LNG Study Visit onboard MS Stavangerfjord & to Norway
17 – 19 September 2013
Welcome onboard MS Stavangerfjord
Who is Morten?

Technical & Nautical Director in Fjordline, member of the board in Fjordline A/S. Project manager for the LNG new buildings and responsible for operation of fleet & ports. 49 years old, educated as Master Marine in 1985 and employed by Fjordline since 2005. History of positions as mate, captain, training manager, route manager & ship owner.
Who is Fjord Line?

Norwegian owned company - management of the ships from Denmark. All ships flying Danish Flag & Registered in DIS.
1. LNG Journey from 2009 to 2013!
Environment Regulations

MARPOL

Contains 6 annexes, concerned with preventing different forms of marine pollution from ships:

Annex I - Oil
Annex II - Noxious Liquid Substances carried in Bulk
Annex III - Harmful Substances carried in Packaged Form
Annex IV - Sewage
Annex V - Garbage
Annex VI - Air Pollution
Summary

✓ LNG Engine Technology etc. is available & proved
✓ Price consequence for LNG Installation onboard vessels
✓ Present & future known Marpol regulation emission limits.
✓ Present Norwegian Nox Tax (For domestic trade in Norwegian Waters)
✓ Present IMO regulations (Interim Code for Gas Fuelled Ships)
✓ Present DNV Class regulations for Gas Fuelled Ships.
✓ LNG can be available in ports.
✓ Bunkering facilities can be available in ports.
✓ An alternative way can be Scrubber & SCR technology
✓ Emissions will have a price tag

? Lobby for changing the Marpol Annex VI
? Marked based instrument (CO2 / Bunker Tax) issued by IMO
? Marked based instruments issued by EU
? Nox tax in ECA’s
? Infrastructure for LNG in ports
? LNG Bunkering Time
? Bunkering during harbour turn around (Pax/Cargo Operation)
? Other barriers as investment, payback times etc.
? Future prices for HFO/MDO/MGO & LNG

✓ The environmental benefits using LNG is clear.
✓ There is a price impact investing in LNG fuelled vessels
LNG PRICES

Europe’s Energy Portal
LNG prices

Figure 22: Historical prices in $/tonne of HFO, MGO, LNG (average of all locations in Belgium) and Brent oil.
LNG = 27 EUR / MWh

On top are Terminal Costs, Transport, Storage, Terminal Operation.
Summary

• Marine Gas engines represents well proven technology.

• LNG is available – increased demand will ensure even better distribution network.

• Dual fuel engines are the choice when enough LNG cannot be carried to complete the voyage.

• Where the application allows single fuel marine gas engines:
  • More efficient
  • Less expensive in terms of operating and life cycle cost.
  • Lower emissions,
  • Less complex engine supporting systems.
  • Green profile for the ship owner – marketing tool.
  • Lower lube consumption
  • Lesser or no sludge
  • No oil spill during bunker operation
  • Better working environment for engine crew
2. MS Stavangerfjord/Bergensfjord LNG Solution
The LNG Solution onboard

2 x LNG 6” bunkers line to TCS & LNG Tanks

One cold flare mast with pipes from all gas compartments
The LNG Solution onboard

- 4 x Rolls-Royce B35:40V12PG engines each rated at 5400 kW
- 2 x 300 m³ LNG tank inkl. TCS with max. Pressure of 8 barg (30 days)
- 2x Gas valve unit compartments
- Rolls-Royce ACON Gas monitoring safety system interface with SAM Plantinium IACMS
The LNG Solution onboard

- 4 x Rolls-Royce B35:40V12PG engines each rated at 5400 kW
- 2 x 300 m³ LNG tank inkl. TCS with max. pressure of 8 barg (30 days)
- 2x Gas valve unit compartments
- Rolls-Royce ACON Gas monitoring safety system inerface with SAM Plantinium IACMS
The LNG Fuel Supply system is structured in the following way:

- UN965 LNG SAFETY SYSTEM TK 1
- UN960 LNG CONTROL SYSTEM TK 1
- LNG TANK 1
- LNG TANK 2
- SOLENOID CABINET TK 1
- SOLENOID CABINET TK 2
- TCS 1
- TCS 2
- L3 Valmarine IAS
- Gas Piping
- Electrical Connections

Diagram showing connections between GRUs, gas engines, LNG tanks, and safety systems.

Engine Room Aft
Engine Room Fore
Safety System Bridge Indication Panel
Safety System ECU Indication Panel
3. LNG Bunkering
LNG Fuel bunkering process

Liquefied Natural Gas (LNG) is bunkered by pressure from:
1) land based stations or
2) tanker trucks or
3) coastal tankers or
4) future bunker barges
3. Movie
Regulations and Risk Analysis
LNG bunkring
Permanent Risavika Stavanger
Plan ”B” LNG Bunkring

From June 2013 to January 2015

Bunker once a week
In Stavanger

Ship LNG from SVG to Frederikstad and by road/sea to Hirtshals twice a week !!

More safety ? In my opinion not and more costs added !
Rules are not always logical!

But Safety First 😊
Again welcome onboard & enjoy the trip
It's settled... we agree to sign a pledge to hold another meeting to consider changing course at a date yet to be determined.
Thx to

DMA / Mogens Schrøder Bech

NOX Fund / Geir Høibye

TEN – T / Morten Jensen & Jaroslaw Kotowski

Danish Ship Owners Association

OSK Ship-Tech

SkanGass

& many others incl. our Owners
Questions ?