

FLOATING AIRPORT TERMINAL DESIGN - NEW WAY OF THINKING ABOUT FUTURE ARCHITECTURE

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ABSTRACT

Lax relocation is the concept of a futuristic floating island functioning as an airport of the future for the year 2100. The project was placed on the water for a reason, until that time progressive climate change will result in melting of glaciers and rapid water level rise. It will cause lost of urbanized coastal areas, today inhabited by 40% of the population. The potential of floating architecture can be use as one of the methods for adaptation to changing conditions [1]. My goal was to develop a collision - free large passenger airport on limited space such as a floating island. The target location of the futuristic floating island that will serve as passenger airport is the coast of Los Angeles, California, USA. A warm, subtropical climate with only 35 rainy days a year and an average water temperature of 17 degrees. Los Angeles Airport LAX – located on the coast is potentially exposed to flooding in the future due to rising ocean levels. The project of the floating island provides opportunities for relocation or enlargement of the main airport of Los Angeles, protecting against the costs of purchasing land for the construction of new airport functions and new infrastructure, enables implementation of new technologies and innovative ideas to improve passenger aviation [2].

The whole floating structure consists of a platform, drifting above the water level on which a system of runways and taxiways is located, two connected passengers terminal buildings (T1 for arrivals, T2 for departures), hangars, ware houses and smaller communication

elements. The floating island is connected with the mainland by a split – level underwater tunnel carrying cars and a hyperloop station.

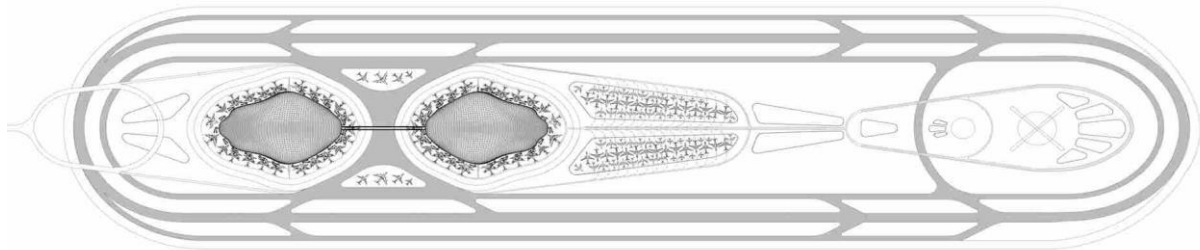


Fig. 1. Floating island layout

The system of combined foundation creates the floating island structural base, it was patented by polish architect and constructor prof. J. Rebielak. The system of combined foundation can be applied for heavily loaded objects located in maritime area, provides the rigidity and stability. Construction is resistant to changes in water level – simply adapts to it [3].

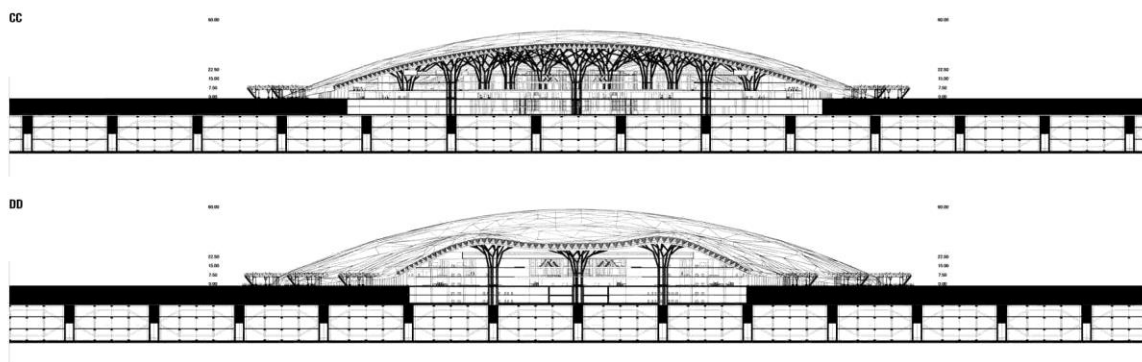


Fig. 2. Floating island cross section

The floating airport covers an area of 485 ha, which compared to LAX airport reduces its area by 65% along with the possibility of serving the same number of passengers. It was possible by stepping out from the form of the traditional airport model and runways layout. New

runways were located along the longer sides of the island, connecting themselves at the end and crossing in the central point creating closed, centralized system for smooth circular aircraft traffic. Airplanes follow clearly defined and tie taxiways, controlled with precision which increase safety and speed up passenger flow up. It is possible to receive up to 75,000,000 million passengers annually.

The terminal building has been divided in to two functionally distinct buildings connected by communication paths: T1 terminal – operating the arrivals and T2 terminal – operating the departures. The purpose of it was to improve the speed of passenger flow, airport procedures and to increase security during epidemiological situations. Isolation is the key during the epidemic, only this new type of dividing can reduce the risk of infection transmission up to 50%. Additionally, isolation covers 4 underground metro lines – 2 of them will be operated only by the arrivals terminal, the remaining 2 will be operated only by the departures terminal. Terminals and 4 hyperloop stations can be subdivided once again, into the international arrivals area, the national arrivals area, the international departures area and the national departures area. Large area of terminals can be changed and extended for additional temperature measurement stations, sanitizing points, strict separated walk paths and information points for passengers [4].

The soft form of the building inspired by nature, filled with modern technology is an optimistic vision of the architecture of the future and the capabilities of more and more creative and advanced engineering possibilities.



Fig. 3. Airport visualization

Function is concentrated around the 4 main pillars of the T-I-M-E system, which reduces the check – in time while maintaining the required control and safety rules [4].

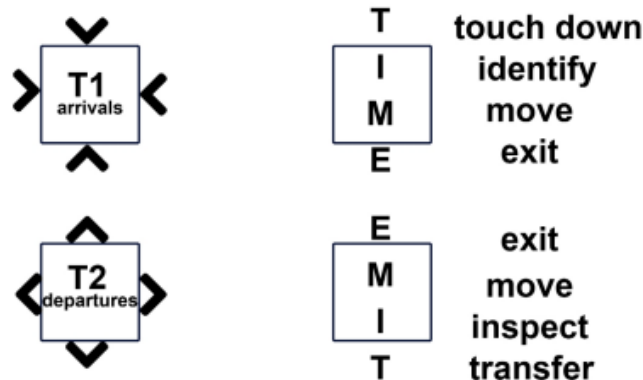


Fig. 4. TIME system scheme

The airport of the future applied innovative ecological regulations. Electricity is obtained by solar panels installed on the vehicle and aircraft hangars's roofs. Traffic control tower has been equipped with a vertical wind turbine providing it wind energy. Beneath the island fields of volute-shaped water turbines were located to convert the power of water movement into energy, also the temperature difference between the water levels at the surface and at the bottom of sea is use to generate power. In addition, terminal buildings cover transmits sunlight lowering the energy consumption needed to illuminate the building. Drinking water is obtained by desalinating sea water, while algae system neutralize and allow for reuse the recovered water e.g. for plants irrigation. The island's waste will not disturb the aquatic environment. These hybrid solutions increase island's energy efficiency [5].

The project also include additional space for individual biomass production from marine algae. Algae absorb carbondioxide and sunlight growing they are excreting oil, probably this oil will be used for vehicle fueling. At the moment, these innovative ideas are in the research stage but it is possible that in the future it will be the main source of energy for flying machines.

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