

# Application of innovative rolling system for rowing on YAL-6

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## Abstract

**Objective of the study** was to improve the results of athletes in the training process and competitions through the effective use of an innovative rolling system for rowing on YAL-6.

**Methods and structure of the study.** The pedagogical experiment was conducted on the basis of the St. Petersburg state budgetary institution of the sports school of the Olympic reserve "Znamya" among students of the SUAI (Saint-Petersburg State University of Aerospace Instrumentation) and Admiral Makarov SUMIS (Admiral Makarov State University of Maritime and Inland Shipping) in the period from October 2021 to March 2023 in order to evaluate the effectiveness of using the rolling system while moving along the distance. 28 rowers took part in the experiment.

**Results and conclusions.** As part of the experiment, it was revealed that the use of an innovative rolling system for rowing on YAL-6 improves the effectiveness of passing the distance. Athletes involve the entire muscular system of the body in their work, the muscles of the lower limbs of rowers become the main ones when moving in the supporting part of the stroke (wiring).

**Keywords:** *innovations in rowing, YAL-6 rowing system, sport.*

**Introduction.** Rowing is a common type of physical activity that is practiced not only in Russia, but all over the world. This sport originates from the 17th-18th centuries, when rowing clubs began to appear in Europe, rowing competitions were held. At the end of the XVIII century rowing circles and rowing and sailing clubs appeared in St. Petersburg, Moscow, Kyiv, Riga, Nikolaev, Saratov and Odessa [2, 4].

Widely known types of rowing are: rowing, kayaking and canoeing. These species became popular due to the inclusion in the program of the games of the II Olympiad. Rowing first appeared at the Olympics in 1900, since 1936 it has been included in the program of the Olympics in kayaking and canoeing.

Rowing on naval yawls, a traditional sport that is the basis in naval training of cadets, appeared during the time of Peter I. YAL-6 is a small naval vessel used for landing troops during hostilities, repairing

ship sides, transfer of provisions, communication of the ship with the shore. This type became a sports discipline in the 30s of the XX century. Currently, competitions are held on six rowing (local) yawls among men, women and boys at a distance of 500, 1000 and 2000 m with a coxswain without a turn [1].

Innovations surround us in all spheres of life: in everyday life, in pedagogy, in culture, in transport communications, as well as in physical culture and sports. However, innovations have not fully affected the training of athletes in rowing on YAL-6. The relevance of the research topic is determined by a number of factors. In recent years, the YAL-6 hardware has not been updated. First of all, innovations in rowing equipment will bring boat rowing to a new level. The level at which the rowing provision is now, although it allows you to achieve the necessary results, but the development that could be in the modern world does not contribute to the progress of the

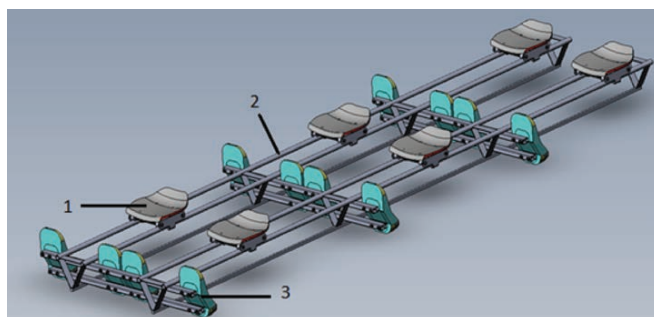


results. The material and technical base for training cadets corresponds to the technical level of the early 50-70s. Since the outdated material and technical base is used, and scientific and technological progress does not stand still, the mass character of this sport is inferior to rowing in its other types. As a result, rowing on naval boats remains only for the training of cadets and students in military naval educational institutions and training of military personnel.

It is necessary to use new innovative means. One of the means to ensure the effectiveness of the training and competitive processes is the rolling system for rowing on YAL-6.

In 1855, for the first time, movable seats began to be used in boats. When performing a stroke, the movement began with the muscles of the lower extremities, then the back muscles were involved and the end of the stroke ended with the work of the hands. This period should be considered the beginning of the history of rowing, which is called academic in Russia. In the academic boat, there are skids that are attached to the hull of the boat, a can on wheels is installed on top of them, the footboard is removable and adjustable [3].

Since the use of the naval yawl in competition, there has been no dedicated racing equipment. Rowers sat on banks (benches) and, holding on to the oar, rowed by tilting their backs and bending their arms. Soon, self-made seats appeared with a fluoroplastic coating, so that the rower sat higher, and the athlete's equipment included denim pants and foam rubber inside, this ensured the fabric slipped over the seat. Due to this, the rower could drive forward by 25-30 cm, the length of the stroke increased.



**Figure 1.** Rolling system for rowing on YAL-6. 1 - carriage on wheels (mounted on rails); 2 - guides (runners); 3 - stops for legs (attached to the guides); straps for fastening the legs in the stops; clamps for attaching the system to the yal

**Objective of the study** was to improve the results of athletes in the training process and competitions through the effective use of an innovative rolling system for rowing on YAL-6.

**Methods and structure of the study.** The pedagogical experiment was conducted at the St. Petersburg Sports School of the Olympic Reserve "Znarya" among students of the Saint-Petersburg State University of Aerospace Instrumentation and the Admiral Makarov SUMIS, from October 2021 to March 2023. 28 rowers took part in the experiment.

According to the drawings, a rolling system for YAL-6 was developed (see figure 1).

Athletes were offered to train on new equipment according to the competition preparation program and using new rowing techniques. In the period from October 2021 to March 2023, in the training process, the following were developed: a rolling system for YAL-6; rowing technique, taking into account the use of a rolling system; questioning of rowers in order to study the reaction to the change of equipment, its impact on the athlete's well-being, assessment of the state of the body to a change in rowing technique; survey of helmsmen to study the movement of the yawl in water with a rolling system, the effect of new rowing technique on performance and passing the distance, checking the level of knowledge of helmsmen for admission to the management of the boat and the ability to act in emergency situations; conducting a medical examination in a physical culture and sports dispensary to obtain admission to sports.

In the experiment, the results of passing the distance of 1000 m on two yawls at the same time under different weather conditions with a change of crews of teams (among men and women) were determined.

**Results of the study and their discussion.** The table shows the results of changing the rowing distance of 1000 m under various weather conditions among men's and women's teams. Time indicators were recorded on a traditional yawl (without a rolling system) and on a yawl using a rolling system.

As part of the experiment, it was revealed that the use of an innovative rolling system for rowing on YAL-6 improves the performance of the rowing distance. The main indicator is the reduction in the passage of a distance of 1000 m by 1 min 30 s, which is 19.9% of the time for women and by 1 min 13 s, which is 19.5% of the time for men. Athletes use the entire muscular system of the body in their

*The result of the rowing distance*

Weather	Without the use of a rolling system		Using a rolling system	
Distance 1000 m	Women's team EG	Women's team CG	Women's team EG	Women's team CG
Clear, +16 Wind 3-4 m/s, NW Pressure 762-756 mm Hg. Art. Humidity 45-47%	8'16"56	8'13"58	6'48"15	6'42"35
Cloudy, +11 Wind 7-8 m/s, W Pressure 759-753 mm Hg. Art. Humidity 63-65%	8'16"14	8'16"49	6'52"25	6'45"56
Overcast, +13 Wind 8-9 m/s, NW Pressure 761-764 mm Hg. Art. Humidity 58-60%	8'26"47	8'19"42	6'55"48	6'48"14
$\chi \pm \sigma$	8'18 $\pm$ 0'05*		6'48 $\pm$ 0'05*	
Weather	Without the use of a rolling system		Using a rolling system	
Distance 1000 m	Men's team EG	Men's team CG	Men's team EG	Men's team CG
Clear, +16 Wind 3-4 m/s, NW Pressure 762-756 mm Hg. Art. Humidity 45-47%	6'48"54	6'45"38	5'46"23	5'27"55
Cloudy, +11 Wind 7-8 m/s, W Pressure 759-753 mm Hg. Art. Humidity 63-65%	6'51"29	6'49"55	5'44"56	5'28"49
Overcast, +13 Wind 8-9 m/s, NW Pressure 761-764 mm Hg. Art. Humidity 58-60%	6'55"31	6'53"17	5'47"34	5'30"37
$\chi \pm \sigma$	6'50 $\pm$ 0'06*		5'37 $\pm$ 0'15*	

Note: \* Significance of differences (Student's t-test) at  $p < 0.05$

work, the muscles of the lower limbs of rowers become the main ones when moving in the supporting part of the stroke (wiring). During the experiment, statistically significant differences were obtained between the results of the teams with and without the use of the sliding system ( $p < 0.05$ ).

According to the results of the survey, 92.9% of rowers believe that innovations will help rowing on yawls to become a promising sport again, and the same number of respondents prefer the rolling system for YAL-6. Athletes unanimously noted that when using the rolling system, positive changes occurred in the state of the body: pain in the back muscles does not appear during training, body fatigue appears after a longer period of time. The helmsmen note that the acceleration of the boat, using the sliding system, has become faster, the speed has increased, the sliding system has not affected the control of the boat.

**Conclusions.** The use of the rolling system for rowing on YAL-6 in the training process, on the basis of the experiment, showed an increase in the effec-

tiveness of passing the distance relative to yawls not equipped with a rolling system.

As part of the experiment, it was found that the use of an innovative rolling system for rowing on YAL-6 improves the effectiveness of passing the distance, namely, reducing the passage of a distance of 1000 m by 1 min 30 s, which is 19.9% of the time for women and by 1 min 13 s, which is 19.5% of the time in men.

The use of the rolling system will improve the results of the training process in rowing on YAL-6 and will allow:

- Reduce the load on the muscles of the back by including the muscles of the lower extremities. The athlete, starting from the foot rests, with the help of the quadriceps muscles of the thigh, tilting the back backwards and bending the arms to the stomach, performs a stroke; with the help of the biceps muscles of the thigh, calf muscles, tilting the body forward and straightening the arms, the athlete moves forward on the carriage (a seat that slides on the runners);



- increase the speed of the boat due to the powerful movement of the legs in the first phase of the stroke (when the oar captures the water) and sliding through the water (due to the soft approach of the athletes to the beginning of the stroke), as a result, the indicators for passing the distance will be better;

- Athletes will be able to cover longer distances, as the load on the body will be distributed evenly (all muscle groups work) and performance will last longer.

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