
QUALITY STANDARD FOR SHIPHANDLING TRAINING ON MANNED MODELS

1. INTRODUCTION

Training on manned models is considered to be an unavoidable complement to electronic simulation and can efficiently replace real life experimentation.

This Quality Standard is intended as a minimum requirement offered by the Port Revel Training Centre to ensure quality to users who wish to improve their shiphandling skills by training. With over 40 years of experience and over 6000 pilots, masters and officers having attended the courses, Port Revel is the leader in this kind of training.

2. RATIONALE FOR TRAINING ON MANNED MODELS

But... why is training necessary?...

Because human error is still the main cause of accidents.

... and why train on manned scale models? ...

Because this is still the best way to acquire certain reflexes which, when the time comes, will make all the difference between being good and being the best. Training on scale models provides experience that could never be gained on real ships for the simple reason that neither ship-owners nor local authorities would allow such risks to be taken. Scale models allow the shiphandler to make mistakes. Scale models allow experimentation on ship behaviour to explore unknown fields beyond the limits of safety.

Training on the manned models is a valuable complement to training on electronic simulators as it provides *additional experience* through a feeling of "*déjà vu*":

- *Nature is at work* on scale models, with random effects similar to those encountered in real-life situations. The unforeseeable character of squalls, shallows, currents and waves calls for an immediate, appropriate reaction, without any repeat or automatic response. And when things go wrong on the scale model, the pilot *really feels his ship* run aground or collide with another ship or berth. Those who have experienced a situation of this kind know how much it motivates and convinces them to do better...
- For the same reason (natural phenomena) hydrodynamic effects are correctly reproduced on scale models and it is therefore unnecessary to transpose them in the form of complex equations. This gives a *better simulation of hydrodynamic effects* such as interactions between ships (for example in a canal), interactions between the ship and berth, little under-keel clearance (such as 10% of the ship's draught) and the use of anchor dredging in various operating situations.

- The scale effect of wind on a manned model is well known, but it is also well known that this is in no way detrimental to the use of manned models for serious and effective shiphandling training. Wind is a factor in the everyday life of pilots throughout the world. The design of the manned model lake is such that the *wind element will vary in different parts of the lake*. This allows a course to be structured in such a manner as to introduce wind as and when required. Extreme wind conditions are encountered in the real world. If they occur at a manned model centre, with care they can be used in various scenarios to demonstrate how well control can be maintained.
- The *ship models behave exactly like real ships, only much faster*. Hence, reality will be much slower than the model, thus leaving quite a lot more time to react. Manned models sharpen the shiphandlers' natural senses of perception and anticipation and enable the ship's behaviour as a whole to be appreciated. These skills are paramount when manoeuvring a full size vessel.
- The time scale also means that it is possible to perform five times as many manoeuvres. In other words, it is possible to perform as many manoeuvres in a 35 hour course *as in 175 hours on the real ship*. If you then consider the cost of scale models compared to computer models in terms of cost per manoeuvre and per pilot, you might find that *scale models are even cheaper than computer models!!*

Manned models are considered by ships' captains and pilots - shiphandlers par excellence - as the *next best thing to a full-scale prototype* for studying and understanding a ship's behaviour.

A manned model training centre is also *a permanent forum of ideas*, an ideal meeting place where information and experience can be exchanged.

It is recommended that captains, mates and pilots train on manned models *once every five years*.

3. QUALITY ASSURANCE

Adequate QA procedures are implemented in line with ISO 9001 requirements that Sogreah has been fulfilling since its certification in 1995:

- For evaluation by the customers in order to adapt the course content to their needs,
- For innovations on equipment in order to improve services to be offered,
- For shiphandling research in order to update the course content,
- For ship and equipment maintenance in order to minimize down time due to failures,
- For security of staff and students during operations in order to avoid danger,
- For communications with customers and staff in order to avoid misunderstanding.

4. THE SHIPS

Port Revel's ships have the following characteristics in compliance with our quality standards:

- A single scale of 1:25 is used, allowing at least two persons on board.
- Eleven fully operational ships are available: tankers and/or crude carriers, container ships, LNG carriers, a cruise ship, a car carrier, allowing a variety of exercises for 8 to 10 students working simultaneously.
- Each ship can have different set conditions (e.g. diesel motor or steam turbine, additional bridge at the bow) to the extent that the fleet can reproduce a total of over 20 vessels.

- Each ship is fitted with two fully operational anchors, a bow thruster (and in certain cases a stern thruster).
- Each ship is fitted with appropriate instrumentation (wind speed and direction, log, rpm, rudder angle, heading).
- Five ships are fitted with a GLONAS-GPS centimetric tracking system.
- One ship is fitted with an optional Schilling rudder, and another ship with an optional Becker rudder.
- One ship is fitted with two optional pods.
- Three fully operational tugs (one ASD and two VSP) are available.

5. THE INSTRUCTORS

Port Revel's instructors are chosen and allocated according to the following quality standards:

- They are (former) maritime pilots with at least 20 years of practice as a pilot and good teaching ability in the French and English languages.
- The number of instructors available on the lake is at least two for three sailing ships at any time during exercises.
- The tugs are operated by tug masters with at least 15 years of experience.

6. THE LAKE

Port Revel's lake has been designed in accordance with our rigorous quality standards:

A lake area of about 5 ha is available, allowing 5 ships to sail freely without mutual or outside interference:

- It can be emptied for maintenance
- It has a controllable water level
- It has very small natural wind effects (<1% of downtime in August and October)
- It has a ship positioning system with centimetric accuracy
- It has a variety of features including:
 - 50 various docking configurations (open wharfs, solid quaywalls, rock slopes)
 - Deep and shallow water areas (70% shallow water areas)
 - Buoyed channels
 - Canal (7 km full scale) with a drawbridge and a berth
 - 2 locks
 - SBM
 - Wave generator (H=3 m with 750 m wave front full scale)
 - Current generators (on 50% of the lake, giving local currents of 3 kn full scale)
 - Movable wind generator (locally 40 kn full scale)

7. THE COURSES

Port Revel's courses are organised according to our quality standards as follows:

- Course duration of at least 5 days for a basic course
- Course duration of at least 2.5 days for refreshers

The courses aim to provide a good balance between "Teaching" and "Training" with the emphasis placed on "Training".

7.1. COURSE CONTENT: PRESENTATIONS

Around one hour/day on the following subjects:

- Scale fundamentals
- Shiphandling fundamentals
- Forces acting on the ship
- Shallow water effects
- Use of bow thrusters and anchors
- Ship interactions in canals
- Use of escort tugs
- Use of pods

A detailed manual (over 400 pages) is given to each student

7.2. COURSE CONTENT: EXERCISES ON THE LAKE

At least 35 h on the lake for a 5-day course, with at least 60% of the time with currents:

- Docking/undocking on different types of structure (with or without current)
- Manoeuvring with bow thrusters
- Entering locks, canals and channels (with or without current)
- Meeting and overtaking in canals (with or without current)
- Manoeuvring with anchors (with or without current)
- Turning circles in deep and shallow water
- Skidding in sharp turns
- Effect of waves
- Emergency situations (with or without escort tugs)
- Manoeuvring with pods is possible
- Local conditions can be reproduced