TRANSFER/BUNKERING OPERATION OF LNG

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Content

• LNG transfer from LNG import terminal to ships and bunkering stations
• Safety during LNG transfer
• Safety during bunkering operations
• LNG small supply and bunkering ships
• LNG supply and bunkering trucks, train wagons and tank containers
• Personal education and training
LNG TRANSFER FROM LNG IMPORT TERMINAL TO SHIPS AND BUNKERING STATIONS

- LNG transfer by small LNG tankers
- LNG transfer by trucks
- LNG transfer by rail tanks
- LNG transfer by LNG tank-containers
LNG IMPORT TERMINALS

Part-financed by the European Union
(European Regional Development Fund)
SMALL SCALE LNG TERMINALS
SAFETY DURING LNG TRANSFER AND BUNKERING

• Legal basis of the safety during LNG transfer (Regulations)
• Safety zones
• Actions in emergency situation
LNG DANGEROUS OR NOT???
LNG SAFETY ZONES BASIS
KLAIPEDA LNG IMPORT TERMINAL SAFETY ZONES
SAFETY OF THE LNG TANKS

Barred Fill Range

Usual permitted limit
70% H

Usual permitted limit
10% H

H
LNG SMALL SUPPLY AND BUNKERING SHIPS

- LNG small supply Sea ships (capacity from 4000 m³ up to 15000 m³ of LNG)
- LNG small supply IWW ships (capacity from 400 m³ up to 2000 m³ of LNG)
- Port LNG supply ships (capacity from 200 m³ up to 1000 m³ of LNG)
LNG SUPPLY AND PORT TANKERS
LNG SUPPLY AND PORT TANKERS
PORT LNG SUPPLY SHIPS MAIN PARAMETERS

• Length up to 40 – 50 m
• Width up to 10 – 12 m
• Draft up to 3,5 – 5,0 m
• Capacity (LNG) from 200 up to 1200 m³
• Speed up to 10 knots
LNG FUEL SUPPLY VESSEL IN PORT MAIN CONDITIONS

- LNG fuel quantity on LNG supply vessel should be at least for the 2 Ro-Ro vessels
- LNG supply vessel must have possibility fulfill at least 2 times per week on LNG terminal
- LNG supply vessel could provide LNG supply operations near Ro-Ro quay walls or in port waters
- LNG supply vessel should be able supply LNG shore facilities
PLANNING LNG FUEL FOR THE RO-RO SHIPS QUANTITIES IN KLAIPEDA PORT

• 4 – 8 Ro-Ro ships constantly work on Ro-Ro lines link Klaipeda port with other ports

• Ro-Ro ship in average should use per day up to 40 – 60 m³ LNG

• Planning LNG fuel per week for the Ro-Ro ships (weekly bunkering) 3000 – 4000 m³ LNG
LNG FUEL SUPPLY IN EAST BALTIC PORTS MAIN CONDITIONS

• LNG fuel quantity on LNG supply vessel should be at least for the 1 – 2 ports (at least for 4 - 6 Ro-Ro vessels in one port)
• LNG supply vessel must have possibility fulfill at least 1 time per week on LNG terminal
• LNG supply vessel could provide LNG supply operations near quay walls or in port waters
• LNG supply vessel should be able supply LNG shore facilities
DISTANCES BETWEEN KLAIPEDA AND OTHER PORTS

• Klaipeda – Baltjsk – 110 n.m. – 8 h – 1 d
• Klaipeda - Liepaja – 55 n.m. – 5 h – 18 h
• Klaipeda – Ventspils – 120 n.m. – 12 h – 1,4 d
• Klaipeda – Riga – 236 n.m. – 18 h – 1,8 d
• Klaipeda – Paldisky – 285 n.m. – 22 h – 2 d
• Klaipeda – Tallinn – 320 n.m. – 24 h – 2,5 d
LNG SUPPLY SHIPS FOR THE EAST BALTIC SEA MAIN PARAMETERS

• Length up to 100 - 115 m
• Width up to 12 – 16 m
• Draft up to 5,5 – 6,5 m
• Capacity (LNG) up to 5000 – 9000 m³
• Speed up to 14 – 16 knots
LNG LOADING ON LNG SUPPLY TANKER
SUPPLY SMALL SCALE LNG TERMINAL IN KLAIPEDA
LNG TRANSFER TRUCKS, RAILWAY WAGONS AND TANK-CONTAINERS
LNG BUNKERING FACILITIES IN BALTIC SEA (Planning)
SHIPS LNG BUNKERING SYSTEMS

Approach of bunker vessel, mooring, connecting, bunkering, disconnecting, departure

LNG fuell ship

Approach of LNG truck

Truck to ship bunkering

Bunkering via pipeline

Intermediate LNG storage tank

Ship to ship bunkering

LNG powered ship

LNG track

LNG contained

LNG tank

Pipe line To Ship (PTS)

Portable tank transfer

Vessel to vessel

Terminal tank for vessel

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LNG BUNKERING (FILLING) STATIONS
LNG BUNKERING STATIONS

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BUNKERING FROM MULTIPLE TANK TRAILERS

4 Tank Trailers
Serial or Parallel Connections
2 Pumps each with 60 m³/h
Flow rates 120 m³/h
LNG BUNKERING – INTERMEDIATE TANK ON QUAY

2 x 300 m³ tanks

Pump unit

2 x 65 m³/h pumps

Flow rates from 40-130 m³/h

One truck loading point
LNG BUNKERING – STATIONARY STORAGE TANK WITH MULTI TRAILER

40 - 320 m³/h bunkering flow

5-450 m³ per bunker operation

Optionally equipped with PBU for fast bunkering

Ideal to achieve high flow and maximum flexibility

Possible to increase capacity and flow rate in phases
MULTIPLE FUEL STATION

400 m³ & 30 m³ LNG storage tanks

LNG transfer pumps

LNG measurement system

LNG bunker system on the quay

LNG and CNG filling station for road transport
BUNKERING CAPACITIES AND INTENSIVELY
SAFETY DURING BUNKERING OPERATIONS
LNG BUNKERING STS SAFETY ZONE
SAFETY FIRST (at least 2 persons must be on important operations)
PERSONAL EDUCATION AND TRAINING
Global Natural Gas Prices

A Cap for Natural Gas Prices in the Region

Average annual natural gas import price

2012
2013
2014
2015 H1

EUR/ MWh

Klaipėda LNG Terminal is in Operation

LNG price sets natural gas price cap

2. EU average
3. RU-DE boarder
4. Regional average
5. Lithuania
6. NBP+3.5

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CONCLUSIONS

• LNG transfer from LNG import terminals to ships and bunkering stations could be by LNG supply vessels, trucks, tank-containers.

• Safety during LNG transfer must be on basis fulfil IMDG Code, ADR Agreement, etc. basis.

• Safety during bunkering operations must be fulfil according terminal safety regulations and ISM Code on LNG ships.

• LNG ships and terminals personal education and train is the main way minimize non standard situations.
THANK YOU FOR YOUR ATTENTION

Questions?