Global MTCC Network meeting and technical workshop

“Capacity Building for Climate mitigation in the Maritime Shipping Industry”

Ship energy efficient technologies:
LNG propulsion, bunkering vessels and terminals

July 2019 – Chaguaramas, TRINIDAD
Marco La Valle – Marine Engineering Services S.R.L.
CLASSIFICATION OF TANKS:

- type A / B / Membrane - Prismatic
- Type C :
  - Cylindric
  - Bilobes
CLASSIFICATION OF TANKS:

- type A / B / Membrane - Prismatic
- Type C:
  - Cylindric
  - Bilobes
  - Double wall
Technological Solutions for Insulation:

Multy Layer Insulation (M.L.I.) & Perlite

Expanded Perlite is an amorphous volcanic glass. Thermal conductivity is depending on temperature and density - less 1 W/m² abt. heat flow - $10^{-3}$ torr

Multilayer parallel layers of thin reflective material. The overlapped films are separated by a light and low thermal conductivity support.

MLI heat flow = $\frac{1}{2}$ Perlite

*Lifetime* (outgassing and compaction of perlite)

*Weight* (abt. 400 kg MLI, while the same tank arranged with perlite insulation would have about 5 tons)

The requested vacuum grade is $10^{-4}$ torr, although multilayer can keep nearly unaltered performances up to $10^{-3}$ torr. Differently from perlite, insulation performances deteriorate quickly above this limit and loss of vacuum behaviour is critical.
TANK and Tank Connection Space:
RO-Pax FERRY - FINCANTIERI

- 2 x Double wall tanks 280 m³
- 9% Ni
- Vacuum + M.L.I.
LOGISTICS

NO LNG BUNKERING

NO D.F. PROPULSION
GLOBAL INFRASTRUCTURE FOR LNG BUNKERING
INFRASTRUCTURE FOR LNG BUNKERING (ITALY)

- Several under discussion
- Ravenna PIR-Edison (2021)
- OLT Offshore LNG Toscana (2021)
- Sardegna Oristano (2020)
Oristano LNG terminal (Sardinia – Italy)

Partnership:

G&H / HIGAS / Stolt Nielsen
COMPATIBILITY STUDIES (Ship to terminal)
COMPATIBILITY STUDIES (Ship to ship)

Loading arm
Flexible hoses
ERS
COMPATIBILITY STUDIES (Ship to ship)

ship to ship bunkering
ship to ship bunkering
Hazardous Areas and Compatibility
Logistic – LNG bunkering facilities

- Tugs for port operations

TUGA escort Tug Gas propelled
LNG as fuel: a new challenge?

- Technology
- Competence (new Players)
- ship design & gas handling / dual fuel propulsion systems are strongly correlated
- Rules & Regulations (IGF Code consolidated)
- HAZID / HAZOP / Risk assessment
- LNG familiarization: basic / advanced courses, training, propulsion system simulators
THANKS FOR THE ATTENTION

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7500 m$^3$ LNG bunkering vessel