MB05. RESPOND TO EMERGENCIES

BASIC KNOWLEDGE OF EMERGENCY PROCEDURES, INCLUDING EMERGENCY SHUTDOWN

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Content of the lecture

1. **DRILLS AND EMERGENCY EXERCISES (general requirements)**
2. **Emergency procedures and requirements**

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1. **Fire organization and action to be taken on ships subject to the IGF Code**
2. **Special hazards associated with fuel systems and fuel handling on ships subject to the IGF Code**
3. **Firefighting agents and methods used to control and extinguish fires in conjunction with the different fuels found on board ships subject to the IGF Code**
4. **Firefighting system operations**

DRILLS AND EMERGENCY EXERCISES

- Drills and emergency exercises on board shall be conducted at regular intervals.
- gas-related exercises could include for example:

1. tabletop exercise
2. review of fuelling procedures based in the fuel handling manual
3. responses to potential contingences
4. tests of equipment intended for contingency response, like water spray
5. reviews that assigned seafarers are trained to perform assigned duties during fuelling and contingency response

EMERGENCY PROCEDURES/REQUIREMENTS

(cont.1/7)

EMERGENCY PLAN

The plan should be directed at achieving the following aims:

- Rescuing and treating casualties
- Safeguarding others
- Minimizing damage to property and the environment
- Bringing the incident under control

EMERGENCY PROCEDURES/REQUIREMENTS

(cont.2/7)

ALARM PROCEDURES

1. Fire-fighting plans and muster lists should be prominently displayed and sign by all personnel
2. Guide in case of LNG fire should cover the following:
   - Raise the fire alarm
   - Assess the fire's source
   - Implement suitable emergency plan
   - Stop the spread of the fire by isolating the source of fuel
   - Cool down surfaces under radiation or flame with water
   - Extinguish the fire with appropriate equipment

FIRE ORGANIZATION AND ACTION TO BE TAKEN ON SHIPS SUBJECT TO THE IGF CODE

EMERGENCY ORGANIZATIONAL STRUCTURE:

(cont.3/7)

1. Emergency Command Centre
2. Emergency Party
3. Back-up Emergency Party
4. Engineers Group

EMERGENCY PROCEDURES/REQUIREMENTS

(cont.4/7)

EMERGENCY ORGANIZATIONAL STRUCTURE

1) Emergency Command Centre, should:

- In a port be established in the Cargo Control Room
- The senior officer in control of the emergency, supported by another officer and a crew member acting as a messenger
- Communication maintained by portable radio or telephone

EMERGENCY PROCEDURES/REQUIREMENTS

(cont.5/7)

2) Emergency Party, should:

- Pre-designated group
- The first team sent to the scene and reports to the Emergency Command Centre on the extent of the incident
- Recommends the action to be taken and the assistance required
- The Party is under the control of a senior officer and comprises officers and other suitable personnel trained to deal with rescue or fire-fighting

EMERGENCY PROCEDURES/REQUIREMENTS
(cont.6/7)

3) Back-up Emergency Party, should:

- Assist the Emergency Party under the direction of the Emergency Command Centre
- Led by an officer and comprises selected personnel

EMERGENCY ORGANIZATIONAL STRUCTURE
(cont.7/7)

4. Engineers Group, should:
   - Act under the leadership of the chief engineer
   - Responsible for dealing with an emergency in the main machinery spaces
   - Provides emergency engineering assistance as directed by the **Emergency Command Centre**

FIRE AND EMERGENCY BREAKAWAY

- All cargo/bunker operations must be stopped
- Emergency signals must be sounded as agreed
- All ship's personnel should be removed from manifold area
- Detailed ship and shore emergency procedures will be started
- From ashore ESD system will be activated
- Ship/Shore IMO water spray system will be activated in case of fire
- Fire parties will attempt to start commence firefighting actions
- Vessel must depart from the berth with pilot/tugs or other support
- All interested parties should be informed

EMERGENCY SHUTDOWN (ESD) SYSTEM
(cont.1/3)

- ESD (Emergency Shutdown System)
- Requirement of the IMO code and recommendation of SIGTTO
- ESD is fitted to protect the ship and the terminal in the event of cryogenic or fire risk, on the ship or at the terminal
- ESD system is fitted to shut down the pumps, gas compressors, manifold and ship-side valves to stop the flow of LNG and vapor

EMERGENCY SHUTDOWN (ESD) SYSTEM
(cont.2/3)

THE GUIDING RULES FOR LIMITING PRESSURE SURGE ON LOADING OR DISCHARGING ARE:

(1) To stop the cargo/bunker pump

(2) First close the ESD valve nearest to the pump

(3) Finally, close other ESD valves

EMERGENCY SHUTDOWN (ESD) SYSTEM
(cont.3/3)

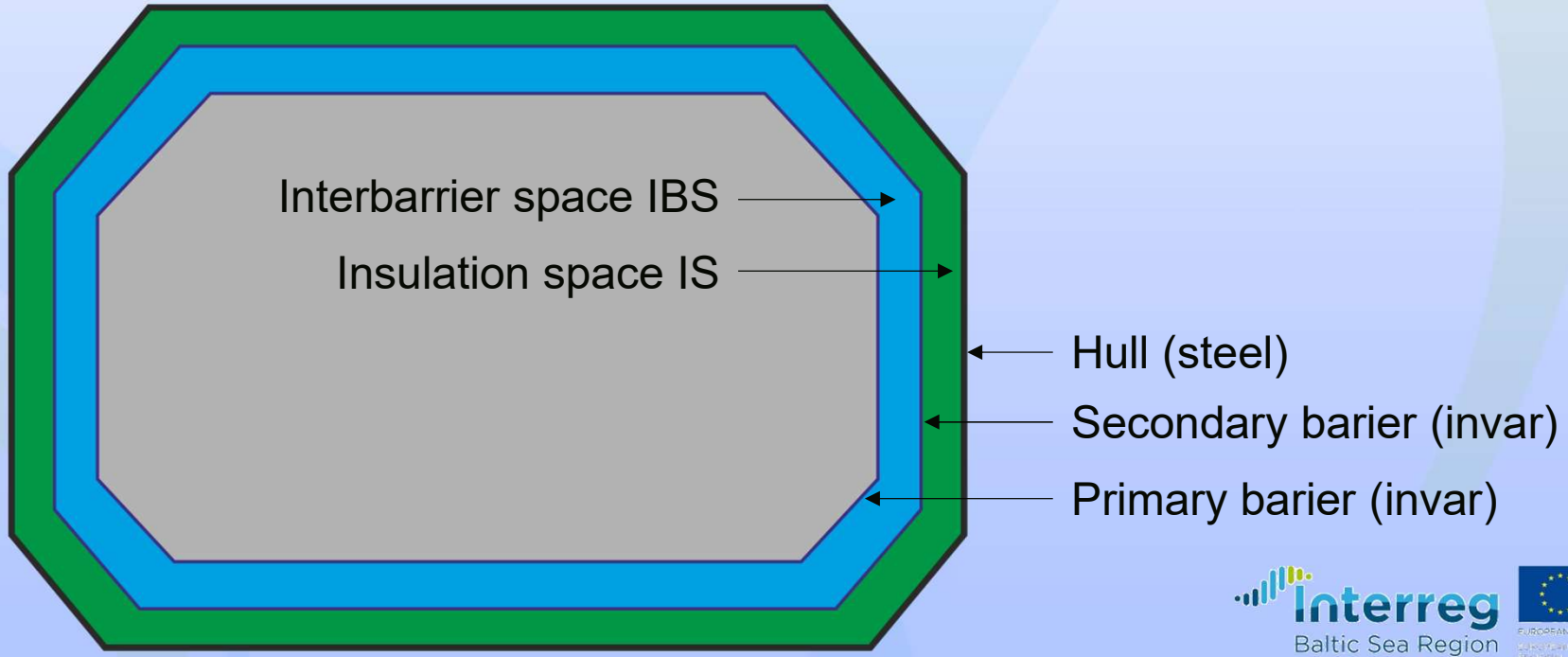
ESDs may be split into various groups:

1. ESD system at the manifold area
2. ESD system at the cargo/bunker tanks
3. ESD system at the gas heater
4. ESD in Cargo machinery room
5. ESD in Electric motor room

LNG VAPOUR LEAKAGE TO BARRIER

(cont.1/5)

- IBS and IS barrier spaces continuously swept with N_2
- Detection of vapor leakage by gas sampling analyzer



LNG VAPOUR LEAKAGE TO BARRIER

(cont.2/5)

POSSIBLE LEAKAGE INDICATORS:

1. A sudden rise in the percentage of methane vapor in one primary insulation space
2. Steady increase of vapor concentration when fracture is below the liquid level
3. Fluctuating increase of concentration when the fracture is above the liquid level

LNG VAPOUR LEAKAGE TO BARRIER

(cont.3/5)

LEAKAGE OF METHANE VAPOUR-DETERMINING THE RISK

Maintain continuous record all pressure changes occurring in the bunker tank and primary insulation space and additionally:

1. No change of flow of N_2 to the primary insulation space > record hourly for 8 hrs: gas concentration and temperature

2. Adjust N_2 to maintain gas concentration below 30% (vol) > record every 4 hrs: gas concentration and temperature

LNG LIQUID LEAKAGE TO BARRIER

(cont.4/5)

LNG LIQUID LEAKAGE TO PRIMARY BARRIER (MEMBRANE) indicators:

1. A rapid increase in the methane content of the affected space
2. A rise in pressure in the primary insulation space
3. Low temperature alarms at all temperature sensors
4. A general lowering of inner hull steel temperatures

WATER LEAKAGE TO BARRIER (cont.5/5)

- The pressure differential caused by the head of water building up in the insulation space may be sufficient to deform or even collapse the membrane into the tank
- Each tank insulation space is provided with water detection units
- A bilge piping system is used for the removal of any water

- Thank you for your attention