

# People, research work, publications and symposia

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## INTRODUCTION

The aim of this paper is to remember and to fix in the memory some events of the activities of the Experimental Centre in Ilawa. The idea and initiative of setting up in 1956 the Experimental Centre of the Gdansk University of Technology Chair of the Theory of Ships came from prof. Lech Kobylinski. No such research centre to support the developing shipbuilding industry was then available in Poland. Fifty years ago the beginnings of the Centre in Ilawa were modest, but within a short time, 10 to 15 years, it became an important centre of the ship hydromechanics in Poland. Apart from the head of the Chair, many people contributed, in a greater or less degree, to the development of the Centre. Some of them have been mentioned in the description of investigations performed. I would like to mention now some non-typical tests and their participants, but first of all those workers of the Centre who passed away. It should also be remembered that Ilawa is the cradle of Polish ship hydromechanics as here the hydromechanical scientific symposia were started. Since then they have been continued as international symposia with worldwide participation and organized in turn by several Polish institutions.

## People

Many persons marked their presence in Ilawa with their activity in the course of time. We wish we could see here today the former workers of the Chair of Theory of Ships, later renamed to Division of Ship Hydromechanics in the Shipbuilding Institute, but not only them as many persons worked here who were not employees of the Gdansk University of Technology. The attendance of so many people tells about the ties with the Ilawa Centre. Therefore, let's take this opportunity and try to summarize the professional and scientific achievements brought about by the Ilawa Centre activities.

This is also an opportunity to remember all those who took part in the research work and contributed to the development of the Centre. It is difficult to mention all of them by name, but I will call those who have died. Fifty years is a long period in a human life. If the list of living former workers is still long, it is only because they were young or very young when they began to work here, some of them even 50 years ago. Some of those who passed away did not even reach the retirement age.

In the initial period of the Centre development Zbigniew Gryglewski (1954-1958, +1992, years of work with the Chair and the year of death) contributed a lot, then technical manager of the Division of the Theory of Ships, later director of the Gdansk Ship Repair Yard and worker of the United Polish Ship Repair Yards head office. Tadeusz Nasiłowski (1958-+1981), the next technical manager, supervised construction

of the first brick building in the Centre. Our modellers built in Gdansk ship models for Ilawa, repaired them in Ilawa after collisions, made all the woodwork in the Centre and also constructed a small house on the Lipowa island. They were: Stanisław Kułak (1973-1986, +1988), Waclaw Piechowiak (1963-1984, +2002), Antoni Staszak (1959-1974, +1998), and Bolesław Szymanek (1958-1979, +1999). The mechanics working in Ilawa were: Jan Berendt\* (1954-1979), the first K-1 hydrofoil boat foil maker, Walerian Gampe (1957-1970), also a supply van driver, Wiktor Strawski (1958-1965), Jan Wardak (1975-1991, +2002), Tadeusz Wiśniewski (1961-+1989) and Włodzimierz Wojtera (1964-1983, +1989). The measurement apparatus engineers spent a lot of time in Ilawa: Edmund Adelman (1957-+1966) and Romuald Snarski (1957-+1991). Tadeusz Racki\* (1963-1972, +2002), the workshop manager, later worked with the CTO towing tank; Witold Krenicki (1958-+1978) took part in the fast ship tests; Andrzej Fiedziuszko (1952-1991, +2000) although did not come to Ilawa for tests, prepared documentation in Gdansk of models built for Ilawa. Designers: Lucjan Dębski (1955-1959, +1985), later employee of the PROREM design office i Jerzy Połubiński\* (1959-1962, +1988), later in the then Central Ship Design Office and in the Gdansk Shipyard. Aleksandra Kempieńska (1981-1987, +1989) draftswoman in the Divisions. Mikołaj Kuszniir (1971-1989), the Centre housekeeper and Anna Kuszniir (1956-1971, +1983), cleaner.

The mentioned persons, employees of the Chair of the Theory of Ships or the Division of Ship Hydromechanics, worked for the benefit of the Ilawa Centre. Some of them, e.g. those marked with (\*), were formally, at least for a part of that period of time, employees of the Institute of the Fluid Flow Machines, Polish Academy of Sciences.

## Non-typical tests

Apart from investigations that may be considered routine, very diversified tests, depending on the needs, were also carried out. They are worth reminding here. Some of the results were implemented in designs, other investigations did not go beyond laboratory tests or the results were used only in publications. Some of those non-typical tasks are described here.

## Gas-stream propeller

In the years 1961-1965, on Jeziorak Lake in Ilawa, tests of a gas-stream propeller were carried out on large self-propelled models, to an order of the Maritime Institute in Gdansk. The main structural element was a straight inclined propulsion channel, an integral part of the hull.

Compressed air was supplied to the propulsion channel through a special conduit and then mixed with water in the preliminary mixing chamber. The mixture flowed freely along the propulsion channel. Horizontal component of the normal force was the propeller thrust force. The investigations were led by Tadeusz Witalewski from the Maritime Institute side and by Wiktor Maksymiuk from the Chair of the Theory of Ships side. The aim of the tests was to confirm the theoretical principles of such propeller, developed in the Maritime Institute, and also to obtain additional information necessary for the design of floating units with such propulsion system. It was assumed that such propellers without moving parts would have some advantage over the screw propellers mainly in the shallow, overgrown and fouled waters. The tests allowed to develop a propulsion channel design method for specific operating conditions. In view of the strong hovercraft development at that time, units with such propulsion system did not arouse much interest. The outcome of the investigations were publications, two patent applications and a doctor dissertation accomplished in 1968.

### Damping of the ship rolling

In the years 1961 – 1964 all the large models in the Experimental Centre, used earlier for the resistance and propulsion tests, took part in the damped rolling tests on calm water in order to determine the rolling damping characteristics. The tests were performed as own research work. The models were tested in different loading conditions, with or without the bilge keels, tugs and fish cutters with bar keels. From those measurements an approximate method of damping calculations for different hull shapes was formulated and then used for the analysis of ship behaviour in waves.

In 1969, to an order of the Maritime Institute, a series of measurements were performed of the damping effectiveness with different shapes of the bilge keels. Selected bilge keels were installed on one of the “Koga” fishing company cutters. In the same year, during stormy weather on the Gulf of Gdansk waters, a Division of Ship Hydromechanics team carried out measurements of two B25s cutters, one with bilge keels, the other without. Results of those investigations were later a subject of several patent applications submitted by a Maritime Institute employee.

### Landing craft

From 1961 comprehensive model tests of the landing craft were carried out as those ships were intended not only for modernization of the Polish Navy but also as an attractive export article. Those ships were built in different variants but on the same hull by the Northern Shipyard and Naval Shipyard. Apart from the resistance-propulsion and manoeuvring tests, also the beach landing tests were performed with the measu-

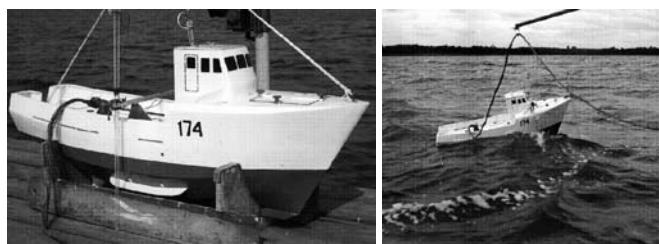


Fig. 1. Investigations of the bilge keel effectiveness

rements of hull pressures and withdrawal from beach tests. Model landed on the beach with various speeds without the use of own propulsion and helmsman. In that test, the model was towed by a plummet falling from a high tower. Also landing tests of a self-propelled model with helmsman and withdrawal from beach tests by the astern operation of propellers were performed. As observers of the Warsaw Pact manoeuvres would tell, those ships had a strong instinct of self-preservation, as they would easily withdraw from the beach, whereas landing craft built in the USSR and GDR had considerable difficulties with the withdrawal.

The Naval Shipyard in Gdynia built altogether 17 medium size landing craft, including 4 ships for India in 1974-1976 and additional 4 in 1984-1986; 4 ships for Iraq in 1976-1979 and 4 for Libya in 1977-1979, and 1 for Yemen in 2002. During the commissioning of ships in Gdynia, the Iraqi officers ordered commemorating medals with a Gdansk medallist. There is a medal for the first ship (ATIKA 1976), for the second ship (JENADA 1977) and for the fourth ship (NOAH 1979). No medal was ordered for the third ship GANDA in 1978. The ships received consecutive side numbers from 82 to 85. When a Shipyard delegation was in Iraq in 1989 to discuss the conditions of repair of those ships, the Iraqi fleet had only three ships and the last, NOAH, had number 84. It turned out that the third ship, GANDA, the one without the commemorating medal, had been destroyed by mistake by own air force. The medals were a good talisman for the ships. But in August 1990 the invasion on Kuwait took place and five months later the “Desert Storm” operation began. A rocket attack of British helicopters on ships stationed in the Umm Qasr harbour completed the destruction. Repairs were no longer needed.



Fig. 2. Landing craft investigations

In the water area near the Lipowa island and Siemiany village a system of the Gdansk Northern Port piers and jetties was reconstructed. A model of the then largest Polish tanker ZAWRAT was used for the handling tests. Before the real ship entered the port, self-propelled model tests were carried out and also with auxiliary floating units simulating the tugs, with measurements of forces in the tow-ropes. Tests were carried out in 1975 and 1976, with the participation of Jacek Nowicki

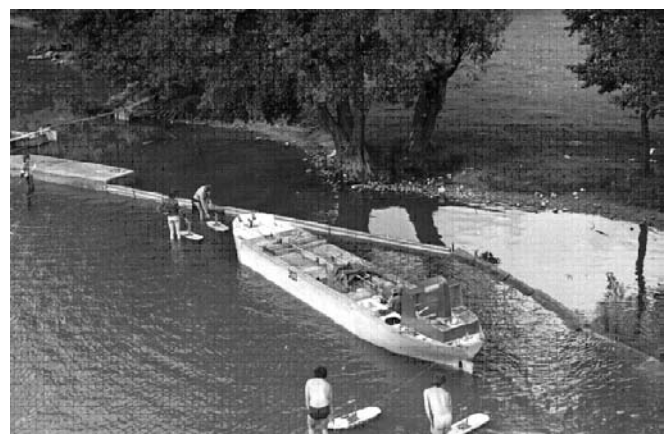


Fig. 3. Model tests of handling a large ship in the Gdansk Northern Port

(leader), Anicet Niedźwiecki, Wiesław Kopylec, Anna Kokoszka and students of the Shipbuilding Institute.

### Trawl nets

In the 1970s, Polish shipbuilding industry was a world power in building seagoing fishing vessels. The Sea Fishing Institute (MIR) in Gdynia worked on the improvements in fishing tools and processes as well as on the optimisation of the ship - trawl system. In order to obtain information on the water flow speed distribution in the trawl during hauling and on forces in the individual trawl system elements, a series of tests were performed in Ilawa in 1971, in cooperation with MIR, on several trawl models hauled by catamaran with different speeds. The trawls had different net mesh size and string thickness. The speed distribution in trawl was measured with a set of MIR-designed logs. The test results allowed to develop improved trawls preventing fish escaping from the trawl system and thus improving the fishing effectiveness. The tests in Ilawa reduced the scale of later real tests at sea. From the MIR side the investigations were led by Zbigniew Ziembo.

In 1978 tests of the pelagic trawl models were performed. The models were delivered by MIR and the trawls were to be used on the B418 type factory trawlers. For different hauling speeds, tests were carried out of the trawl warp angle, trawl horizontal and vertical opening, trawl mean draught and forces in the trawl warps. Measurements were performed with one trawl as well as with a set of two or three trawls. For determination of the scale effect and tow rope power predictions, the test results of geometrically similar real trawls were used. Leader of the test team (a large team from MIR and from the GUT Division of Hydromechanics) was Andrzej Jarosz.

### Kayaks and sportsboats

In 1975-1978 investigations were carried out, ordered by the PROMOR Ship Production Technology Centre in Gdansk, aimed at improving the performance of the Polish canoeists and oarsmen. The problem was coordinated by Bogdan Szanser from the RKS Stocznowiec sports club and employee of PROMOR. The tests consisted in determining and improving the hydromechanical characteristics of the racing kayaks and canoes as well as designing the kayak rudders. The work included also the shape of oar blade for the racing canoe and blade shapes of other oar types. A conception was developed of an oar movement simulator and the oar driving mechanism together with the measurements of forces. Result of the work was patent application "Device for automatic measurement of the impulse and time of the force on an oar blade". The results were tested on a group of sportsmen and sportswomen. The work was led by Krzysztof Paul in cooperation with Ryszard Kaminski, Witold Blocki and Mikolaj Jagielka.

### Determination of the maximum overloads of a dropped lifesaving capsule

Model tests, ordered by the GUT Division of Ship Production Technology, were carried out of a dropped lifesaving capsule, by means of an ejector. The capsule was intended for evacuation of people from a drilling platform or ship in emergency, first of all in the conditions of sea surface covered with burning oil. The aim of tests was to determine maximum overloads during such operation. In the real scale (model in 1:10 scale) the drop height was 10 to 30 m and the ejection distance 20 to 40 m. Maximum resultant accelerations could reach 10 g. Tests were carried out in December 1983, after ice had

been removed from water at the jetty where the capsule was dropped to water. The tests were performed by Janusz Stasiak, Krzysztof Paul, Wieslaw Gozdur, Jerzy Seregiet and others.

### Ship capsizing

In 1993 and 1994, the Foundation for Safety of Navigation and Environment Protection performed a series of measurements to show what are the conditions of a ship capsizing in waves. In view of a great number of different parameters influencing the behaviour of a ship in waves, the measurements were limited to wave recordings and determination of the effective wave height as well as the calm water righting lever of the tested model. The tests were performed on one self-propelled, remotely controlled model of a fishing trawler, with two different values of the hull depth. The model was tested with different stability characteristics, different speeds, different headings in relation to the waves near the wave recording probe, until the model capsized. Those results were used to describe a safe curve of righting levers as a function of the effective wave height and to verify the theoretical calculations. The tests were performed by the author of this paper with Ryszard Kaminski, Janusz Wolniak and Jan Bielanski.



Fig. 4. Tests of a ship capsizing in waves

### Cooperation with the Military Engineering Institute

From the end of 1980s to mid-1990s investigations were carried out for and in cooperation with the Military Engineering Institute in Wroclaw. The first tests consisted in the use of track chain drive as a floating tank propeller and were performed by the GUT Division of Ship Hydromechanics. The work on propellers for the armoured wheeled vehicles was carried out by the Foundation for Safety of Navigation and Environment Protection. All those tests were performed on Jeziorak Lake. An additional smaller model of an armoured vehicle was used for tests in the GUT Chair of the Theory of Ships towing tank, aimed at determining the scale effect in the wheeled vehicle resistance tests.

### Publications and symposia

When the scope of investigations carried out in the Ilawa Centre was widened and the measurement techniques gradually improved, the Centre became a recognized performer of research work ordered by the ship design offices and ship owners. Also analyses were undertaken aimed at verification of the test results as well as scientific research work in the long-term R&D plans. That influenced greatly the number of reports issued and the number of papers published in the technical journals, domestic and foreign, by the Division of Ship Hydromechanics employees. In 1971, on the 15th anniversary of the Centre, prof. L. Kobylinski initiated organization of a symposium on the open water ship model tests. The symposium met with

a lot of interest in many ship hydromechanics research centres in the country. At that time the CTO Centre of Ship Hydromechanics in Oliwa did not exist yet. The symposium summarized the number of publications issued in connection with work carried out in Ilawa, comprising internal test reports, papers in technical journals, the International Maritime Organization (then IMCO) documents and patent applications. There were 174 such papers written by 29 persons. Three years later, in 1974, those numbers were 244 and 38, respectively. Among them were several accomplished doctor dissertations.

That first Symposium in Ilawa in 1971, organized together with the Polish Society of Mechanical Engineers (SIMP) (let's call it symposium number zero or initiating), where 10 papers of 13 authors were presented, started a permanent series of ship hydromechanics conferences in Poland. They have been organized until now and their list is given below.

Two years later, in 1973, the GUT Division of Ship Hydromechanics with the Ship Design and Research Centre (CTO) organized the next Symposium in Ilawa, which received number "1". There were more papers, including one author from abroad - Boris W. Mirokhin, assistant professor from the Leningrad Shipbuilding Institute, the then close cooperation partner. In view of large interest, it was declared at the end of that 1st Symposium that they would be organized every year. The next 2nd Symposium in 1974 was organized by the Ship Design and Research Centre (CTO) in Gdansk together with the GUT Shipbuilding Institute. In the conference proceedings the Shipbuilding Institute is named as an organizer, but in fact the organizer was always the SI Division of Ship Hydromechanics, and the role of Shipbuilding Institute was so underlined because the same person, prof. L. Kobylinski, was then head of the Division of Ship Hydromechanics and director of the Institute. In 1975 the Department of Ship Propellers of the Institute of

the development of the "School of Captains", first on the Jeziorak Lake and later on the nearby Silm Lake, as well as with the research work conducted there, scientific conferences devoted exclusively to ship manoeuvring were increasingly needed. The birthplace of those conferences, international from the start, was Ilawa. As it had been with HYDRONAV, they started modestly as a Ship Manoeuvring Workshop – Manoeuvring Qualities in Ship Design, on 4–7 October 1993, organized by the Division of Hydromechanics, Faculty of Ocean Engineering and Ship Technology, Gdansk University of Technology with cooperation of the Foundation for Safety of Navigation and Environment Protection, with 12 papers prepared by 14 authors. Two years later the Foundation for Safety of Navigation and Environment Protection organized in Ilawa, on 16-19 October 1995, the first International Symposium on Manoeuvrability of Ships at Slow Speed, with 23 papers prepared by 41 authors. It was then decided that those conferences would be held every five years. The consecutive ship manoeuvrability conferences were organized in 1999 and 2005 but as joint symposia with HYDRONAV. Those combined conferences received an own acronym - HYDMAN.



Fig. 5. Scientific session on the 15th anniversary of the Ilawa Centre

Fluid Flow Machines, Polish Academy of Sciences, joined the organizers of Ship Hydromechanics Symposia as a third permanent partner. It was then decided, however, that symposia would be held every two years organized in turn by one of the three organizers with support from the other two, which has been regularly happening. In 1989 the Faculty of Mechanical Engineering of the Technical University of Wrocław joined the organizing group and it was then decided that in view of the increasing number of foreign participants the symposia would have an international character. In 1991 the conference papers were published in English and the symposium acronym HYDRONAV was adopted. From the 11th Symposium in 1995 the language of conference is English and all papers are published in English.

Apart from the Ship Hydromechanics, in connection with



Fig. 6. 2nd Symposium on Ship Hydromechanics

### List of the symposia on ship hydromechanics

#### Model tests in open waters

Ilawa 17 – 18.09.1971. Organizer: GUT Shipbuilding Institute with the Polish Society of Mechanical Engineers. Chairman of the Organizing Committee – assist. prof. Wiktor Maksymiuk, secretary – Witold Krenicki, papers: 10, authors: 13.

#### 1st Symposium on Ship Hydromechanics

Ilawa 20-21.09.1973. Organizer: GUT Shipbuilding Institute with CTO and the Polish Society of Mechanical Engineers. Chairman of the Organizing Committee – prof. Lech Kobylinski, secretary – Jacek Pawlowski, papers: 14, authors: 14 including one from abroad.

#### 2nd Symposium on Ship Hydromechanics - Model tests in ship design

Gdansk 28 –30.10.1974. Organizer: Ship Design and Research Centre (CTO) Model Testing Centre with the GUT Shipbuilding Institute. Chairman – Kazimierz Szponar, secretaries – Marian Banacki and Andrzej Bujnicki, papers: 18, authors: 21, including three papers prepared by five authors from abroad.

#### 3rd Symposium on Ship Hydromechanics - Hydrodynamic problems of ship propulsion

Gdansk 20 – 22.11.1975. Organizer: Institute of Fluid Flow Machines, Polish Academy of Sciences with GUT SI, and CTO. Chairman – prof. Henryk Jarzyna, secretaries – Tadeusz Koronowicz and Ryszard Kozubowski, papers: 19, authors: 20, including three authors from abroad.

#### 4th Symposium on Ship Hydromechanics – Ship dynamics

Gdansk 26 – 27.05.1977. Organizer: GUT Shipbuilding Institute

- with IFFM PAS and CTO. Chairman – assist. prof. Wieslaw Welnicki, secretary – Anicet Niedzwiecki, papers: 15, authors: 17.
- 5th Symposium on Ship Hydromechanics - Design and research problems of ship propellers  
Gdansk 20 – 21.09.1979. Organizer: Ship Design and Research Centre with GUT SI and IFFM PAS. Chairman – Kazimierz Szponar, secretaries – Marian Banacki and Andrzej Bujnicki, papers: 17, authors: 17.
- 6th Symposium on Ship Hydromechanics - Hydromechanics in the design and economic operation of ships  
Gdansk 9 - 11.10.1985. Organizer: Ship Design and Research Centre with GUT SI and IFFM PAS. Chairman – Marian Banacki, secretaries – Jan Dudziak and Antoni Bednarek, papers: 36, authors: 42.
- 7th Symposium on Ship Hydromechanics - Numerical methods in ship hydromechanics.  
Gdansk 11 – 13.11.1987. Organizer: IFFM PAS with GUT IS and CTO. Chairman – prof. Henryk Jarzyna, secretaries – Jan Szantyr and Jacek Centkowski, papers: 29, authors: 31.
- International Symposium on Ship Hydromechanics “Hydromechanics ‘89”  
Wroclaw 20 – 22.11.1989. Organizer: Faculty of Mechanical Engineering, Technical University of Wroclaw. Chairman – prof. Waclaw Kollek, secretary – Jozef Samolyk, papers: 42, authors: 65.
- Ninth International Symposium on Ship Hydromechanics HYDRONAV ‘91  
Sarnowek 17 – 19.09.1991. Organized by: Division of Ship Hydromechanics, Faculty of Ocean Engineering and Ship Technology, Gdansk University of Technology. Chairman of the Organizing Committee – prof. Lech Kobylinski, secretary – Janusz Stasiak, papers: 30; authors: 46.
- 10th Symposium on Ship Hydromechanics - The role of hydromechanics in the design and operation of ships  
Gdansk 2 – 3.12.1993. Organizer: Ship Design and Research Centre. Chairman – Ryszard Lech, secretary - Stefan Jaworski, papers: 27, authors: 36.
- 11th International Conference on Problems of Marine Propulsion HYDRONAV’95  
Gdansk 22 – 24.11.1995. Organized by: Department of Ship Propellers, Institute of Fluid Flow Machines of the Polish Academy of Sciences. Chairman – prof. Jan Szantyr, secretary – Leszek Wilczynski, papers: 22, authors: 31.
- Twelfth International Conference on Hydrodynamics in Ship Design HYDRONAV’97  
Szklarska Poreba 17 – 19.09.1997. Organized by: Faculty of Mechanical Engineering, Technical University of Wroclaw. Chairman – prof. Jan Kulczyk, secretary - Tomasz Tabaczek, papers: 35, authors: 48.
- Joint 13th International Conference on Hydrodynamics in Ship Design and 2nd International Symposium on Ship Manoeuvring, HYDRONAV’99 and MANOEUVRING’99 dedicated to professors of the Gdansk University of Technology Lech Kobylinski and Mieczyslaw Krezelewski on their Golden Jubilee.
- Ostroda 22 – 24.09.1999. Organized by: Faculty of Ocean Engineering and Ship Technology, Gdansk University of Technology and Foundation for Safety of Navigation and Environment Protection. Chairman – prof. Jan Szantyr, secretary – Wojciech Misiag, papers: 46, authors: 59.
- 14th International Conference on Hydrodynamics in Ship Design Miedzyzdroje 27 – 29.09.2001. Organized by: Technical University of Szczecin. Chairman – prof. Tadeusz Szlangiewicz, secretary - Tomasz Abramowski, papers: 32, authors: 60.
- 15th International Conference on Hydrodynamics in Ship Design – Safety and Operation, HYDRONAV’03  
Gdansk 22 – 23.10.2003. Organized by: Ship Design and Research Centre. Chairman – Ryszard Lech, secretary - Leszek Wilczynski, papers: 28, authors: 50.
- Joint 16th International Conference on Hydrodynamics in Ship Design and 3rd International Symposium on Ship Manoeuvring HYDMAN’05  
Ostroda 7 – 10.09.2005. Organized by: Faculty of Ocean Engineering and Ship Technology, Gdansk University of Technology and Foundation for Safety of Navigation and Environment Protection. Chairman – prof. Lech Kobylinski, secretary – Milosz Frackowiak, papers: 56, authors: 94.

### Summary

It can be seen from this overview that those two Centres, one of the Gdansk University of Technology in Ilawa and the other of the Foundation for Safety of Navigation and Environment Protection in Ilawa-Kamionka have greatly influenced the development of ship hydromechanics. All the conferences on these subjects were initiated here. In sixteen HYDRONAV and three MANOEUVRABILITY Symposia held in the 1971-2005 period, together with two preliminary symposia, 511 papers were presented by many Polish and foreign authors. Ilawa is well known on all the continents, also because of a great number of shipmasters trained in the Research and Training Centre for Ship Manoeuvrability. Apart from the symposia listed here, results of research work carried out in Ilawa were presented also in the Conferences on Fluid Mechanics, Scientific Conferences of Naval Architects and Marine Engineers and also in many conferences abroad. It may well be said that Ilawa is a cradle of the Polish ship hydromechanics.

It has to be underlined that the test conceptions and result interpretation had an individual character but test execution was always a team work carried out by teams assigned to each task.

Measurements on the lake caused some losses which always interfered with the course of tests. The lake would swallow up some tools, sometimes pieces of apparatus, it happened that a self-propelled model lost its propeller and once a model was sunk and in spite of its quite large size, was found in the muddy waters of Jeziorak only after a prolonged search.

Summing up today the professional, teaching and scientific achievements of the Ilawa centre for the shipbuilding and shipping industry, one may say that Ilawa is a lucky place. In fifty years of activities not a single serious accident occurred, although dramatic situations were plenty. May Ilawa remain such a lucky place for the years to come.

