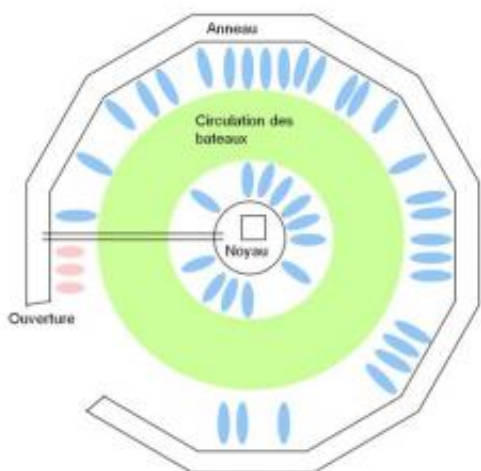


A floating port for docking boats offshore (w/ Video)

July 2 2012, By Sandy Evangelista



Moorage space is becoming increasingly rare in the ports along Lake Geneva. An EPFL student is working on an alternative that provides additional mooring spots without overcrowding the lakefront.

Just a stone's throw from the shore, a hundred pleasure boats can be docked on a 116-meter diameter floating circular ring. This invention, the result of an interdisciplinary Master's degree project, will surely be of interest to lakefront communities whose harbors have ridiculously long waiting lists for moorage space. As part of her project, Civil

Engineering Masters' student Morgane Ugo also built a model that she immersed and tested in a wave basin.

Finding a spot to dock a boat is complicated, particularly along the shores of Lake Geneva. Boat traffic is heavy, and the number of [ports](#) cannot be increased. EPFL's Hydraulic Construction Laboratory (LCH) and Metallic Constructions Laboratory (ICOM) worked together on this project. Ugo revealed the scope of the problem in her preliminary study: "I telephoned many ports along the lakefront to inquire as to their capacity. In Morges' three ports, for example, there are 1,400 people on the waiting list, with an average waiting period of 10 years."

Docking offshore

The proposed solution is to place a floating dock less than 50 meters from shore. This new structure has never been studied, which is what motivated Ugo. "You can find literature on boats or floating dikes attached to solid structures, but no one has yet worked on a totally separate element."

The structure is designed to be built in sheet metal, outfitted with a 4m tall, 6m long tanks for flotation. "We also installed a kind of underwater skirt to attenuate wave effects, to both protect the boats as well as provide stability to the entire structure."

Lessons learned from Expo '02

"We had acquired quite a bit of experience working on Jean Nouvel's monolith for the Expo '02," explains LCH director Anton Schleiss. "In particular, we had to ensure that the structure could easily absorb wave motion so that visitors wouldn't feel queasy. In addition to this, it was also essential to ensure the stability of the floating structure even if everyone decided to pile up in one corner of it."

As part of her Master's project, Ugo had to confront this same issue. She, too, had to come up with a way to stiffen the structure in order to maintain its monolithic character. The floating dock, however, is able to bend under the effect of waves, because its ring-like structure is much thinner and thus less solid than Nouvel's Expo '02 cube in Morat.

Under the waves

For her Master's project, Ugo built a 1/50-scale model and immersed it in a wave basin. She then analyzed the movements of the [structure](#) using infrared sensors. "I thought about putting the port off shore near several actual cities. To determine the waves the ring would be exposed to, as well as its orientation and opening, I studied the winds for the areas in question, taking into account their distance and duration. This allowed me to take advantage of statistical studies for the tests." In Geneva, the wind and the bise must be considered, which can give rise to large waves. Ugo subjected her wave-basin model to waves that would correspond to 1m50 waves in reality.

Provided by Ecole Polytechnique Federale de Lausanne

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