EXPANDED INFORMATION. PROJECT*3*.

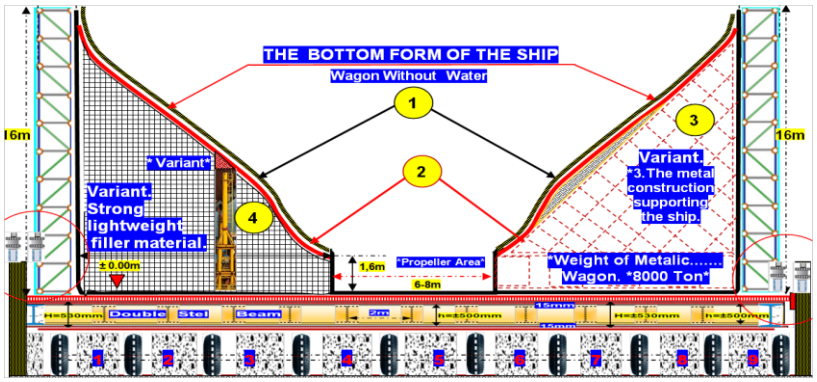
❖ SHIP VOYAG SEA-LAND-SEA.

THE JOURNEY OF SHIPS ON RUNWAYS OR HIGHWAYS.

THE JOURNEY OF SHIPS ON RAILWAY TRACKS.

Information about the Transport Vagon and the Submarine Station:

1. The engineering project of ship travel on the motorway and railway route is presented for the first time. As with any new concept or project in the technical field, it is not easily understood.
2. The concept does not envision that a ship 300-400 meters long and 32-45 meters wide, with a weight of 100,000 tons, can calmly be lowered onto the transport tug.
3. The transport wagon is an open metal structure but with a rigid platform floor. On it, a bed is constructed that will support the ship. the travel route.
4. Road transport tugs, which are rubber-tired, are 60 meters long, while the ship's transport tug consists of *X* sections, each *X* meters long.
5. Below are two transversal sections. On the left is the transversal section of a ship in the process of construction in the Dry Docks of a naval yard. The ship transporter also has the shape or structure of a Dry Dock, but it moves by the force of electromagnetic motors, etc.
6. The supporting bed of the ship (on the transport wagon) is built with lightweight materials.
7. The vibrations or oscillations on the ship's transport tug are much smaller than those experienced during maritime navigation.



On the left side, the cross-section of a shipbuilding yard is shown. The shipbuilding or repair yards are also Dry Docks. They are usually built with reinforced concrete walls. On the right side, the cross-section of the ship's Transport Wagon on the highway is shown.The bed of the Transport Wagon is the same as the bottom of the ship, because the ship in the Underwater Station will be lowered and supported on the bed of the Transport Wagon.

8. Waterways Engineers has designed a simple hydraulic structure that enables the positioning of the vessel on the Transporter Wagon and the lowering of the vessel onto the bed of the Transporter Wagon within 10-20 minutes, by lowering the water level through communicating vessels, without the use of pumps.
9. The project foresees an experiment at a 1:10 scale for testing the functionality of the Underwater Station. The goal of the experiment is to simulate the entire process: the entry of the vessel from open sea into the Underwater Station, positioning the vessel on the Transporter Wagon, lowering the vessel onto the bed of the Transporter Wagon, and the exit of the vessel from the Underwater Station onto the highway route.
10. The Underwater Station is designed as a type of pool with a maximum width of 7.5 m, a sloped floor, a maximum depth of h = 0-2.5 m, and a maximum length of 200 m. The experiment can be conducted at various scales. The Underwater Station resembles a miniaturized hydraulic laboratory. Control of the electromechanical and electromagnetic indicators can be carried out in specialized laboratories

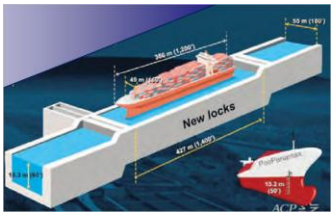
PROJECT-3- **"A NEW MOVEMENT FOR THE TRAVEL OF POPLE AND THE TRASPORT OF GOODS."**

THE JOURNEY OF SHIPS ON RUNWAYS OR HIGHWAYS
THE JOURNEY OF SHIPS ON RAILWAY TRACKS.

The main objective of the project:

- **The main goal of the project** is for cargo and passenger ships to travel on railway tracks and roadways, like all other vehicles.
- **The travel of ships on land** will transport goods to their destination without the need for unloading (loading-unloading) at seaports, thereby reducing port infrastructure costs.
- **Ship travel on railways and roadways** will cut transportation costs by half and reduce travel time by three times**The speed of ship travel on railways or rail tracks** will initially be 25-36 km/hour or 6.94-10 m/second.
- **In conclusion**, Waterways Engineers have studied and designed a new movement that will change the geography of maritime cargo circulation.

HY HAS THE LAND AND RAIL TRANSIT OF SHIPS ACROSS THE ISTHMUS OF PANAMA BEEN STUDIED?



April 2021-2023. Lake Alhajuela is drying up. It is the main that supplies the Esclusas de Panama with water.

- The land transit project for ships across the Isthmus of Panama has been studied because the Panama Canal depends on the use of fresh water from Gatun Lake, which is becoming scarce due to climate changes. Additionally, the cost and duration of transit are lengthy and expensive. The cost for ships to transit varies from $500,000 to $800,000 per passage, while the duration is about 8-10 hours..
- The new project has studied the land transit of ships for the Old and New Panamax versions. According to calculations, the maximum cost of a transit will be $400,000, while the maximum travel duration will be 3 hours.
- The Pan.Canal, an engineering marvel, was completed in 1914.Today,it facilitates the passage of goods worth around $270 billion annually,representing approximately 6% of global trade.
- Between 2019-2020 and again in 2023-2024, the Panama Canal has faced recurring water crises, worsened by the El Niño phenomenon. Reduced rainfall has led to a significant drop in water levels in Gatun Lake, a crucial water source for the canal's locks. This situation threatens both global trade and Panama's economy. However, proposed solutions, such as building a new reservoir on the Indio River and using cloud-seeding methods to stimulate rainfall, have not provided a definitive solution for the canal's long-term sustainability.
- The engineering marvel of the Panama Canal now belongs to history..Instead, we suggest repurposing its resources. The waters of Gatun Lake and the Anjuelas River could be used to generate electricity, while both the old and new locks, along with Gatun Lake, could serve as attractions for tourist cruises.

PROJECT "3"
EXPANDED INFORMATION

THE JOURNEY OF SHIPS **ON RAILWAY TRACKS .**
ON RUNWAYS OR HIGHWAYS.

Tecnologie

THE JOURNEY OF SHIPS ON RUNWAYS OR HIGHWAYS. (with solid rubber tires)

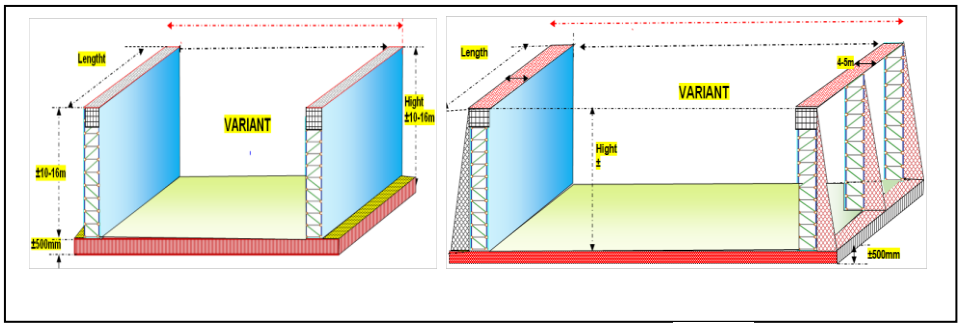
- Ship transport on the highway on the mega transport wagon.
- Ship transport on the highway with chassis and wheels mounted on the ship's structure or on the bottom part of the ship. (For Shiips up to 100 000 Ton)

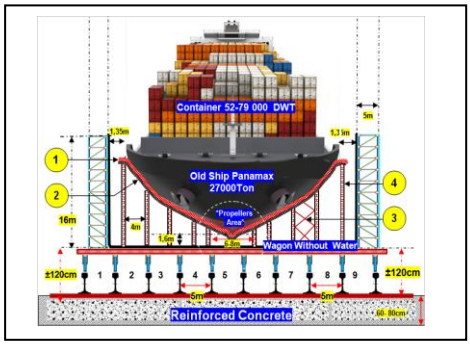
THE JOURNEY OF SHIPS ON RAILWAY TRACKS.

- Ship transport on the railway track on the mega transport wagon...
- Ship transport on the railway track with chassis and wheels mounted on the ship's structure or on the bottom part of the ship.(For Shiips up to 100 000 Ton)

THE MEGA RAILWAY OR ROAD WAGON THAT WILL TRANSPORT SHIPS.

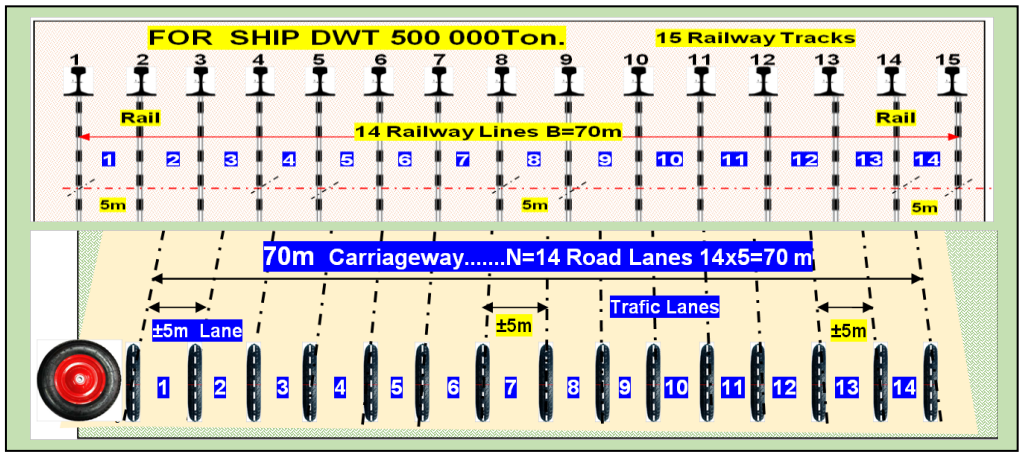
- The railway wagon for transporting Panamax ships relies on a hybrid system 95% of the weight of the transport wagon and ship will travel suspended(1cm)thanks to lift from electromagnetic Maglev forces,while the remaining 5% will be supported by wheels to ensure stability and balance.
- **The use of the Maglev system, Inductrack III model,** is designed to carry heavy loads at low speeds.This design is applied to enable the transportation of ships on railway tracks,highways, or road paths.With a speed of V=25-36 km/h.
- **Cargo ships have maximum dimensions of 400 meters in length, 69 meters in width, and 25 meters in height.** Ships with a deadweight tonnage (DWT) of 100,000 to 500,000 tons can travel on land using the Mega Transport Wagon. This wagon is standardized to be assembled **from 8 parts, which are connected using a hinge system,on either a railway track or a road platform.The Transport Wagon is standardized in lengths of 320m,360m,and 400m.**
- The Transport Wagon is constructed with stainless steel.It is open on all sides.The connection of the Transport Wagon to the ship with flexible ropes is provided through a special design.
- 5. The maximum weight of the transport wagon reaches up to 8% of the ship's total weight. It can transport all categories of ships. In perspective, the chassis and wheels of the transport wagon can be mounted onto the ship's structure or on its lower part. In this version, the weight of the wagon mounted on the ship's structure does not exceed 4%. Initially, this can be done for ships up to 100,000 tons.
- The possibility is not excluded that,in the future,for ships with a DWT of 100,000–500,000 tons, the chassis and wheels of the Trasporter wagon could be mounted on the ship's structure or on the bottom part of the ship.In this variant, the weight of the wagon mounted on the ship's structure does not exceed 4-5%.

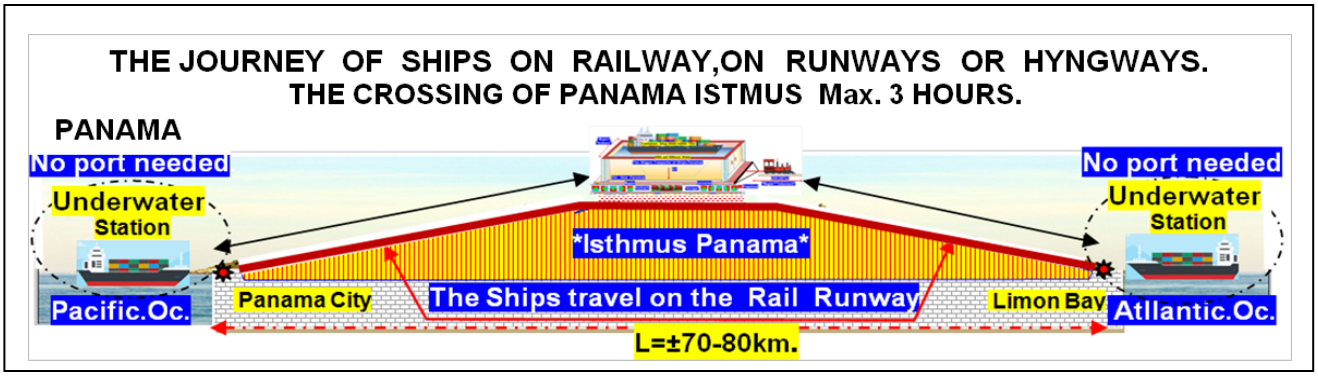




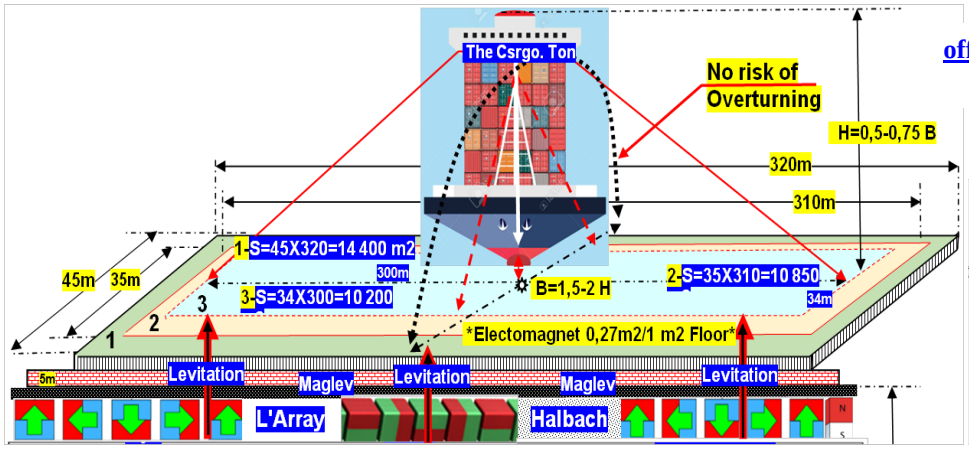
RAILWAY TRACK OR ROADWAY (Highway) FOR SHIP TRAVEL.

- The railway track and roadway or highway, where the ships will travel or move, will have a maximum width of B=70 m, a horizontal radius of ±5 km, a vertical radius of ±2 km, while slopes will follow the standard for flat railways. Structurally, the land-based travel routes will be conventional but calculated according to the geology of the terrain.





- The max. height of the ship,together with the Transport Wagon,does not exceed h=26 m. According to the structural catalog,the width of the ship is 1.5 to 2 times greater than the height of the ship. Practically and theoretically,for a speed of V = ±40 km/h, there is no risk of vibration or overturning during travel. In conclusion, ships on the railway track and road or highway will travel more smoothly and safely than navigating in sea or ocean waters.



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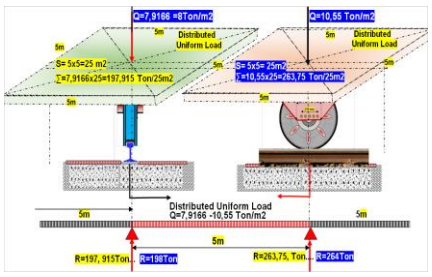


PROJECT"3"

THE UNDERWATER STATION.

EXPANDED INFORMATION

THE LOWERING OF THE SHIP FROM SEA LEVEL,TO THE BED OF THE TRANSPORT WAGON.

THE LOWERING OF THE SHIP FROM SEA LEVEL , TO THE RAILWAY PLATFORM, OR ROAD PLATFORM.

CONSTRUCTIVE AND HYDRO-MARITIME INFORMATION

1. The Underwater Station is the most important hydro-maritime work of the Project.
2. The Underwater Station is a simple hydrotechnical structure.
3. Structurally,the Station resembles a *X* but with a *X*floor.It is formed by two side walls that extend to a maximum marine depth of H=-25m.
4. For Old and New Panamax ,the underwater depth at the Underwater Station must be 16-18m.
5. The Underwater Station is constructed with a maximum width of B=50-75m.
6. The Underwater Station is built to be 3-5 times longer than the ships that will be processed.
7. On the maritime side, the Underwater Station has a gate of the "Horizontal Sliding Gates" type or "Horizontal Sliding Gates Underwater Station."
8. Inside the Underwater Station, there are electrically controlled gates that connect with equilibrium basins or communicating vessels to raise and lower the water level.
9. The Underwater Station's purpose is to lower and lift the ship from the bed of the Transport Wagon when ships use the Transport Wagon to travel on the railway or roadway.
10. Another purpose of the Underwater Station is to lower and lift the ship from the platform of the railway or roadway when ships are not using the Transport Wagon for transport.
11. On the sloped floor of the Underwater Station, there may be 1-3-5 horizontal platforms to process multiple ships at once or to raise and lower several ships simultaneously.
12. Functionally, multiple types of Underwater Stations can be built for all categories of ships. Ships are grouped, and a station may serve one or two groups of ships.
13. Given that the width of the Underwater Station is B=*X*-*X*, several Underwater Stations can be constructed in parallel along the coast. For 500,000 DWT ships, the width reaches B=75m.

INNOVATION IN SHIP LOWERING ONTO THE TRANSPORT WAGON BED OR TRAVEL PLATFORM

1. At the Underwater Station, ship l owering or raising operations are performed.
2. The ship to be processed enters the space of the Underwater Station from the open sea.
3. The horizontal gate, "Horizontal Sliding Underwater Station," is then closed.
4. The water level in the Underwater Station is equal to the water level in the open sea.
5. "The ship, with the help of tugboats, markers, and fixed orientation signs on the inner walls of the Station,as well as the control cameras,is positioned on the horizontal platform of the Underwater Station."
6. TheTransport Wagon is pre-positioned on the concrete receiving platform of the Submarine Station.The maximum height of the floor of the Wagon platform is h = ±120 cm, while the ship's floor is positioned ±1.5-1.75 m above the bed of the Transport Wagon.The bed of the transport wagon is adapted to the bottom shape of the ship.
7. The transfer or lowering of ships from sea level to the bed of the Transport Wagon Highway is done within ±10-15 minutes through the Submarine Station and Communication Vessels.
8. When the ship has wheels mounted on its aft chassis, the lowering onto the concrete platform of the underwater station is easier and takes approximately ±10-15 minutes.

INFORMATION ON THE UNDERWATER STATION AND TRANSPORT WAGON

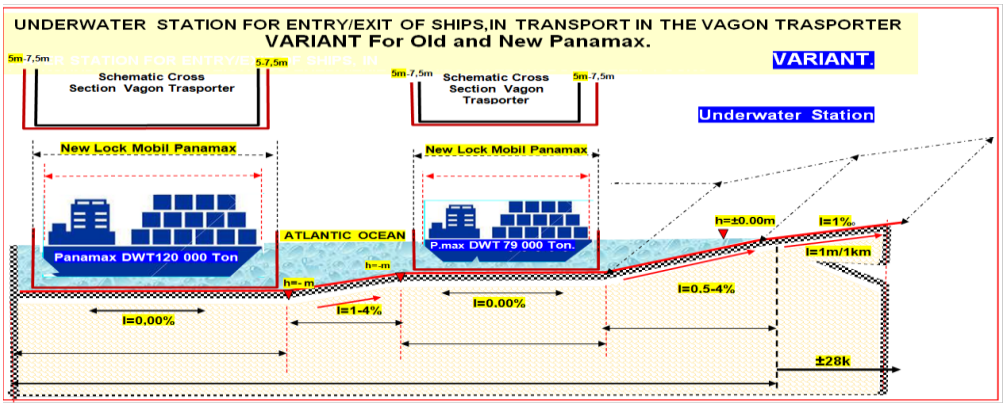
- Lowering or supporting the ship onto the bed of the Transport Wagon is accomplished by controlling the reduction of the water level in the Und./Station through communicating vessels.
- The smooth lowering of the ship onto the Transport Wagon bed, without removing seawater with pumps, constitutes a core innovation of the Underwater Station project.
- In cases where ships are equipped with a chassis and travel wheels (metallic or rubber,such as solid rubber tires),they are lowered directly onto the horizontal platform to Underwater Station.
- For 100,000 DWT ships, the authors recommend that these ships do not use the Transport Wagon. Instead, the chassis and travel wheels should be installed on the ship's body.
- In the project designs, the Transport Wagon is depicted with two gates at both ends. However, the Transport Wagon will actually not have gates; it will be open on both sides. To stabilize the connection between the ship and the Transport Wagon after the ship rests on the wagon bed, **several cross-links can be implemented, as indicated in the design guides.**

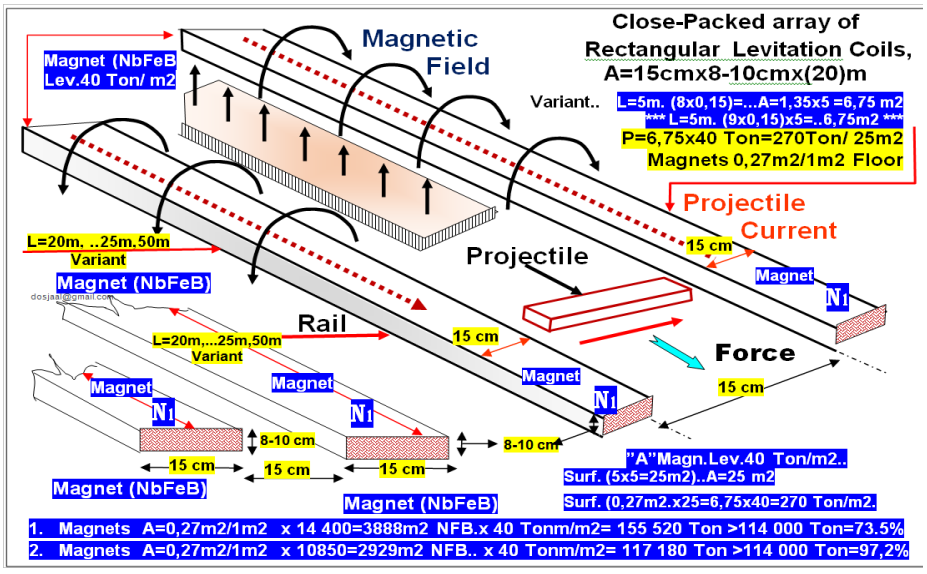
EXIT OF THE SHIP FROM THE UNDERWATER STATION

- The ship's exit from the Underwater Station is facilitated by electric, electromechanical, and electromagnetic motors mounted on the chassis and side walls of the Transport Wagon. After leaving the water, the Inductrack-III-based combined Maglev system is engaged.
- When the chassis and wheels are directly mounted on the ship's structure, the ship's internal engines, along with additional electric motors mounted on the attached chassis, aid in moving out of the Underwater Station.

SHIP TRAVEL ON RAIL OR ROAD TRACK

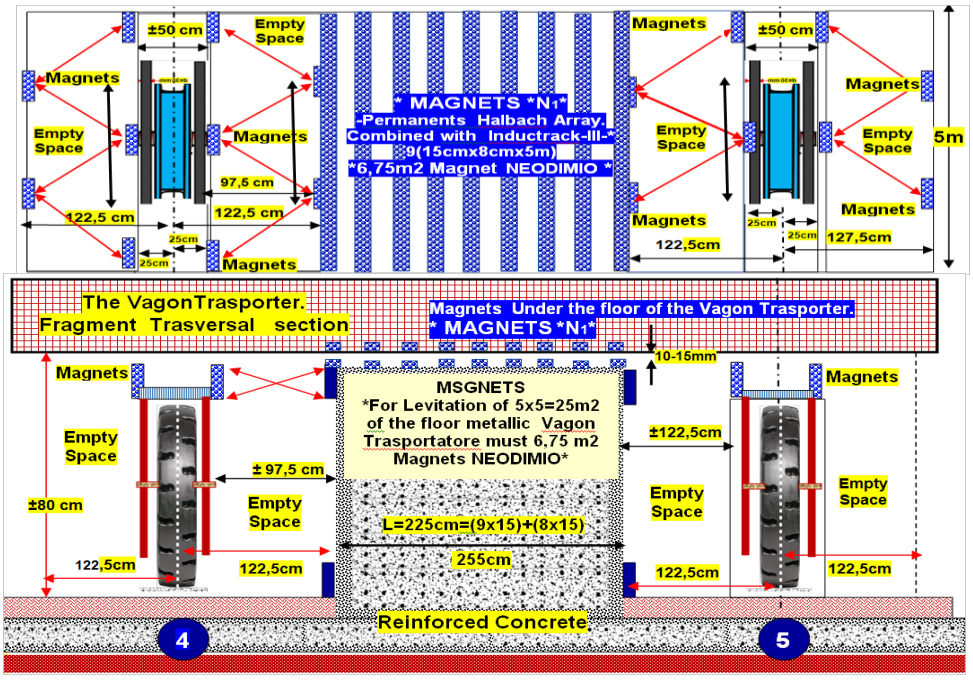
- The ship's travel on the rail or road track is carried out similarly to other vehicles, with the main difference being the large dimensions of the Transport Wagon and the forces required to move the Wagon or Ship.
- The Ship Tr.Wagon,whether for Old Panama or a Self-Propelled Ship,operates on a Hybrid System:96.5% of the combined weight of the Transport Wagon and Ship (110,000 tons) will be suspended10mm above the rails or road track due to the lift generated by elec/magnetic Maglev forces,while the remaining 3.5%(4,000 tons)will rest on wheels to provide stability and balance.
- The primary pulling forces for the ship are generated by NbFeB(neodymium-iron-boron) magnets with a lifting capacity of Af=40 tons/m².In the project, the magnets cover an area of Sm =0.27m² per m² of the ship's floor, resulting in a total lifting capacity of Af=0.27x40 =10.8 tons/m²,while the maximum load on the Transport Wagon floor is P=10.55 tons/m².
- An example layout for positioning the magnetic strips on the rail or road track is provided. The electromagnetic forces are combined with the forces of electric traction motors to facilitate movement.



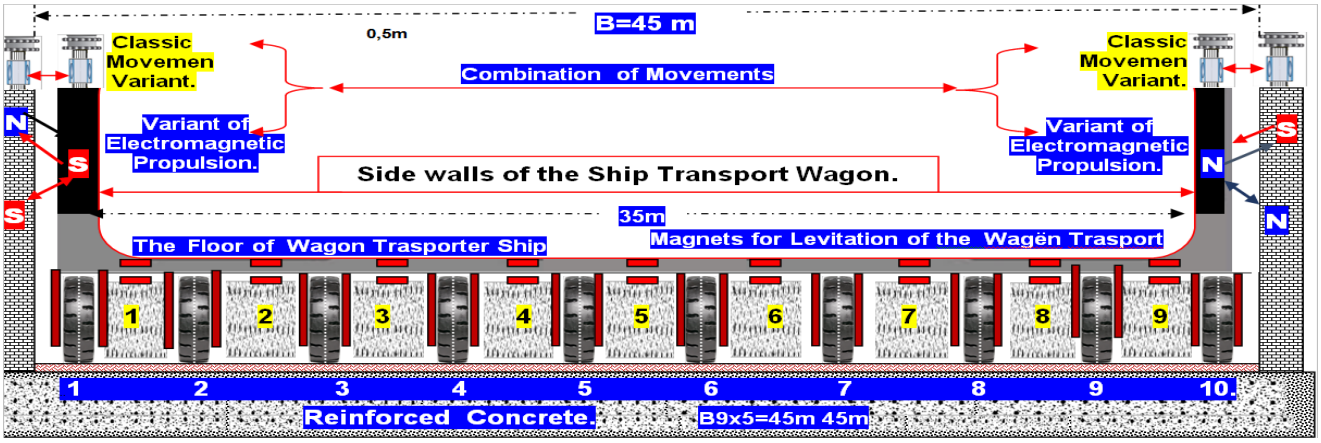


Variant...Inductrack-III Dimensions and placement scheme of passive magnets for lifting the transport wagon of the ship.**

Variant...Inductrack-III View and Cross-Section. Positions of the placement of magnets and electromagnets in a compartment S=(5x5)m.**



Variant...Inductrack-III Cross-sectional View ofthe Ship Transport Wagon, with solid rubber tires.**



PROBLEM:

- Global trade relies heavily on key maritime chokepoints like the Panama Canal, the Strait of Hormuz, the Kra Isthmus in Thailand,the Tehuantepec Isthmus in Mexico,the United Arab Emirates Isthmus,and the Riyadh-Dammam railway inSaudi Arabia. These strategic passages are prone to blockages, delays, and high tariffs, increasing costs for shipping companies.
- The respective governments are considering large-scale projects to build ports or channels on both sides of these continents to bypass these passage points. However, these infrastructures are expensive, disrupt ecosystems, and incur high costs for loading, unloading, and arranging goods.

RAIL AND ROAD TRANSPORT OF SHIPS**

- Transporting ships via railways and highways will transform the geography of sea routes, reducing the cost and time of global trade. The project should be implemented in the Panama Isthmus, Kra Isthmus in Thailand, Tehuantepec Isthmus in Mexico, United Arab Emirates Isthmus, and the Riyadh-Dammam railway in Saudi Arabia, among others.

SOLUTION:

- The ship transport system using an open wagon, open tug system, or a movement system mounted on the chassis or bottom structure of the ship implies a new approach to the circulation of vehicles, goods, and people. Especially ships between 10,000-50,000 tons will experience rapid development. The capability of ships to navigate on both sea and land will inevitably reform the entire sea and land transport system, the shipbuilding industry, and the dual-function vehicles industry.

.TECHNOLOGY... INNOVATION IN INFRASTRUCTURE: The New Ship Transport System.

- The primary innovation in infrastructure is the Rail and Road Ship Transport System, enabling the transport of ships whether loaded or empty.
- Ship Transport Wagon and Maglev System (Inductrack III):** The project's central technological feature is the Ship Transport Wagon, which moves ships along rail or land tracks using a combination of passive electromagnetic induction technology and traditional electric motors. The Mega Transport Wagon employs a combined propulsion system with electric and hybrid gas-electric motors, offering towing capacities from 2000 to 4,000 tons. The project is based on Post, R.F. (1996). *The Inductrack Concept: A New Approach to Magnetic Levitation*, Lawrence Livermore National Laboratory Technical Report, UCRL-ID-124754.
- Maglev Efficiency:** The Inductrack III system, with the Halbach array, provides a lifting capacity (40 tons/m²), allowing the wagon to travel at speeds of 26-36 km/h with low energy consumption. This system does not require superconductors, making it efficient and affordable.
- **End of Journey:** At the end of the rail line, the ship enters an underwater station; the wagon lowers onto the underwater platform, allowing the ship to detach from the transport wagon bed due to water depth forces and sail toward its destination.

KEY BENEFITS OF THE PROJECT.

- Avoiding maritime chokepoints:** Ships can bypass congested routes like the Panama Canal and the Strait of Hormuz, significantly reducing travel time and global transport costs.
- Minimizing port operations.This system eliminates the need for loading and unloading at traditional ports, reducing overall transport time and costs.
- Expanding global trade routes:** By transforming inland regions into major transit hubs, the project enables land-sea trade without exclusive reliance on coastal ports.
- Sustainability:The energy-efficient design and reduced dependency on long sea routes help decrease the environmental impact of global transport.

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