercise:** • LNG Risk Rating case	9.30AM-13.00pm AM BREAK
	LUNCH		13:00-14:00
4	**Historical incidents and lessons learnt** • Valve and vent mast incidents • Grounding incidents • The Cleveland accident and non-shipping accidents • The worst disasters in history	Continue with lecture and group discussion. • Quiz	14:00- 17:30 PM BREAK