The analysis on the safety operations of LNG transportation

Chang Junyu
PART ONE SELF INTRODUCTION
Part 1  SELF INTRODUCTION

Resume

- Train crew and students about liquid cargo operation.
- Research in safety of ships and port approaches
  - The operation and management of GCU on LNGC
  - Research on the application of simulator in crew training of liquid cargo ships management
  - Research on the training standard of crew on board LNG fueled vessel
  - A study on the influencing factors of large cruise ships at Wusong International Cruise Terminal
- Sea career
  LNGC & General Cargo ship experience
PART TWO

RISK ANALYSIS

- The safety zone of LNGC
- Methods of risk identification and safety analysis of LNG operation
Different places different rules. Ports and authorities can decide their own requirement, lots of experts did research about safety zone, but there is no standard method to make decision.

- **Montreal, France**: F&A: 2nm, P&S: To shore
- **St. Peter’s bay, America**: F: 0.5nm, A: 0.25nm, P&S: 0.25nm
- **Dampier, Australia**: No exact rule
- **Shenzhen, China**: 2nm around
Part 2

2.2 The risk identification and safety analysis of LNG operation

FSA

AHP

ANP

Mamdani

sugeno
The author uses Formal Safety Assessment (FSA) to analyse the risk. And the result is both the individual and the social risk level lies within the As Low As Reasonable Practicable (ALARP) area, meaning that further risk reduction should be required only if available cost-effective risk control options could be identified.
2.2.2 Enabling a viable technique for the optimization of LNG carrier cargo operations – Onakoya Rasheed Alaba

The author uses Analytic hierarchy process (AHP) method to compare the importance of operations below:
- Berthing-related precautions, LNG PRE1
- Personnel and procedural precautions, LNG PRE2
- Cargo equipment precautions, LNG PRE3
- Procedural precautions during operation, LNG PRE4
- Precautions regarding probable emergency situations, LNG PRE5
PART THREE

Methods to reduce risk
Part 3 methods to reduce risk

- Permit & JHA system
- Guidance procedures for nearly all operation
- Training both on board and ashore
- Take full use of every near miss.
3.1 Permit & JHA system

- Hot work
- Confined space entry
- Work on high voltage system/equipment
- Work at high
- Hazardous task
- Lock out/Tag out
### 3.2 Procedures to be followed

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Procedures</th>
<th>Records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Officer</td>
<td>Chief Officer is responsible to the Master for the planning of all cargo and ballast operations.</td>
<td>Cargo Plan</td>
</tr>
<tr>
<td>Master</td>
<td>A Cargo Plan shall be developed by the Chief Officer and shall be approved by the Master prior to arrival. As a minimum, the Cargo Plan shall cover the following:</td>
<td></td>
</tr>
<tr>
<td>Chief Officer</td>
<td></td>
<td>Cargo Order Book</td>
</tr>
<tr>
<td>Cargo Watchkeeping Officers</td>
<td>• Arrival and departure draughts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stability conditions at critical stages, including maximum shear forces and bending moments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Expected quantity to load/discharge, including retention of heel.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Procedures on commencement of cargo – cooling lines, ESD tests, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Expected bulk load/discharge rates, expected ramp-up/rate down and any other limiting conditions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Loading sequence and required vessel trim or tank stagger.</td>
<td></td>
</tr>
</tbody>
</table>
3.3.1 Training simulators

- Computer based
- Mock-up
3.3.2 Resolution MSC.396(95) requirement for training

Part 3

**Familiarization**

All seafarers serving on board ships subject to the IGF Code

**Basic**

Seafarers responsible for designated safety duties associated with the care, use or in emergency response to the fuel on board ships subject to the IGF Code

**Advanced**

Masters, engineer officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships subject to the IGF Code
Part 3

3.4 Take full use of every near miss

Steering failure → Fleet notice → Safer

Report → Action → Safer
THANK YOU