# Mobile Rowing Tank IGL-B

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## Description

The purpose of the Mobile Rowing Tank IGL-B (Simulator of Rowing Boat) is the most adequate simulation of Biomechanical conditions of on-water rowing during exercise in indoor rowing tank.

The main differences between on-water rowing in a boat and rowing on any stationary device (ergo, stationary tank) are the following:

1. There is no power transfer through the stretcher in stationary rowing, which contribute nearly 40% of power production in on-water rowing.
2. There is no gearing effect in stationary rowing, so the average handle and stretcher forces are approximately equal. In on-water rowing the stretcher force is closely related to the gate force, so it is 40-50% higher than the handle force.
3. The consequence of two points above is that on-water rowing requires more legs power, while stationary rowing requires more upper body power.
4. Absence of the stretcher acceleration on stationary device makes vestibular sensations of the rower very different from the sensations during on-water rowing.
5. On a stationary device rowers can not interacts through the stretcher, while on-water it is important accurate timing of the efforts through the stretcher.

A device was invented to overcome above problems (ref. 1):

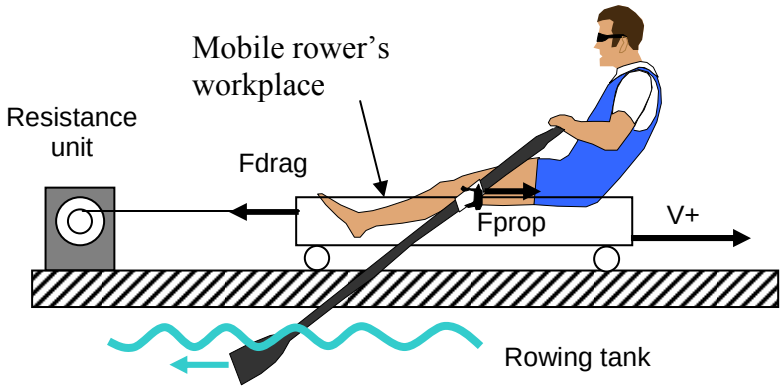


**Figure 1. Diagram of the Mobile Rowing Tank**

The device consists of a carriage with rower's workplace (stretcher, slides with seat, riggers with gates and oars), which can move horizontally on wheels by rails. The carriage is connected through a cable with a resistance unit (the simplest version is just elastic cable on pulleys), which applies force to the carriage backwards. Area of the blades used with the device should be reduced down to 20-25% of the original.

The device operates in the following way: During the drive a rowers applies force through the blades to the water in a tank, which creates a reaction force and move the carriage with a rower towards the bow. During recovery only simulated drag force is applied to the carriage, so it moves towards the stern. Therefore, during the stroke cycle the device performs oscillations back and forth, which is similar to oscillations of the boat shell visible from a launch travelling parallel with the same average speed.

It is possible to use a number of carriages connected to each other, which simulates rowing in a crew boat (double or four). Resistance force must be increased proportionally in this case.

## Biomechanical characteristics

The charts below show mechanical characteristics of on-water rowing, which can be simulated in Mobile Rowing Tank:

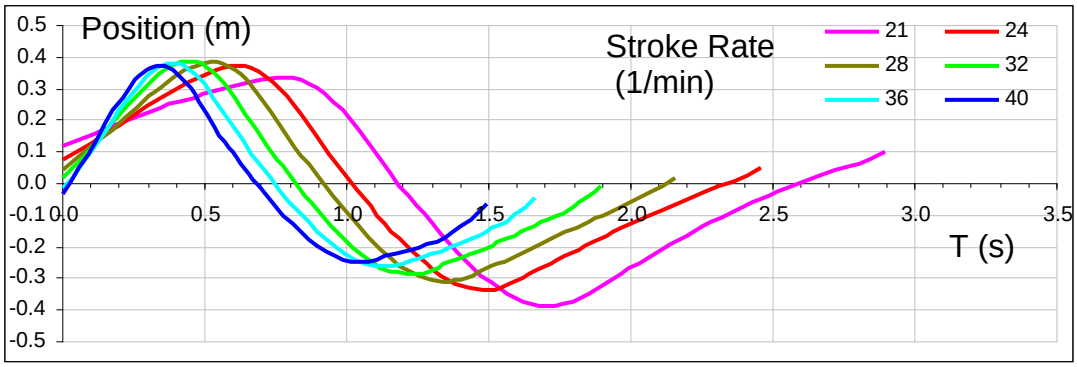


**Figure 2. Position of the carriage during rowing at various stroke rates**

The amplitude of oscillations of the carriage should not be longer than 1m plus about 0.5 spare space.

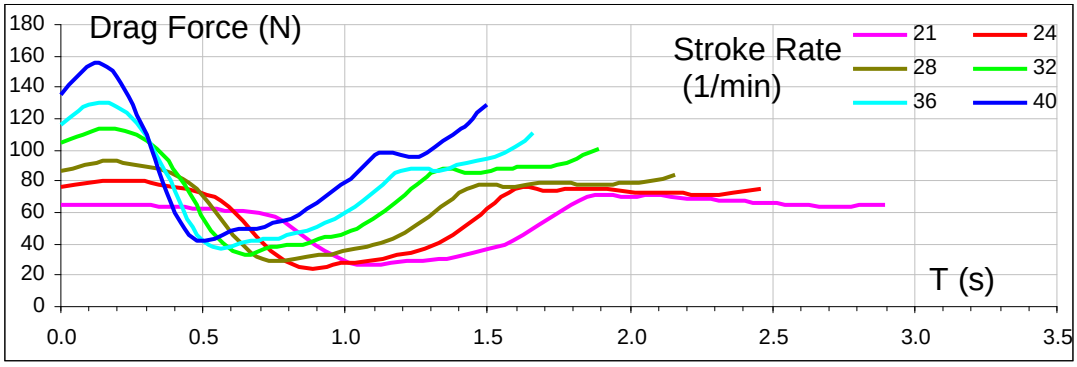


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**Figure 3. Drag force applied to the carriage during rowing at various stroke rates**

The maximal drag force applied to one carriage should not be higher than 160N (16kG).

## References


Kleshnev V. 1992. Device for rower's training. Patent of Russian Federation N 1802718 from 09/10/1992

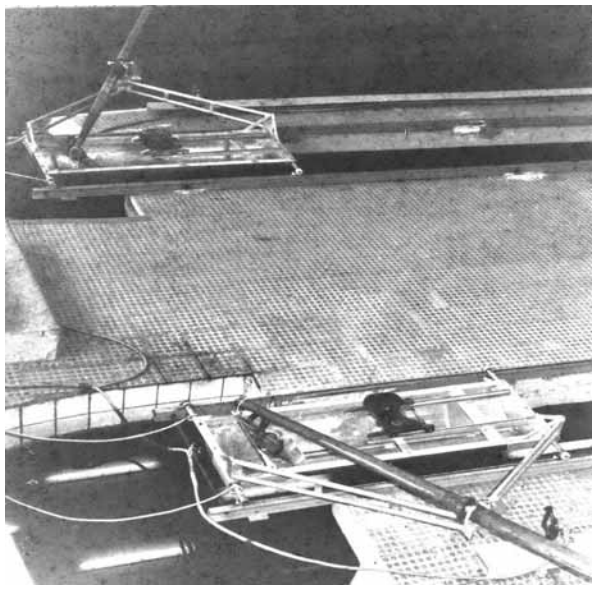
Kleshnev V. 2001-2009. Rowing Biomechanics Newsletter www.biorow.com 2003/10, 2004/06, 2005/01, 2005/03, 2008/10, 2008/12.


The patent is now expired and can be used for free anywhere.

The device was implemented in three locations:

**1990 Rowing club "Znamia", St. Petersburg**

This tank was mentioned by Chris Dodd in his book “The story of World Rowing”, 1992, page 267-268: “The tanks have slides mounted on runners which are mounted on rails and anchored to the wall by means of an elastic rope, so that the seat and its frame simulate the movement of a boat more closely than a conventional structure.”



**1992 Rowing Center “Krilatskoe”, Moscow,**

**2008 Rowing Center “Strela”, St. Petersburg**