NOTE

LORIENT FLUME TANK

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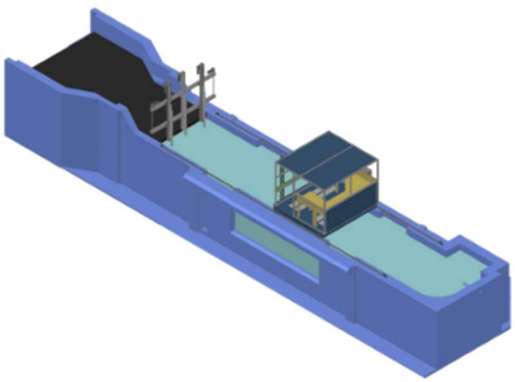
The Lorient flume tank is an hydrodynamic facility available for any qualification and observation of submerged objects in still or moving water. It is a closed loop circulating tank filled with fresh water. The fluid is moved with a 70 kW pump-motor with a velocity between 0 and 1 m/s and homogenized with a series of pressure drop systems.

The overall dimensions are 24.50 m long, 7.50m wide and 3.30 m high. The part where experiments can be set up is 12m long, 2.6 m wide and 1.5 m deep. A mobile bottom belt can be synchronized with the water flow velocity and enables to simulate the seabed velocity relatively to a towed object. The overall process of the facility is controlled by a user friendly interface.

Lorient flume tank history

The first French flume tank dedicated to fishing science was built in Boulogne sur Mer in the north of France in 1967. Many professionals involved in the fishing industry understood the benefits of such a tool. A study was then launched by the Chamber of Commerce and Industry of Morbihan in 1971 using the feedback of the Boulogne sur Mer fishing gear technologists team during their 4 years flume tank exploitation. The technical study for the Lorient flume tank was led by hydraulics specialists of Alsthom Grenoble. Construction began in 1973 and finished in 1976 with a cost of 1.5 million French francs (around 230 000 euros). The project was funded by the National Maritime School and the ISTPM (former part of IFREMER) with the contribution of the Chamber of Commerce and Industry of Lorient and the regional and local authorities.

Between 2010 and 2012, an important work was undertaken to modernize technical parts of the tank : mainly motorization to set the water in motion and set up of an intuitive and user-friendly interface to control the flume tank components. The cost was about 965000 euros and was totally funded by regional and local authorities.



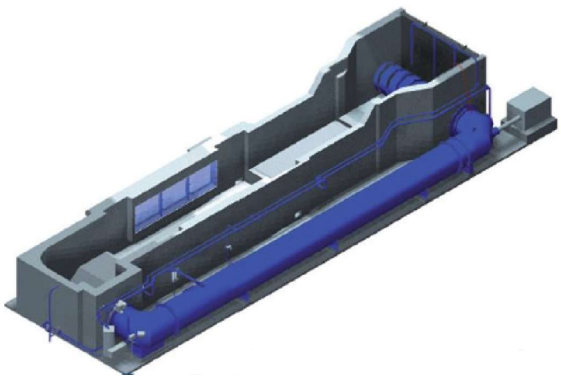


Figure 1 : Lorient Flume tank

Usage

The Lorient flume tank is mostly dedicated to fishing technology: gear development, optimization of fishing technics, training of students, and experiments to improve the mechanical behaviour knowledge about fishing gears or fishing gears components. These studies can be carried out for static or towed fishing gears. Recent projects were related to selectivity, the mitigation of fishing gears physical impacts on the seabed and the reduction of energy consumption. A general purpose of the flume tank is to validate concepts and designs in order to reduce the duration and the cost of following sea trials.

The occasional hydrodynamic qualification of specific systems like hydrofoils, drones, or systems related to renewable marine energies enables a diversification of activities and skills.

The Lorient tank is equipped with measurement sensors like a variety of force cells (range from 1N to 500N), a 6 components balance (200N / 70Nm) and velocimetry sensors (from 0 to 1.5m/s, 1.5% accuracy).

More than a hundred trawl scaled models are available for training and for general purpose works, like comparing the shapes of different trawl design and possible modifications, comparing efficiency of a set of doors etc …

Figure 2 : trawl models fitted for the Lorient flume tank

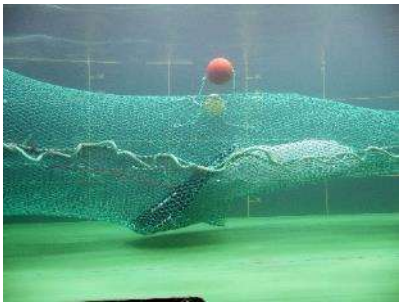


Figure 3 : Testing Nephrops and monkfish grids in a trawl extension at full scale

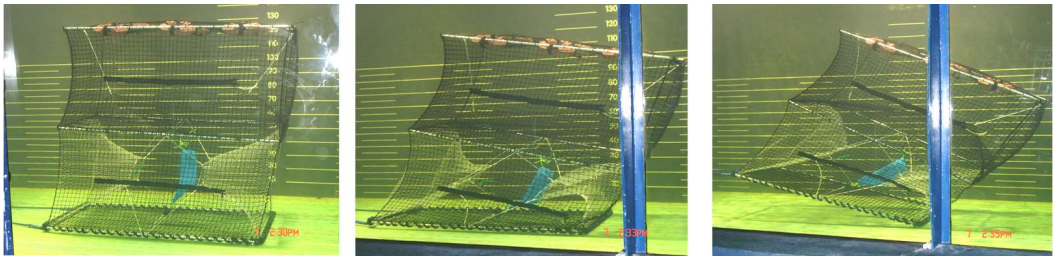


Figure 4 : testing fish pot behaviour at 3 different levels of water current

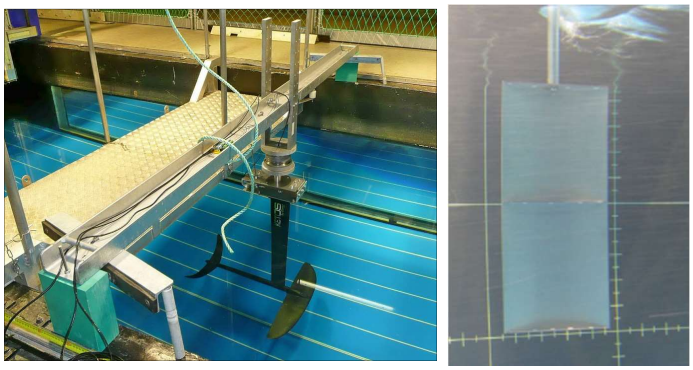


Figure 5 : qualification of a foil model (left) and a « Suberkrub » like profile (right) with a 6 components balance.

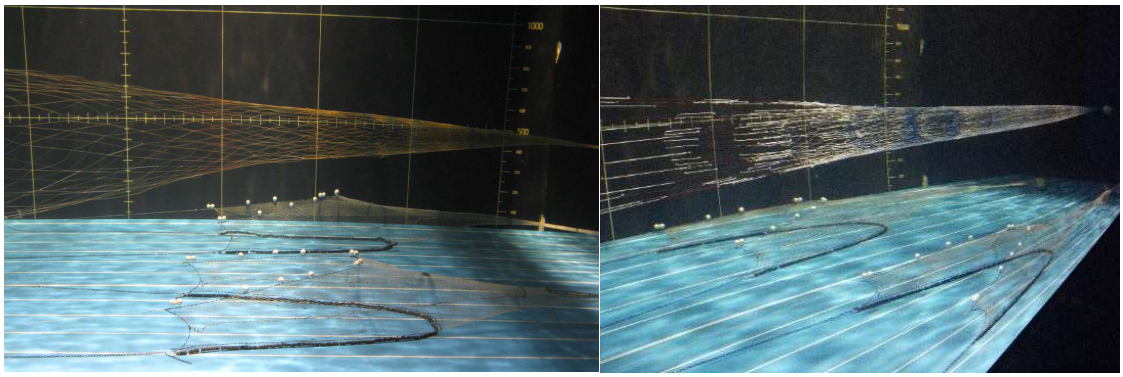


Figure 6 : Educational demonstration of pelagic and twin bottom trawls

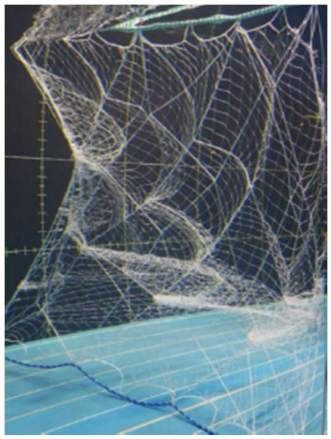


Figure 7 : Testing of a piece of trammel net

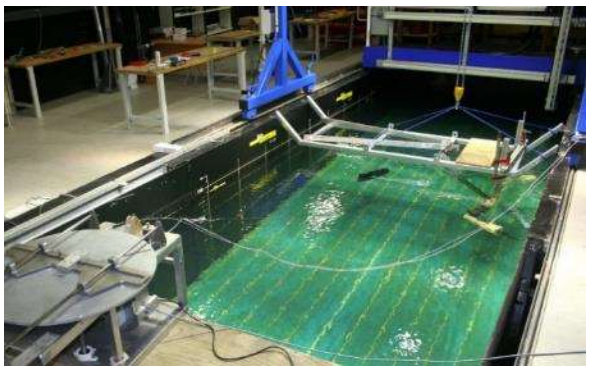


Figure 8 : Study of the dynamics of a door model