효과적인 LNG 교육훈련을 위한 시뮬레이터 활용방안

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요약: LNG 선박의 규제에 의한 승무원 심화한 부족현상에 대비하여, STCW의 긴급 개정 등과 같은 IMO의 대응은 물론 각 국가에서 승무원 양성을 위한 교육과정의 개설은 물론 관련 법제 정비 등으로 대응방안은 마련하고자 노력을 하고 있다. 이러한 시기에 국제해양학연합과 한국해양대학교를 중심으로 한 아시아 LNG 교육훈련센터에서는 향후 국제무대에서 활약할 LNG 교육훈련가를 양성하기 위한 전문과정을 추진하고 있다. 이 발표에서는 LNG 교육훈련 전문강사 과정의 개요를 살펴보고, 이러한 과정을 효율적으로 운영하기 위한 시뮬레이터 활용방안에 대하여 설명하고자 한다.

핵심요소: 아시아 LNG 교육훈련센터, LNG 교육훈련 강사 양성과정, CBT, LCHS, IAS, 시뮬레이터 활용

Contents

- Current Situation
  - LNG Forecast
  - New LNGC Orders
  - MET

- Critical Elements
  - Facilities
  - Instructor Training Course
  - Quality Control

Conclusion

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**LNG Forecast**

- LNG Trade in 2005
- LNG Trade Perspective in 2015

**MET**

- Traditional Operators
  - MET system for their own crew members
  - Key Point: Onboard Training (Overlapping)
  - Conservative and Closed
- New Entrant Operators
  - MET System?
  - Onboard Training?
  - Support from Traditional Operators?
- Reliable and Qualified MET System Required

**New LNGC Orders**

- Change in Size
  - More than 200,000 Cubic Meters
- New Technologies
  - Cargo Containment System
  - Reliquefaction Plant on board
  - Regasification Plant on board
  - Main Propulsion System
    - Steam turbine
    - DFDE
    - SSDE

**Key Resources**

 Qualified LNGC Officers

- Human Resources
- Facilities
- Equipment
- Training Materials
- Experience
- Certification
- Quality Control
- Assessment

**Critical Elements**

- Number of Officers of an LNG Carrier
  - Deck Officers: 5 (including Cargo)
  - Engineer Officers: 5 (including Cargo)
  - Total: 10 (Senior 60%)

- Estimation of Necessary Officers
  - 143 X 10 X 2.5 = 3,575
  - Senior Officers: 2,145 (60%)
  - Junior Officers: 1,430
Facilities

- Key Facilities
  - CBT (Computer-Based Training) System
    - Texts, Figures, Photos, etc.
  - Basic Knowledge of LNGCs
  - LCHS (Liquid and Liquefied Cargo Handling Simulator)
    - Conventional Type of Simulator
    - Basic Knowledge for Cargo Handling
  - IAS (Integrated Automation System) Simulator
    - Automatic Control System Used in Almost all LNGCs
    - Advanced Education and Training
    - Cargo Handling
    - Engine and Boiler Operation

Facilities

- CBT

![Cargo Lines Cool Down](image)

Principal Logic

- Temp Calculator
- Pressure Calculator
- Valve Control Logic
- Cargo Pump Logic
- Cargo Load Logic
- Loading Computer
- Tank Load Logic
- Scout Line Logic
- Billet Pump Logic
- Scoring Water Logic

Facilities

- LCHS

Modeling of Liquid Flow

- Conservation Principles
  - Mass Balance Equations
  - Energy Balance Equations
  - Momentum Balance Equations
  - Steady State Solution with Differential Equation

Strategy for Development

- Modeling (Conservation Principles)
- Numerical Analysis = Optimal Solution by Discrete Computers
- Server = Client System
- Simulator for LNGC MET

- Facilities

- LCHS

- CBT

- Cargo Lines Cool Down

- Principal Logic
Facilities

Changes in Simulators

Cargo Control Console

IAS System

Instructor Training Course

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<th>CBT</th>
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Human Resource

• Instructor
  • Effective MET ⇒ Qualified Instructors
  • Competency Standards for Instructors
    • No Standards for LNGC's Instructors
    • Urgently Prepared
  • Severe Lack of Qualified Instructors
    • LNGC Experienced Human Resources
      • Hard to Find
    • Human Resource without Experience onboard LNGCs
      • Faculty Members
      • Instructors in MET Centers

Instructor Training Course

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Instructor Training Course

• Total Period of Training ⇒ 14 weeks
  • Theoretic Lectures: 61 hours
  • CBT: 55 hours
  • LCHS: 31 hours
  • IAS: 53 hours
  • Sub Total: 200 hours (5 weeks)
  • Field Tour: 1 week
  • Onboard Training: 8 weeks
What should be done?

- International Tripartite Collaboration
  - Governments
  - Academia (TAMU)
  - Industries
- Unified Competency Standards
  - Separate Development of LNGC Standards
  - Interim Agreements between Parties
- Human Resource
  - Standards for Instructors
  - Onboard and on-the-job Training
- The 3rd Party Assessment and Quality Control
  - MET Institutions and Centers