PT. LINTECH DUTA PRATAMA

DELIVER HIGH QUALITY EPFC PROJECT SAFELY

Business fields: MINING, INDUSTRIAL AND CHEMICAL PLANT, OIL AND GAS PLANT ONSHORE AND OFFSHORE, MARINE AND SHIP REPAIR

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LINTECH in SELF PROPELLED 20,000 cbm LNG TRANSPORT

Liquefied Natural Gas (LNG) ships are crucial in the global energy supply chain, facilitating the efficient and safe transportation of LNG across vast distances. These specialized vessels are designed to maintain the cryogenic temperature of the natural gas, ensuring it remains in a liquid state during transit.

LINTECH has designed a **SELF-PROPELLED LNG TRANSPORT**, with a cargo capacity of 20,000 CBM in type C bi-lobe cargo tanks, semi-pressurized and fully refrigerated, membrane tanks for optimized space utilization

3D Model SELF-PROPELLED LNG TRANSPORT 20k CBM

CONCEPTUAL DESIGN & GENERAL ARRANGEMENT

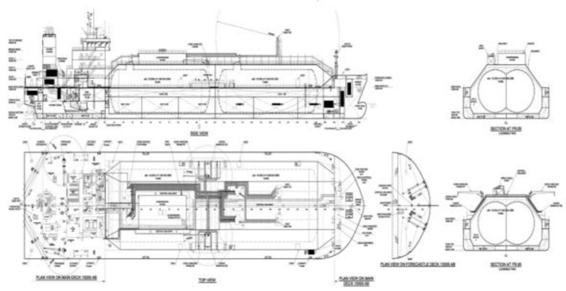
LINTECH Develop a General Arrangement (GA) drawing showing: Hull dimensions (length, beam, draft), LNG cargo tank placement, Engine room and propulsion system layout, Crew accommodation and bridge location.

Principal Dimensions

Length o.a.	140.00 m
Length p.p.	132.70 m
Breadth mld.	35.00 m
Depth at side mld.	10.00 m
Depth at CL mld.	10.30 m
Draught, summer	5.00 m
Deadweight, summer draught	10,927 t

Capacities

Cargo	20,000 cu. m
Marine Diesel Fuel	790.00 t
Lub. Oil	33.00 t
Ballast Water	9,894.00 t
Fresh Water	64.00 t



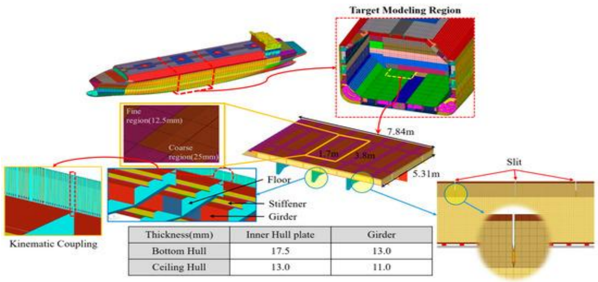
GA Drawing SELF-PROPELLED LNG TRANSPORT 20k CBM

LINTECH DESIGN FEATURE FOR PROPELLED LNG TRANSPORT

-The **vessel's dual-fuel propulsion system** is designed to normally operate on boil-off gas (BOG), whilst having the ability to alternatively run on distillate fuel. As explained, the solution allows the vessel to comply with sulfur emission control area (SECA) restrictions and to manage the amount of BOG during fully laden trips.

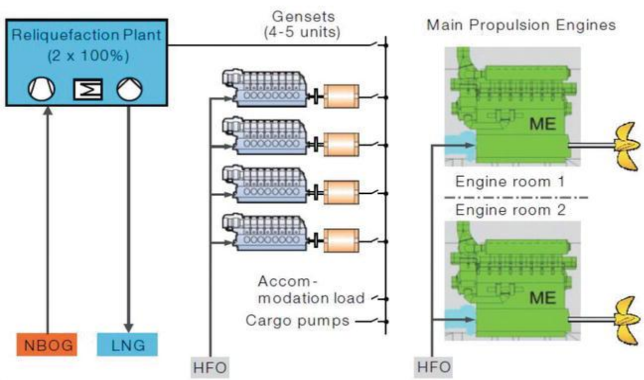
-**Structural Design & Material** Selection

- Choose high-strength steel for hull construction.
- Design double-hull protection for LNG containment.
- Implement reinforced insulation layers to minimize heat ingress.
- Conduct Finite Element Analysis (FEA) to assess structural integrity under external pressure and dynamic loads.



Finite Element Analysis (FEA) to assess structural integrity to calculate both the static and dynamic structural responses

-The **propulsion and power system** of an LNG carrier plays a crucial role in ensuring efficient navigation, fuel economy, and compliance with environmental regulations. **LINTECH** offers a detailed description of the main components and considerations for integrating propulsion and power systems in **self-propelled LNG transport**



Propulsion system dual-fuel

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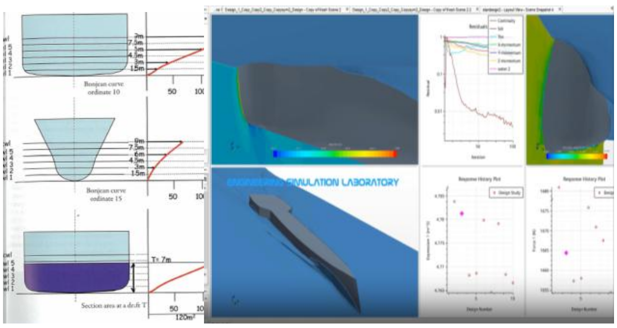
STABILITY & HYDRODYNAMIC ANALYSIS in LNG TRANSPORT

Stability and hydrodynamic analysis are crucial for ensuring the safe and efficient operation of a **self-propelled LNG carrier**. These analyses help optimize the vessel's design for fuel efficiency, maneuverability, and structural integrity under various sea conditions.

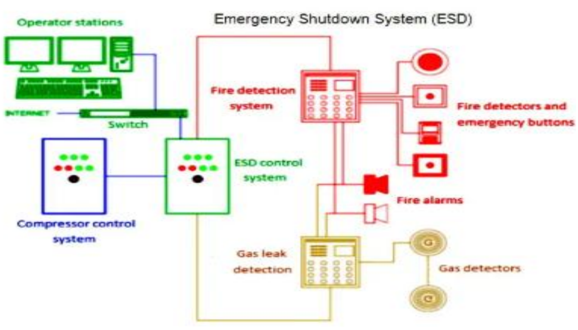
LINTECH conduct Computational Fluid Dynamics (CFD) simulations to optimize hull efficiency, perform seakeeping and maneuverability tests, validate ballast system design for weight distribution and stability.



Stability and Hydrodynamic analysis

LNG CARGO HANDLING & SAFETY SYSTEMS

LINTECH provide design cryogenic piping and vapor return systems, install Emergency Shut Down (ESD) valves for rapid response, implement Boil-Off Gas (BOG) management to utilize excess gas as fuel, ensure compliance with IGF Code (International Code of Safety for Ships using Gases or other Low-flashpoint Fuels

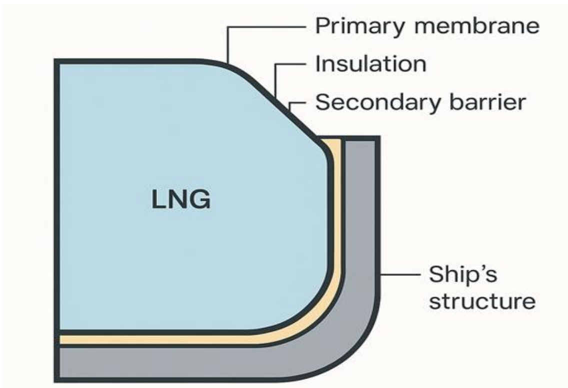


ESD System

SRUCTURE of MEMBRANE LNG TANKS in LNG TRANSPORT

LINTECH provide the membrane systems in the cargo containment systems that use thin, flexible membranes and insulation to keep the LNG at cryogenic temperatures (-163 °C) and prevent leakage.

Advantages of Membrane Tanks in LNG transport are high cargo volume efficiency and optimized space usage compared to moss-type tanks, better ship stability for tank structure integrates closely with the hull, improving balance, lower weight and construction cost compared to spherical tanks for similar capacity, flexibility in tank shape because the membrane system can conform to the hull's shape, maximizing cargo capacity.



Main Components of a Membrane Tank System

1. Primary Membrane
The inner layer directly in contact with LNG. Made of Invar (an iron-nickel alloy) known for low thermal expansion at cryogenic temperatures (~-162 °C). Its main role is to contain the LNG without leakage.

2. Primary Insulation Layer
Located directly behind the primary membrane. Maintains LNG at cryogenic temperature and provides thermal insulation. Typically made of polyurethane foam or reinforced foam blocks arranged in modular panels.

3. Secondary Barrier
A backup containment system in case the primary membrane fails. Can be a thin metal or composite layer embedded within the insulation.

4. Secondary Insulation Layer
Positioned between the secondary barrier and the ship's inner hull. Further reduces heat ingress and protects the ship's steel structure from cryogenic temperatures.

5. Inner Hull (Ship's Structure)
The load-bearing structure that supports the weight and pressure of the LNG and tank system. The membrane system is integrated with the hull so that the ship's structure carries all mechanical loads.