



Mouth of Vistula
River with
sedimentation cone

IBW PAN

Fighting Floods

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The scientific and engineering profile of the Institute of Hydroengineering has changed over the past 50 years: from a purely technical approach to hydro-engineering in earlier years, our studies have now turned more towards environmental problems

The Institute of Hydroengineering was established in 1953, and will thus celebrate its 50th anniversary this year. Originally set up by its founder and first director Prof. Romuald Cebertowicz (later a member of the Polish Academy of Sciences) on the basis of the former Hydraulics Institute at Technical University of Gdańsk, the Institute of Hydroengineering continued to develop as an establishment of

the Polish Academy of Sciences in response to Poland's demand for fundamental and applied research in the field of water resource management, inland and maritime hydraulics, as well as soil mechanics and foundation engineering.

Initially, the Institute worked in close cooperation with the Faculty of Hydraulic Engineering at Technical University of Gdańsk. The scientific activities of the Institute are based on the methods of applied mechanics and mathematics, both analytical and numerical, as well as methods specific to particular problems. Classical methods of hydromechanics, hydraulics and geomechanics have been adapted for standard investigations, and some new and original methods developed. Theoretical studies are supplemented by extensive laboratory and field investigations. The hydraulics laboratory has carried out numerous model studies of hydraulic projects designed and developed in Poland and abroad (Iraq, Libya), concerning inland water, maritime, soil mechanics and foundation projects, as well as groundwater problems.

An important moment in the Institute's activities came in 1969 with the development of a large open-air hydraulics laboratory in Gdańsk-Oliwa, necessary for performing hydraulic model studies of the newly designed North Harbor (a new harbor in Gdańsk) and Świna Strait. Numerous

hydraulic studies, both fundamental and applied, were later conducted using these facilities.

In 1970, the Institute moved to new premises located in Gdańsk-Oliwa, close to the open-air hydraulics laboratory. The Coastal Research Station (CRS) Lubiawo was also developed and commissioned in this same year. Its main interests are in situ measurements of waves, currents, sediment transport and changes of the coastline. The CRS has organized numerous international field expeditions.

Present research activities

The Institute's research activities have changed with time, and now cover basic and applied problems related to inland and maritime hydroengineering, geotechnics and geomechanics, as well as other disciplines connected with environmental engineering. The research subjects and issues it studies pertain to problems that arise at the juncture of the natural environment and human activities, which are important for sustainable development.

The Institute now employs 63 individuals, including 35 scientific staff members (5 professors, 6 docents, 17 doctors, and 7 research assistants). The Institute has an ample scientific library stocked with numerous textbooks, as well as international and Polish technical journals. It also has very well equipped soil mechanics laboratories with modern measuring and recording apparatus. A separate building now houses a new 64 m long wave flume, equipped with very good measuring and recording apparatus.

The Institute publishes the quarterly journal *Archives of Hydroengineering and Environmental Mechanics*, as well as monographs and habilitation dissertations.

Apart from statutory research funded by the Ministry of Science and Information, the Institute participates in several EU projects. These are:

ALARM - Assessment of landslide mitigation in engineering and mechanics (2001-2004)

MANTRA EAST - Integrated strategies for the management of transboundary waters of the Eastern European Fringe, Vistula Lagoon (2002-2004)

HUMOR - Extended human integration with large-scale coastal morphological evolution (2002-2004)

LIMAS - Liquefaction around marine structures (2002-2004)

MAXWAVE - Rogue waves, forecast and impact on marine structures (2002-2003)

The Centre for Environmental Engineering and Mechanics (CEM) was set up within the Institute in December 2002, and is slated to remain in operation until 2005. The CEM's aim involves integrating with the European Research Area and establishing scientific contacts with other scientific institutes from Central and Eastern Europe. It will organize conferences, seminars and workshops.

At present, the Institute is carrying out several important engineering projects and grants. These are:

- A program of flood protection for the city Gdańsk, being realized by the Institute together with three other collaborating institutions;
- A development program for the Vistula mouth with sedimentation cone, being realized by the Institute together with the AQUAPROJECT Design Bureau;

Numerous problems are now solved by means of professional computer programs, instead of expensive hydraulic laboratory experiments.

Field measurements, however, remain a vital source of data for the verification of computer models

- The extension and modernization of a mathematical model for water circulation in the coastal zone, by supplementing currents generated with additional sources based on analysis and field studies - Committee for Scientific Research (KBN) grant;
- Investigations of a representative landslide process in the Carpathian Flysh; experimental landslide in Beskid Niski - KBN grant;
- Impact of progressive waves on an elastically supported block - KBN grant.

Concluding remarks

Despite a significant decrease in staff and important economic transformations, the Institute has proved to be a valuable and unique research establishment in Poland, in both basic and applied research. For three years the Institute has been developing close scientific collaboration with the European Research Area, something that bodes well for our presence in the European Union. ■



Measuring facilities of Institute's Coastal Research Station in Lubiawo