GBS
LNG BUNKERING SOLUTION
LNG, fuel of the future

Regulations on ship emissions (SOx, NOx, CO₂, etc.), along with associated reputation issues and the liberalisation of the market confirm the bright future of LNG as a marine fuel.

To support the growth in LNG demand and assist the maritime industry in the energy transition of its fleet, the market requires a dedicated network of infrastructures accessible worldwide. The bunker station is a key part of the LNG supply chain.

The gravity-based system (GBS) developed by ACCIONA and GTT

The LNG bunker station, which uses a Gravity-Based System (GBS) fully fits into the LNG supply chain. Built by ACCIONA, it consists of a concrete caisson equipped with a membrane containment system designed by GTT. On its upper part, equipment and pipes allow a safe handling and management of the LNG.

The station can be installed in ports as well as in remote areas, without the need for additional infrastructure. The caisson acts as a quay. With the addition of dedicated equipment, it allows the mooring of all types of ships, such as supply vessels (small LNG tankers) and commercial vessels running on LNG (container ships, ferries, etc.). Moreover, it can be connected directly to the gas distribution network.

An adapted solution

1. GBS integrated in the quay, allowing bunkering during the loading and unloading of passengers or goods
2. LNG distribution by bunkering vessels
3. GBS suited to the bunkering of LNG-fueled ships
4. GBS connected to the gas distribution grid
5. GBS at dock combined with a truck loading station
6. Several caissons can be combined for increased storage capacity

The station comprises all of the equipment required for the bunkering activities, including a REACH₄™ loading arm.

REACH₄™: Refueling Equipment Arm, Methane [CH₄] solution fully developed by GTT.

Examples of stations configuration

GBS platform of 8000 m³ designed by GTT and ACCIONA
GTT membrane inside the tank
Piping on top of the caisson
The gravity-based bunkering solution of ACCIONA and GTT offers:

- **a high safety level**
  The design of the station is based on the separation of functions as well as proven, reliable components and equipment. It combines the structural resistance of concrete with the insulating performance and tightness of membrane containment. Moreover, thanks to storage under atmospheric pressure the explosion risk (bleve) is limited, thereby ensuring the highest possible safety level.

- **simplified, optimised construction**
  The bunker station is built outside the port in a dry dock or floating dock. It is then towed to its operational location where it is ballasted to ensure its optimum stability. This “Plug and Play” design limits the impacts of the station’s construction on the operator’s port activities.

- **flexible design**
  The design of the GBS station adapts to environmental conditions, port size and the required LNG volume for the ships’ bunkering needs. In the event of growth in market demand, several caissons can be combined. Designed to be totally self-powered, the station’s operational requirements are covered by the use of natural Boil-Off Gas (nBOG) which is transformed into electricity. The non-used nBOG is re-liquefied then re-injected into the tank.

- **cost reduction**
  The bunker station offers significant cost savings compared to other solutions, in particular through its integrated quay and the use of standardised components and equipment. Its compact size also helps to reduce costs.

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**Typical Bunker GBS**

- **Bunker:**
  - Length: about 60 m
  - Width: about 29 m
  - Height: about 21 m

- **Tank:**
  - Useul 8,000 m³
  - Draft: about 14 m
  - Tide: about 5 m
  - GTT membrane technology
industrial partnership

Since the signing of the license agreement between ACCIONA and GTT in 2013, the two companies have been working together to offer LNG storage solutions for all associated supply chain requirements: small and large-capacity land-based tanks, LNG bunker stations, etc.