



MEGA-FLOAT

Very Large Floating Structures

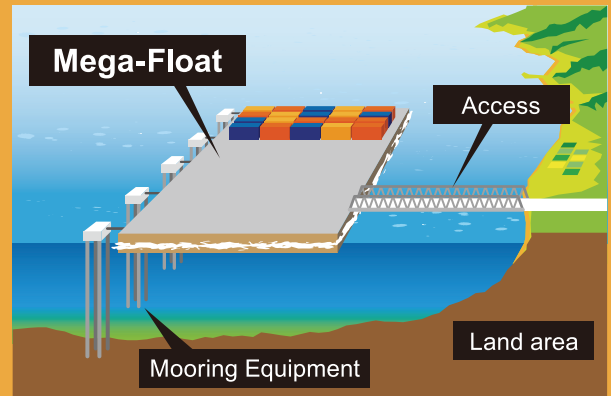


What is Mega-Float?

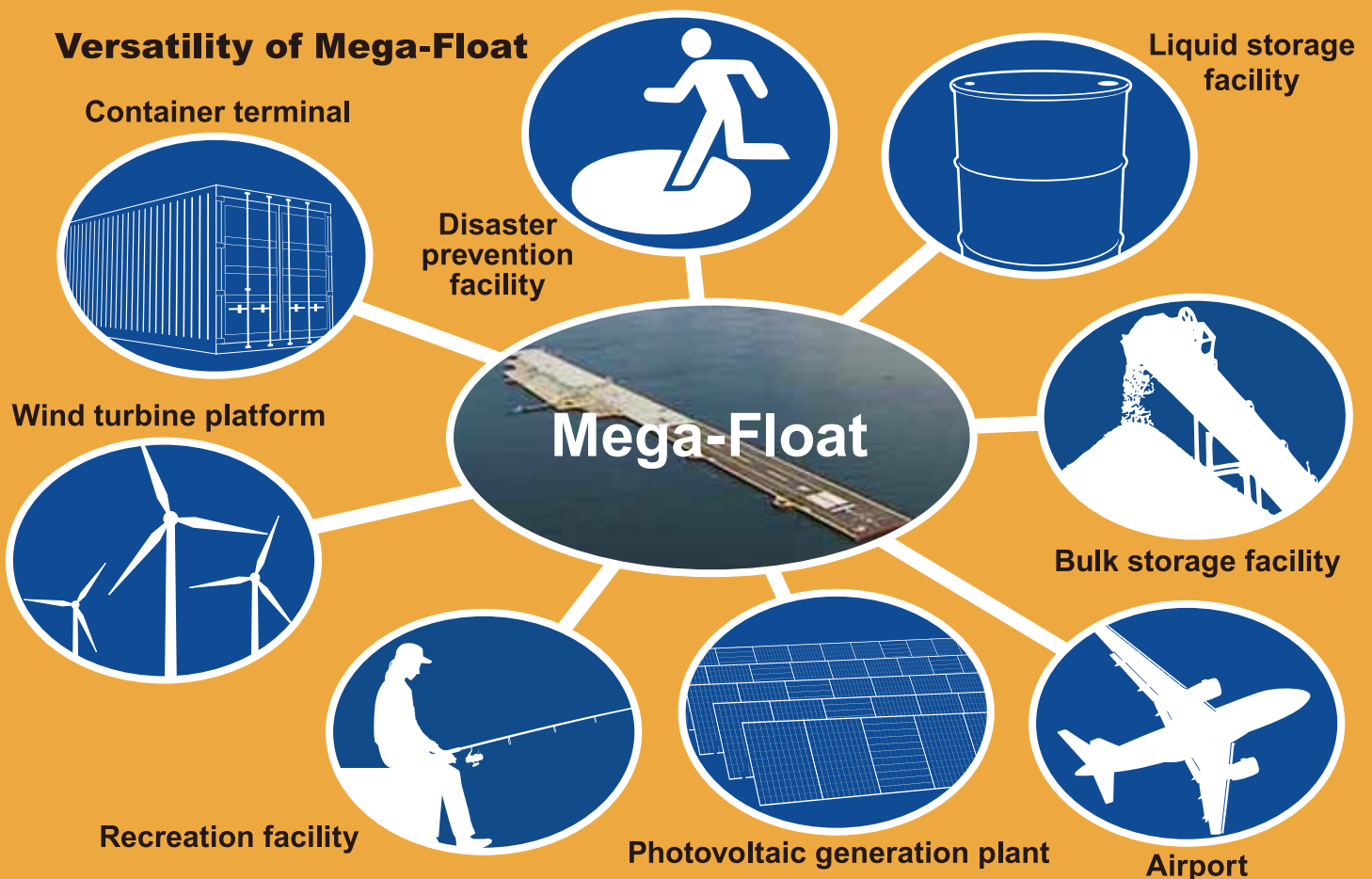
Mega-Float is an artificial very large floating structure on the ocean, consisting of steel units welded together to the requested dimension and configuration. It can be easily connected to land with an access bridge, and installation varies from the inner bay to the high seas. In installing this construction, investigation of hydrographic phenomena (e.g. current) and assessment on the marine environment are required not to have negative effects on the marine ecosystem.

With Japan's renown in welding unit and environmental impact assessment technology, Mega-Float can be applied to multipurpose facilities at underutilized ocean space.

Basic concept of Mega-Float



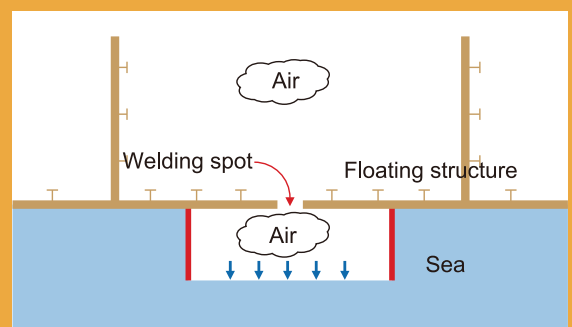
Versatility of Mega-Float



Advantages of Mega-Float

Mega-Float's strong advantages are shown when it is put into places where there exists

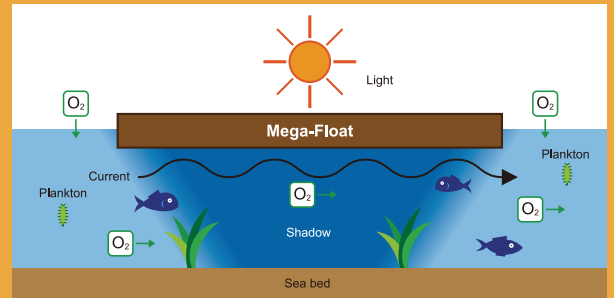
- A need to construct facilities on soft ground
- Shallow water with difficulties in docking at ports
- Deepwater pier
- High tidal variation- A need of earthquake-proofing
- Future possibility of removal
- A need to not impact the tide



Welding technology on the sea

One-of-a-kind technology of Mega-Float in Japan

- Designing floating structures with strength against wind/wave impact and storms
- Welding floating structures in artificial dry condition on the sea
- Securing ultra-long durability of floating structures
- Guaranteeing operational functions of facilities on floating structures
- Environmental assessment to minimize impact



Small impact to environment

Characteristics of Mega-Float

- Users can enjoy high design flexibility
- Units are constructed in a short period with existing shipbuilding technology
- Highly adaptable to diverse weather, sea conditions and earthquakes
- Showing affinity with marine eco-system
- Relatively low construction costs with long durability

Multipurpose utilization

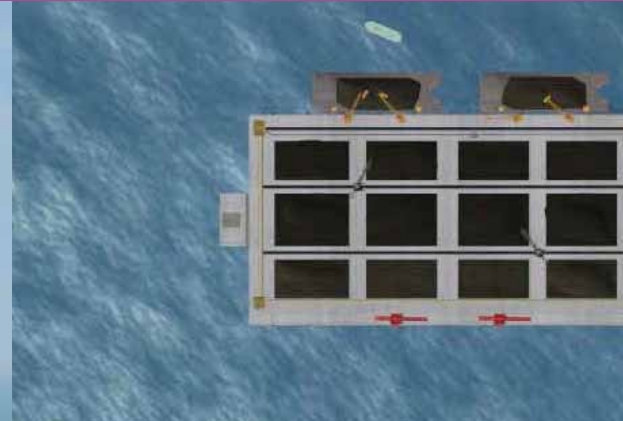
Process of Construction



Mega-Float as bulk storage

Mega-Float can be used as large-scale offshore facility to store/handle bulk especially when topography is too shallow to construct large-scale ports.

Mega-Float can correspond to increasing domestic demand and enables reduction of demurrage with the usage of both loading / unloading broadsides.



<Issues>

- Necessity of time adjustment between barge and large vessel on the sea (arrival and cargo handling)
- Low efficiency of coal transshipment by ship-to-ship
- Collision risk between barge and coal vessel when berthing, etc.

<Improvement with installation of “Mega-Float”>

Unloading from/Loading to the barge

Storage/Blending area

Example of Coal export <Current situation>

Mining



Storage and blending



Transportation by dump truck from mine to stockpile



<Advantages of installing Mega-Float>

- Large coal vessel can call at stock yard in shallow waters.
- Barge and large vessels can load or unload regardless of each other's schedule.
- Limitation of meteorological hydrographic conditions can be relaxed in ship-to-ship transshipment, etc.

The introduction of Mega-Float is one solution to these issues.



Loading to/Unloading from large vessel



Transportation by barge from stockyard to sea

Alongside large coal vessel



Transshipment by ship-to-ship on the sea

Mega-Float as liquid storage

Necessity of Mega-Float for oil stockpiling

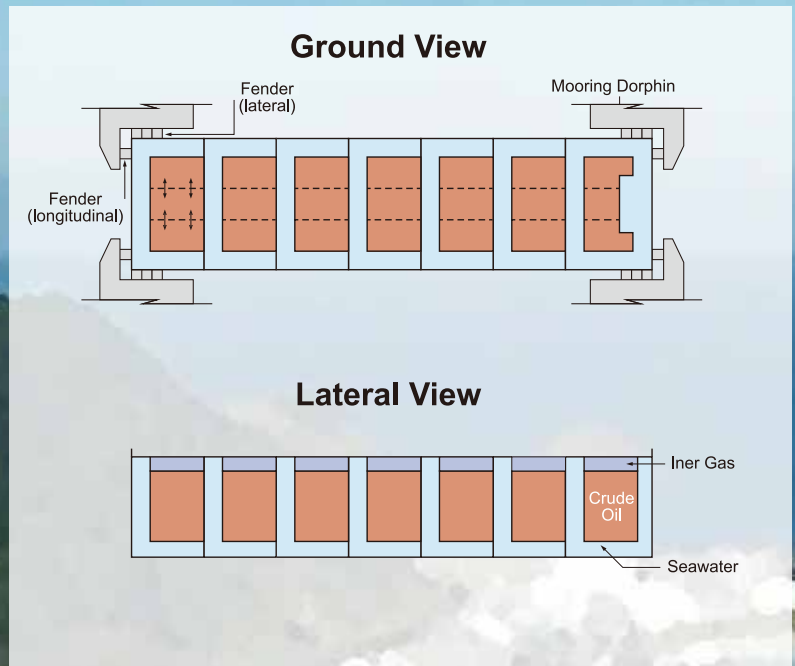
- **Characteristics of oil stockpiling on the sea**

Offshore Mega-Float is hugely attractive as an oil storage together with efficient use of marine space and is environmentally friendly.

- **Offset of energy risk**

There are four types of stockpiling tank systems according to geographical conditions to diversify risks.

- **Aboveground tanks**
- **In-ground tanks**
- **Floating tanks**
- **Underground rock cavern tanks**



IEA (International Energy Agency) requirement

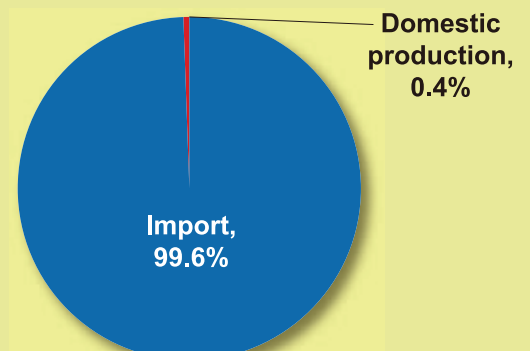
Requires member states to hold oil reserve criteria equivalent to at least 90 days of net imports as strategic reserve in respective countries.

Securement of locations to stockpile oil reserves is vital for energy security, especially for countries having little land.



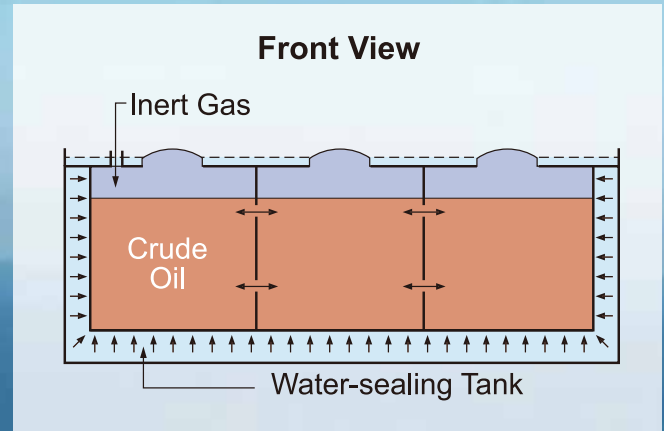
Reference: Liquefied energy dependence in Japan

Since Japan has been dependent on oil and natural gas production through imports of nearly 100%, liquefied energy storage is regarded as an indispensable measure to provide stable supply especially in the case of emergency.



Measures for safety and environment

- Oil spill prevention
 - Water sealing tank
 - Primary oil-intercepting bank
 - Breakwater
- Fire and explosion prevention
 - Inter gas filled in void space
 - Fire fighting equipment such as sprinklers and fixed foam spray guns
- Natural environment protection
 - Oil-containing drain treatment system
 - Impurity decomposition system
 - Floating object filtering system
 - Oil-containing drain filtering system using activated charcoal



Japan's Peculiar Oil storage on Mega-Float

Japan's experience of constructing and maintaining oil storages at Kyushu's offshore area can be applied to other nation's offshore with highly skilled welding technology of steel units on the sea.

Kamigoto National Petroleum Stockpiling Base



Constructed in 1988
 Stockpile capacity: 4,400,000 kl
 (Five unit storage of 880,000 kl each)
 - Length: 390 m
 - Width: 97 m
 - Height: 27.6 m

Shirashima National Petroleum Stockpiling Base

Constructed in 1988
 Stockpile capacity: 4,400,000 kl
 (Five unit storage of 880,000 kl each)
 - Length: 390 m
 - Width: 97 m
 - Height: 27.6 m



Actual Construction

Site: Off Yokosuka (Tokyo Bay)

Year: 1999

Size of Mega-Float:

- Length : 1,000 m (approx. 7.8 ft)
- Breadth : approx. 120 m (approx. 390 ft)
- Height : 3 m (approx. 9.8 ft)
- Area : approx. 80,000 m² (approx. 19.7 acres)
- Durability : 100years

Construction period : approx. 1 year (incl. mooring facilities)

Landing/take off experiment



Reuse

Stockpiling for Emergency



Muroran, Japan

Marine Recreation



Shimizu, Japan

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