

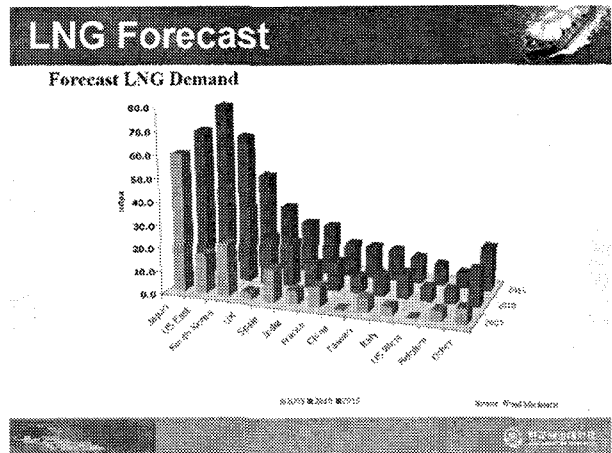
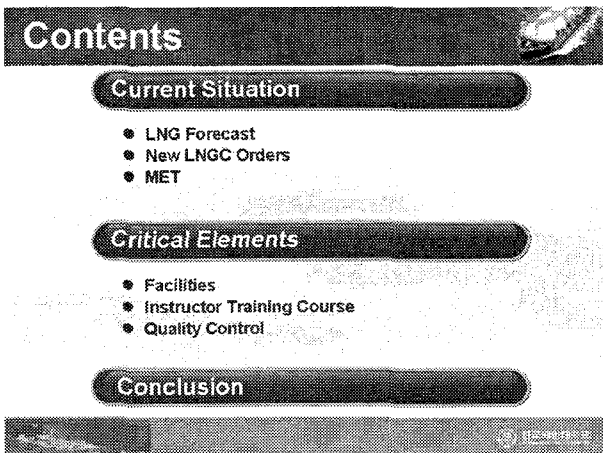
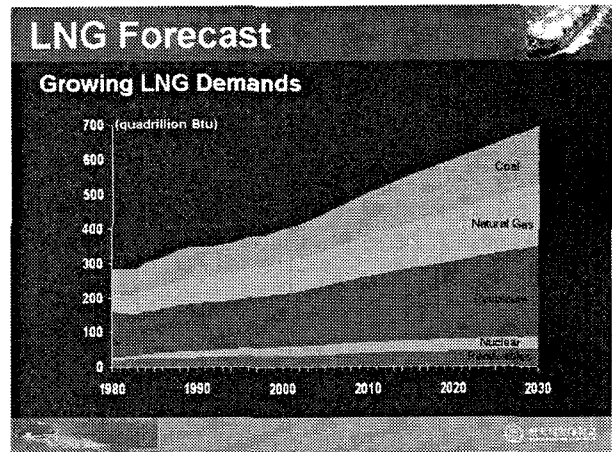
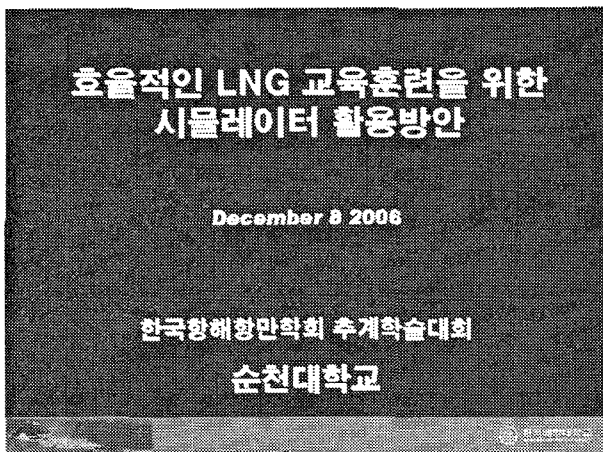
# 효과적인 LNG 교육훈련을 위한 시뮬레이터 활용방안

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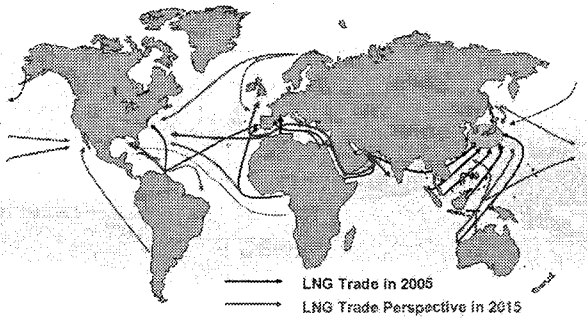
**요 약 :** LNG 선박의 급증에 의한 승무원 심각한 부족현상에 대비하여, STCW의 전면 개정 등과 같은 IMO의 대응은 물론 각 국가에서도 승무원 양성을 위한 교육과정의 개선은 물론 관련 법제 정비 등으로 대응방안을 마련하고자 노력을 하고 있다. 이러한 시점에서 국제해사대학연합과 한국해양대학교를 중심으로 한 아시아 LNG 교육훈련센터에서는 향후 국제무대에서 활약할 LNG 교육훈련강사를 양성하기 위한 전문과정을 추진하고 있다. 이 발표에서는 LNG 교육훈련 전문강사 과정의 개요를 살펴보고, 이러한 과정을 효율적으로 운영하기 위한 시뮬레이터의 활용방안에 대하여 설명하고자 한다.

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



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## LNG Forecast



## 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
    - SSSR

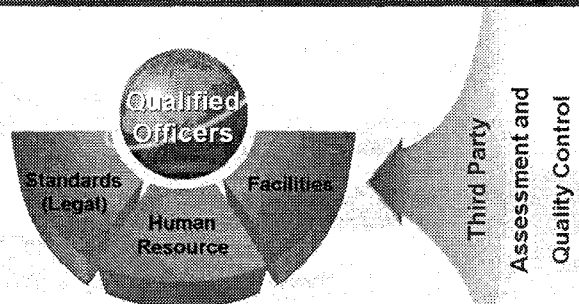
## Key Resources



## MET

- 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
  - ◆  $143 \times 10 \times 2.5 = 3,575$
  - ◆ Senior Officers: 2,145 (60%)
  - ◆ Junior Officers: 1,430

## Critical Elements

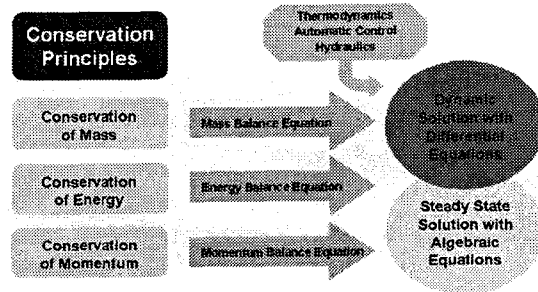


## Facilities

### ● Key Facilities

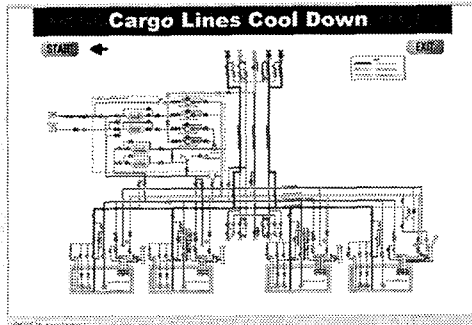
- ◆ CBT (Computer Based Training) System
  - Texts, Figures, Photos, etc.
  - Basic Knowledge of LNGCs
- ◆ LCHS (Liquid and Liquefied Cargo Handling Simulator)
  - Conventional Type of Simulator
  - Basic Knowledge for Cargo Handling
- ◆ IAS (Integrated Automation System) Simulator
  - Automatic Control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

## Modeling of Liquid Flow

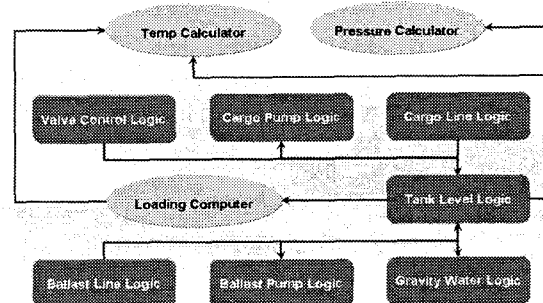


## Facilities

### ● CBT



## Principal Logic



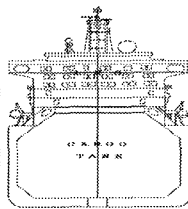
## Strategy for Development

Modeling (Conservation Principles)

Numerical Analysis ⇒ Optimal Solution on Desktop Computers

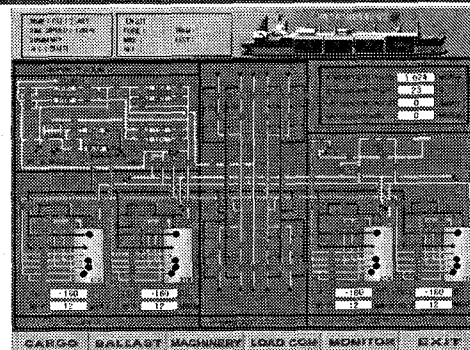
Server – Client System

Simulator for LNGC MET



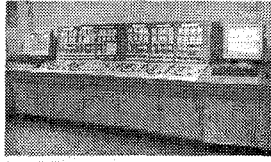
## Facilities

### ● LCHS



## Facilities

### Changes in Simulators



Cargo Control Console



IAS System

## Instructor Training Course

Knowledge and Skill	Theory	CBT	Simulator		Sub Total
			LCHS	IAS	
Introduction	1	1	1	1	4
Characteristics of NG & LNG	8	8			16
Hazards & Safety	4	4			8
Emergency Operation	2	4	4	6	16
Structure of LNGC	4	4			8
Cargo Equipments	8	8			16
Rules and Regulations	8				8
Cargo & Ballast Piping	2	4	6	4	16
<b>Sub Total</b>	<b>37</b>	<b>33</b>	<b>11</b>	<b>11</b>	<b>92</b>

## Human Resource

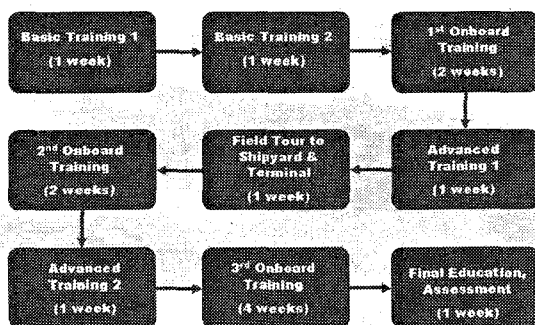
### ● Instructor

- ◆ Effective MET ⇒ Qualified Instructors
- ◆ Competency Standards for Instructors
  - No Standards for LNGCs 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

Knowledge and Skill	Theory	CBT	Simulator		Sub Total
			LCHS	IAS	
Introduction to IAS	4	4		8	16
Loading and Unloading	2	2	4	8	16
Operation during Navigation	4	4	6	8	22
BOG Control	2	4	4	6	16
Emergency Discharging	2	2	2	4	10
Deck Operations	4	4	4	8	20
Firefighting	4				4
Assessment	2	2			4
<b>Sub Total</b>	<b>24</b>	<b>22</b>	<b>20</b>	<b>42</b>	<b>108</b>

## Instructor Training Course



## 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 (IAMU)
  - ◆ 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 3<sup>rd</sup> Party Assessment and Quality Control**
  - ◆ MET Institutions and Centers