

Use of distillate fuels by ships at berth

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The report

- Task 2B of "Service Contract for a Cost Benefit Analysis to Support the Impact Assessment accompanying the revision of Directive 1999/32/EC on the Sulphur Content of certain Liquid Fuels"

From 1 January 2010 ships using ports within the EU will be required to use low-sulphur fuel, maximum 0.1 wt% sulphur, while at berth. The regulations will most likely make it necessary to use distillate fuel while at berth. There are concerns that there are *risks* associated with switching from residual oil to distillate fuel in boilers.

- Identify the type of ships where these risks may be relevant.
- Estimate the number of such ships in 2010 and 2020.
- Describe the nature of these risks.
- Indicate technical solutions and assess the costs of these.

Association ASPEN

- AEA
- TNO
- IVL

This Task was mainly done by IVL with some assistance from TNO and approval of report by AEA.

Sources of information

- Reports and publications
 - Aalborg Industries; Aalborg Solutions No 12 January 2009.
 - DNV; Regulations for the prevention of air pollution from ships, technical and operational implications. February 2005
 - California Environmental Protection Agency Air Resource Board, Fuel sulfur and other operational requirements for ocean-going vessels within California waters and 24 nautical miles of the California baseline, June 2008.
- Interviews by mail, phone and in meetings
 - Shipowners and associations
 - Suppliers
 - Agencies

Safety concerns

- In case of flame failure an explosive atmosphere may be built up that can explode if not handled appropriately
- Fuel switching believed to increase risk
 - Switching from HFO to MGO means that the pipes are heated
 - Evaporation of fuel
 - Irregular flow may cause flame extinction
- Crews not familiar with operation

Other concerns

- Fuel supply of 0.1% S MGO
- Available tanks on ships
- Fuel pumps and valves /change in viscosity, density)
- Time for modifications and training up to 2010
- Costs for modifications and fuel

Small Auxiliary Boilers

- On most ships
- Many can use either MGO or HFO
- Should be assessed before using MGO
- If modifications are needed: 5 – 25 k€
- Not known what fraction that must be modified
- Some shipowners have assessed their boilers

Large Auxiliary Boilers

- Tankers
- Cargo heating and/or steam pumps
- Should be assessed before using MGO
- If modifications are needed: larger costs, may be 150 k€
- 400-500 ktonnes of fuel annually in the EU for discharge
- Not known what fraction that must be modified

LNG ships with steam propulsion

- Boil-off gas is used as fuel in boilers combined with HFO
- Boilers used also for discharge
- High pressure boilers
- Dual fuel for reliability reasons
- 262 ships
- Modifications necessary before MGO can be used
 - Failure in fuel pumps and valves.
 - Evaporation.
 - Burners
 - The burner management system and flame supervision

LNG ships with steam propulsion - options

1. Modifications with extra fuel lines, pumps, valves, modified burners and management system etc.
 - Cost 70 – 1400 k€ (600 k€)
2. 100% BOG. Reliability concerns, costs not known
3. Minimise HFO + BOG. Net emission of SO₂ would be made lower than in the case of full compliance
4. Scrubbers. Not ready

Timing

- All boilers will likely not be assessed and modified by end 2009. Crews need to be trained.
- Action started late 2008
 - Shipowners expected compliance with IMO
 - Sulphur directive expected to be reviewed
 - HFO with 0.1% S was expected to be available