50 years of Port Revel

Picture wooded slopes in the foothills of the French Alps, mostly old-growth hazel with roe deer roaming free, and a long, long way from the sea. A patched-up road leads to a lake and an eighteenth-century hunting lodge. Believe it or not, many a sailor — from Mississippi pilots to Russian captains of ice-breaking LNG carriers — has fond memories of this bucolic setting. Not far from here is the *Palais idéal*, or Ideal palace, a curious masterpiece built by French postman Ferdinand Cheval between 1879 and 1912. Such is the backdrop to Port Revel, a training centre known to seafarers the world over as one of the best places to learn — thanks to a fleet of 1:25 scale models — how to berth, unberth, set two anchors, enter Panama and Suez locks, or deal with the currents off Port Arthur, Texas, to name just a few of the many options.

For over 50 years, Port Revel has welcomed pilots and captains to its renowned training facility amid the hills and the trees and far from the sea and the smell of fuel oil. “There’s no signal for mobile phones, but that only adds to the experience. We pick our clients up at the train station or in Lyon, put them up in a nearby hotel and offer them training courses in the fine art of ship handling, which usually last five days” says François Mayor, a retired French Navy commander. Having sailed on virtually every vessel type in the fleet and worked as an instructor at the French Navy’s training centre in Toulon, François took over the helm at Port Revel in late 2015. “I’m interested in anything and everything to do with commercial shipping. When the opportunity came along to work here at Port Revel with its wonderful facilities, not to mention the freedom, it didn’t take me long to make up my mind, I can tell you.”

A bulk carrier entering a lock (all rights reserved)

Crash stop under tow (all rights reserved)

Port Revel Director François Mayor at the helm (Mer et Marine - Caroline Britz)

So, sailor François dropped anchor in the countryside not far from Grenoble. But why is this advanced-technology training center specialising in ship handling and hydrography located in the foothills of the French Alps? Well, it all started with the hydrography or, more precisely Grenoble-based Sogreah, otherwise known as the *Société Grenobloise d'Études Et d'Application Hydraulique*. In 1952, oil company Esso consulted Sogreah for its expertise in hydraulics and physical modelling. At the time, Esso was considering building larger oil tankers for the Gulf-to-Mediterranean route via the Suez Canal, but needed to know beforehand what impact the new-generation ships would have on shipping operations and on the canal's banks.

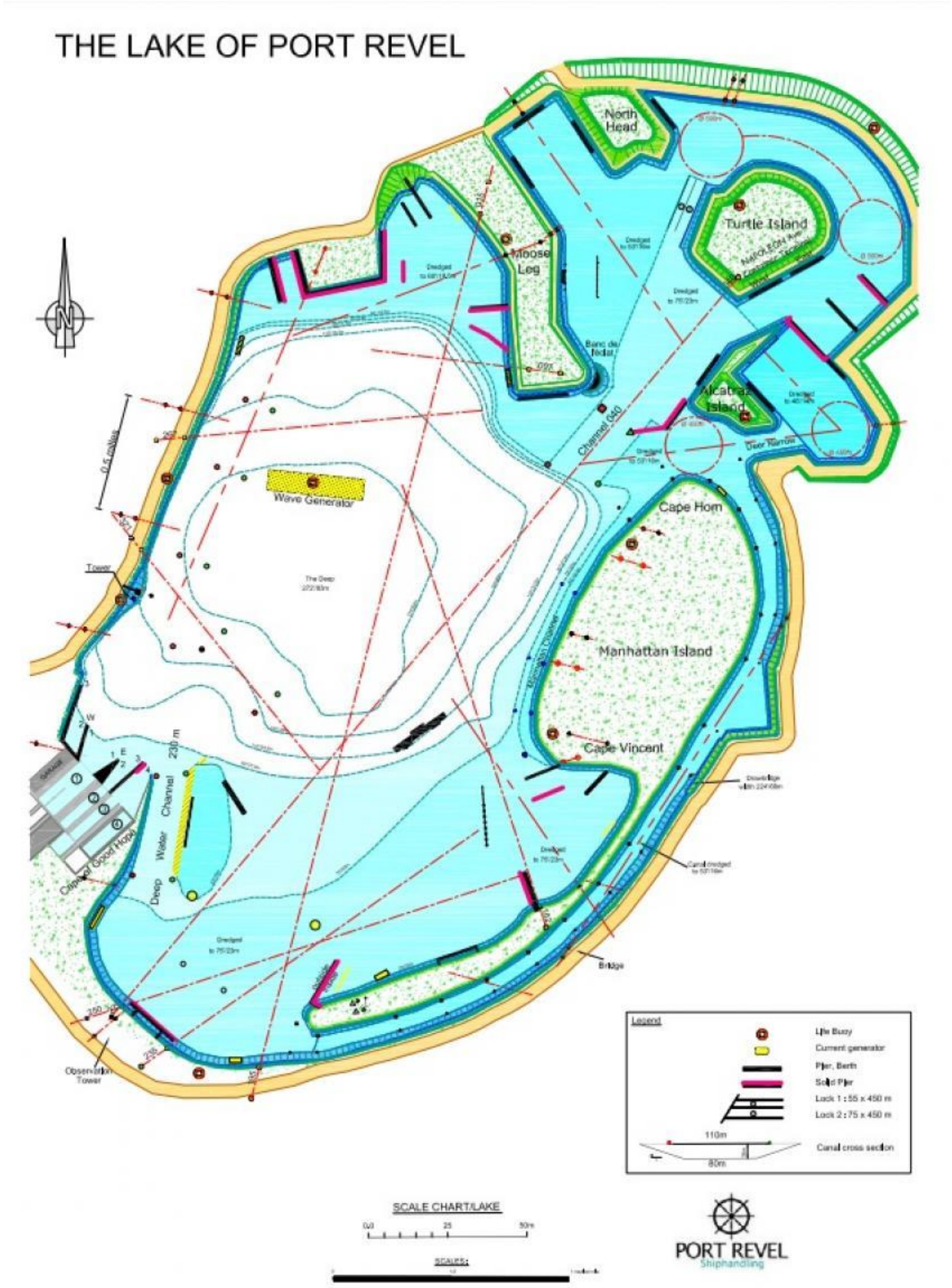
Scale models with faithfully reproduced features

The Sogreah team immediately suggested checking their calculations using a scale model of the vessel in a lab setting. Applying William Froude's law of similitude, they built a 1:25 model of the proposed 30,000-tonne tanker that was accurate in every relevant detail, including hull form, displacement and propeller. The first tests were conducted in a towing tank with the model attached to the towing carriage. The next step was to make the model self-propelled by adding an electric motor scaled according to the same law. Self-propelled models behave in much the same way as the full-size ships they represent.

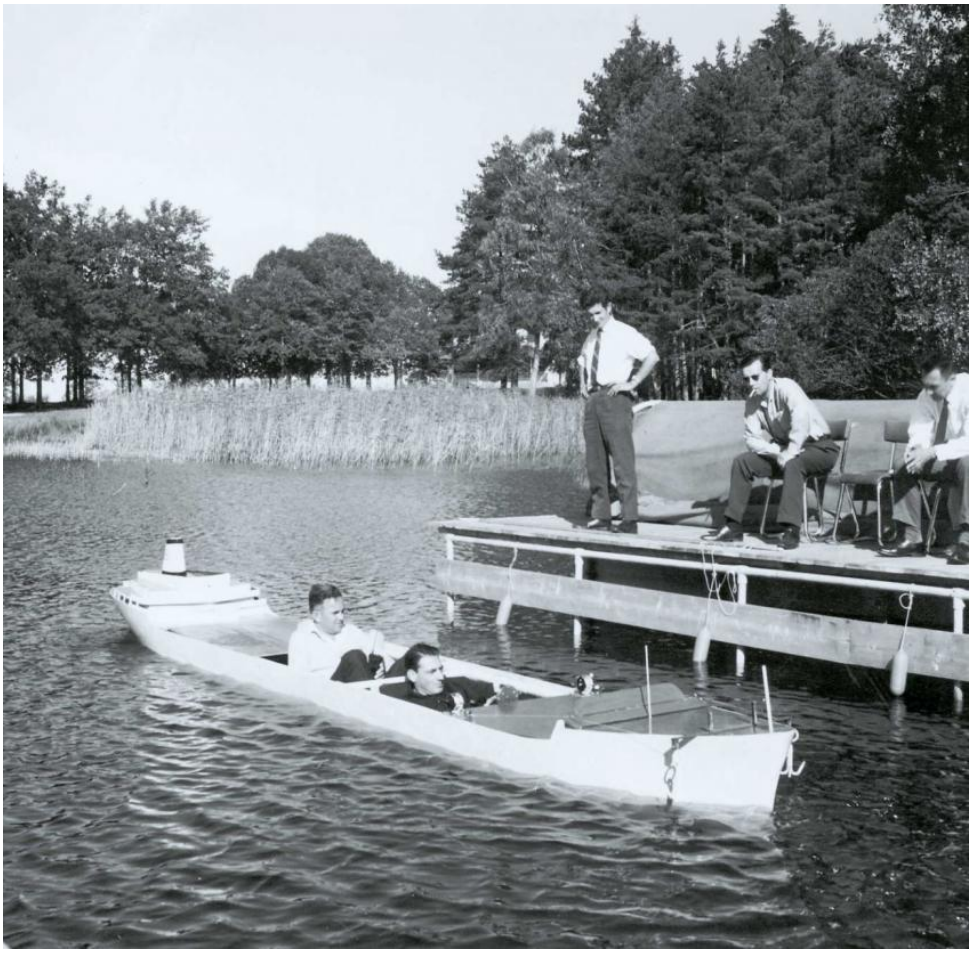
In 1954, Sogreah went a step further when the team designed a 1:25 model of the Esso France tanker with a seat each for the captain and the helmsman; each with their eyes at the height they would be on the ship itself. In front of them, the key items found on any bridge, including the wheel, rudder angle indicator, compass, anemometer, engine order telegraph, and speed & distance log. Captains came from near and far to test the model as all concerned quickly realised how useful the technique would be for training crews and captains under conditions approaching reality.

Work begins on reshaping the lake (all rights reserved)

Next, Esso and Sogreah began looking for a site where they could sail their burgeoning fleet of scale models. They drew a circle 100km in radius centred on Grenoble then overlaid a wind map. At Saint-Pierre-de-Bressieux they found a privately owned, two-hectare lake where the wind effects were minimal. In 1966, the partners drained the lake and began reshaping its bed to model the Suez Canal and the approaches to selected ports and harbours, as closely as possible. The idea was to reproduce local bottom effects and familiarise trainees with both the effects and their vessel's response. Other features were added progressively. Today, a wave generator produces wave packets with controlled amplitude and frequency while 40 current generators produce clockwise or anti-clockwise flows on demand replicating documented local conditions, while huge fans simulate winds of up to 30 knots. Other features include piers, jetties, mooring dolphins, wharves and cranes.



Port Revel lake after enlargement in 2012 (all rights reserved)



First training session (all rights reserved)

Port Revel's Suez Canal (all rights reserved)

Training exercises in Port Revel's replica of the Suez Canal began in July 1967, and continue to this day. Sogreah, now known as Artelia, bought Esso's share of the centre in 1970. The centre is managed by a small 'crew' now led by François Mayor. Over the years, Port Revel has achieved world leadership in ship handling training. "We've a full-time team of eight. We manage everything, including the site and our fleet of 1:25 models. Given that shipbuilders don't offer scale models, we design them ourselves working from original drawings supplied by the owner or builder. After completing the similitude calculations, we order the hull from a boatbuilder then have a subcontractor install the controls and other key items. Otherwise, the rest is done here." Because manufacturers of the full-size items do not offer scale models, everything, including propellers, pods and rudders, is custom made. Constantly aware of Froude's laws of similitude, the Port Revel crew designs, casts and welds components and installs equipment and propulsion systems. Although craftsmanship certainly counts, each model also incorporates a range of seriously high-tech features.

Inside the boathouse (Mer et Marine - Caroline Britz)

New model CRT, or Carousel Rave Tug, by Damen during testing at Port Revel (Mer et Marine - Caroline Britz)

Propellers for different model ships (Mer et Marine - Caroline Britz)

As the director walked along the lakeside, he told me the story of how, in 2012, the lake was enlarged to 5ha, and acquired a deep water area. At one end, there is a large boathouse for the centre's eleven models: six tankers from 38,000 to 400,000dwt, two LNG carriers, two container ships (4400 and 8000 TEU) and, the latest addition, the 313-metre Voyager cruise ship. Five model tugs are also on hand to play their part. "With on-site tailoring, our eleven hulls can faithfully simulate 22 ship types, including ferries and ro-ro vessels. To represent different types of propulsion and power ratings, including diesel-electric and steam turbine configurations, all we need to do is reprogram a model's propulsion system. The Voyager cruise ship even has faithfully reproduced pods." Basically, the Port Revel team can model virtually any vessel type.

The boathouse (Mer et Marine - Caroline Britz)

Tugboat (Mer et Marine - Caroline Britz)

The Voyager cruise ship, latest addition to the fleet (all rights reserved)

Training courses are held continuously from April to October. Pilots come to hone their handling skills on different types of ships and captains to improve their response to new and changing conditions. “The eight instructors, seven French and one Dutch, are all former pilots, recruited by the ‘big brother’ co-optation method, based on their technical and teaching skills. Trainees are accompanied by an instructor at all times. Aside from giving frequent encouragement, the instructors constantly seek the best way to help each trainee. They have developed this into a fine art, over time.” An art that is, moreover, the main reason that pilots and captains come to Port Revel from all over the world. “62% of our trainees come from North America; others from Russia, Europe and Brazil.” In future, the director hopes to see more and more from Asia.

Captain's view (Mer et Marine - Caroline Britz)

Many trainees come back again and again. The Voyager captain who came to test the scale model said: "she really does behave in exactly the same way down to her faults!" This is a typical example of the unstinting praise the centre receives. There was praise too from a captain who saved his vessel after dropping an anchor using a procedure that he had learnt and tested at Port Revel, and also from American pilots who come back every year. The Panama Canal authority even asked Port Revel to oversee the establishment of an on-site training centre using scale models to familiarise pilots with the new locks.

(Mer et Marine - Caroline Britz)

"Nothing is virtual here. Everything is physical. We use real vessels on real water on a real seabed, with everything subject to real weather conditions. Our trainees love to see how they measure up. And, given that human factors remain the prime cause of accidents at sea, training is still vital." Fifty years on, Port Revel is the go-to training centre for ship handling.

The instructors and the rest of the team keep abreast of the latest trends in ship handling and their replication while regularly coming up with new ideas to improve the ships, systems and maintenance procedures. The next new hull will be commissioned in 2018. The story continues.

Original by Caroline Britz, translated and adapted by Steve Dyson