A BRIEF REFLECTION ON THE HISTORY OF IAHR

BY HELMUT KOBUS

IAHR is celebrating its 85th anniversary – a good reason to reflect on our present role as a global association and about our activities and goals for the future, and also to take a brief look back at the frame of our history.

IAHR was founded in 1935. In the same year the construction of Hoover Dam in USA was finished, the largest scale hydraulic structure of its time, for providing water and hydroelectric power to the region. And also in 1935 the first modern aeroplane DC3 started a completely new era of long-distance- travelling, a necessary prerequisite for our 38 IAHR World Congresses.

The book "History of Hydraulics" (Hunter Rouse and Simon Ince, 1957) documents the general situation of water research and engineering in the first half of the last century. And on the occasion of the 50th anniversary of IAHR in 1985 the book "Hydraulics and Hydraulic Research, a Historical Review" (G.Garbrecht, Ed.) was published.

In 1898 the first hydraulics laboratory was established in Dresden, Germany, and subsequently numerous hydraulics institutes were founded in Europe and USA. However, a wide gap between academic doctrine and engineering practice was indicated for the use of hydraulic models to study hydrodynamic phenomena. Therefore, the founders of IAHR had the intention to advance the international cooperation both in hydromechanics research and its application to hydraulic engineering.

The following reflection shortly outlines the main developments of IAHR and its role in science and engineering in a rapidly changing world full of challenges for our profession.

Start and consolidation: 1935 - 1960

On 3 September 1935, the "International Association for Hydraulic Structures Research" was founded in Brussels, Belgium, by 63 directors of hydraulic laboratories (55 from Europe, 8 from USA). Official languages were German, French and English. The first IAHR Congress was held in 1937 in Berlin, but in 1939 World War II suddenly interrupted all connections until 1945. IAHR resumed its activities in 1948 with its second congress in Stockholm. There the word "structures" was dropped from the name in order to indicate the much broader scope of IAHR, the "International Association of Hydraulic Research", maintaining English and French languages until about 1990 and then reducing to English as the only official language of IAHR. As Hans-Albert Einstein once said: "the universal language of science is broken English".

IAHR started with member Institutes as well as individual membership – a wise and far sighted decision for the continuous growth of our association. The secretariat of IAHR was hosted by Delft Hydraulics with its director serving simultaneously as Secretary General – a fortunate arrangement for IAHR that lasted for 65 years.

Our profession deals with water and all its uses e.g. for water supply and irrigation and as a medium for transport and for energy production, with a long historical tradition. The science of fluid - and hydromechanics has progressed rapidly for many engineering applications such as hydropower, navigation or aeronautics. However, in hydraulic engineering the natural water bodies are usually not suitable for direct applications of analytical approaches (geometry of rivers or coasts, sediment problems, variable hydrology). As H.J. Schoemaker put it: "Water engineering is empirism with a gradual and critical absorption of science".

The first 25 years of IAHR were marked by a systematic consolidation of the art and a perpetual struggle with the theoretical structuring of the many phenomena our profession has to deal with in our environment.

Expansion and Globalization: 1960 – 1985

My first contacts with IAHR I had through Hunter Rouse, the director of the Iowa Institute of Hydraulic Research (IIHR). After graduation in Civil Engineering in Stuttgart, I was graduate student in hydromechanics at IIHR from 1961 until 1965. Under the leadership of Hunter Rouse and his team I graduated with a doctoral thesis in ship hydrodynamics and enjoyed the inspiring atmosphere among an international group of doctoral students from all parts of the world. Hunter Rouse, our highly admired teacher, was a global player and a convincing promoter of IAHR, and following his advice most of us joined IAHR.

At this time, our profession experienced rapid developments in hydraulic research for turbulent flows, in laboratory and field measurement techniques and in hydraulic modelling. With the development of digital computers numerical calculations were also advancing rapidly. And in engineering applications, problems of sediment transport, mixing processes and water quality problems required increasing attention.

In response to these developments, IAHR started its "Journal of Hydraulic Research" as an international publication platform for the water sciences. This journal has soon become an outstanding quality mark of the association and a prime option for publishing research results in hydraulics for a global readership. The editorial boards have permanently done and continue to do an oustanding job in maintaining the Journal s mission as flagship of IAHR. And in the meantime we also have the International Journal of River Basin Management, the Journal of Ecohydraulics, and the Journal of Hydroinformatics (published by IWA).

IAHR has established specialized technical sections in order to give ample attention to rapidly developping new branches by means of symposia and reports or guidelines and short courses. The numerous sections were scheduled in 1970 into Division I Hydromechanics (6 technical sections) and Division II Hydro-Environment (by now 9 technical sections, 3 of them as joint committees with IWA) followed by Division III Innovation and Professional Development IPD (2 committees). My personal engagement in IAHR started in the Committee on Fluid Mechanics.

After my return to Germany I worked at the "Versuchsanstalt für Wasserbau und Schiffbau" in Berlin West (in the times when there existed two German states), held a visiting appointment at Caltech, USA and joined the University of Karlsruhe (by now KIT). There I worked with Eduard Naudascher and Erich Plate, who both had graduated in Germany and then started their careers in USA and were keen supporters of IAHR. With Erich Plate we organized the IAHR 1977 Congress in Baden-Baden with the support of all West German Hydraulics Institutes (sharing the risk of a potential financial deficit). The Congress turned out to be a big success both for IAHR and also for the German hydraulics community with the consequence of many permanent cooperations.

As an example for the globalization process in these times, I want to mention just one particular step. In 1984, we organized an IAHR symposium on "Scale effects in modelling hydraulic structures" in Germany with participants from 40 nations. However, so far participation in IAHR from China was exclusively from Taiwan and Hong Kong, although mainland China had many big hydraulic engineering projects on the agenda. In the preparation phase we learned – with the help of IAHR honorary member Ben Yen – the political reason for this and could finally manage to bring several representatives of Chinese hydraulics institutes to the symposium to presented their laboratories and their projects. This door–opening event had the result that IAHR since that time has experienced an increasing participation and support from China.

The rapid advances in science have led to a significant broadening of the research activities of IAHR, but the focus on science was also connected to some extent with a reduction of the involvement of practicing engineers, since the direct link to hydraulic engineering was not always adequately considered. The interaction between consulting engineers, governmental representatives and researchers showed a widening gap for some time.

Broadening the scope: 1985 – 2010

The membership of IAHR has grown from about 1000 in 1960 to about 2000 members from all continents in 1985. The rapid developments in research, many international engineering projects, and increasing internationalization of educational efforts have been driving forces, and after the turn of the century we have crossed the 4000 members line and presently move towards 5000.

The rapid developments of hydroscience and proliferation of research activities, which is reflected in the structure of the Technical Divisions and the growing number of sections, required strategic considerations by the IAHR Committee on Future Directions and Initiatives, which produced guidelines for the profile of IAHR in 1995 followed by an IAHR Strategic Plan 2005 -2009. The policy paper promoted several main thrusts:

- Efforts to bridge the gap between research and application with inclusion of professional issues and engineering practice in its broadest sense into the IAHR spectrum of activities.
- The broadening of the scope of IAHR activities towards water resources management, including ecological, economic and societal aspects.
- Involvement in continuing education and professional development.
- Initiation and support of regional and local activities.

In consequent pursuit of these goals, the name of IAHR has been changed from "Hydraulic Research" into "Hydraulic Engineering and Research" in 1999 and finally into "International Association of Hydro-Environment Engineering and Research".
The UNESCO/IAHR panel report "Education of Hydraulic Engineers" triggered the establishment of a new section on Continuing Education and Professional Development. And as a step from policy towards implementation, in 1999 a network of European universities collaborated in a "European Engineering Graduate School Environment Water (IAHR-EGW)". This ultimately was also a reason to form a European Division of IAHR.

In Stuttgart we started an international bilingual M.Sc.program WAREM (Water Resources Engineering and Management) in 1997, and a bilingual doctoral program ENWAT (Environment Water), which finds worldwide interest and response. The first IAHR Student Chapter started here in 1999 (by now IAHR YPN BW). The formation of student chapters was considered the best way to involve the young generation, and soon many universities followed the example. And all these local chapters were finally called "Young Professionals Network" (YPN) – by now there exist more than 50 YPNs in IAHR.

With the development of fast computers, computational hydraulics took off in the 1970s, with rapid advances in numerical modelling of hydrosystems and for hydroenvironmental impact assessment studies. And since 1989 the developments in "Hydroinformatics" have opened totally new possibilities for our profession. From now on the combination of laboratory models and numerical models together with field data provided good options for the solution of complex engineering tasks. And hydroinformatics for water and environment

1993 Tokyo Congress - President Carstens and Vice President Kobus.


2007 Executive Committee Members: (from left to right) Ramon Gutierrez Serret, Joseph H. Lee, Etienne Mansard, Nobuyuki Tamai, Gerhard Jirka, Peter Goodwin and Christopher George.

also provided new opportunities for interdisciplinary collaboration with geology for groundwater problems or with biochemistry for water quality problems and for ecohydraulics.

I have been involved in the continuous enlargement of the scope of activities in IAHR as Council member since 1988, with the Committee on Future Directions and Initiatives and as Vice President, before serving as president from 1996 to 1999.

In 1987 a Chinese translation of our book "Hydraulic Modelling" was published. I spent visiting research appointments in Shanghai, China 1988 and in Tokyo, Japan 1993, and in 2003 our student chapter YPN BW organized an extended excursion to China including a visit to the 3-Gorges project in its final phase.

The expansion of activities in the global network with its numereous Technical Committees and in the four Regional Divisions provided strongly increasing tasks for the IAHR secretariat, which according to General Secretary Henk Jan Overbeek needed a full time professional leadership. Christopher George was hired as the first Executive Director of IAHR in 1999. Simultaneously, the financial situation of IAHR became more difficult, and discussions with the host institute Delft Hydraulics led to the conclusion that another location of the Secretariat should be considered to allow IAHR to develop along its new professional avenue. An offer from CEDEX backed by the support of the Spanish government to host the IAHR secretariat was accepted, and the secretariat left Delft after 65 years and moved 2001 to Madrid with Cristobal Mateos as Secretary General, who in the meantime was succeeded by Ramon Gutierrez Serret. And in 2015, IAHR accepted a Chinese offer and established also an IAHR secretariat in Beijing, with Jing Peng serving as Secretary General. Thus, the organisation has now a firm global basis with two secretariats.

In 2005, the JHR published a special issue "IAHR 70 YEARS with the Water Scientific Community" with many contributions providing a good picture of the history of our organisation.

Recent developments

During the last decade IAHR has consistently continued to develop along its strategic goals. The close connection between research and practice in IAHR is reflected in the current issues of Hydrolink, which show many examples of practical challenges, management concepts and research needs which have found attention. The decade with the presidents Nobuyuki Tamai, Roger Falconer and Peter Goodwin and the World Congresses in Australia, China, Netherlands, Malaysia and Panama has demonstrated the continuous broadening of our engagement towards Hydroenvironment and Water Resources Management. And the new Council with president Joseph Lee will certainly continue along the strategic plan set up for 2019 – 2023.

On the global political agenda water has become an important item. Global warming and climate change has significant effects on the hydrologic cycle and causes rising sea levels, more frequent storms and more extreme cyclones, catastrophic flood events or dry periods with strong effects on agriculture and environment. And pollution or overexploitation of surface and groundwater resources, sedimentation and erosion problems, the "virtual water" issue - the challenges for hydroenvironmental engineering are tremendous.

Water resources management needs adequate solutions, and IAHR has the necessary state of the art prerequisites available. Hydrosystems models provide the tools for tackling problems of increasing complexity, and environmental systems models can provide the basis for interdisciplinary cooperations. Also the shift from physical to numerical models caused a corresponding shift from laboratory measurements to large scale field measurements. Modern observation and information systems with remote sensors are available and can be used both for the purpose of model validation or for monitoring the state of the water and environment system for prediction and control.

International communication has seen great developments in recent years. IAHR committees are promoting their work via internet and video conferences – an option that is booming presently during the Covid 19 pandemic and will certainly be more often used in future.

In the past 85 years the common goals of IAHR have always been promoted and guided by the voluntary engagement of our membership (the numerous outstanding members can not be listed here by name). Considering our history, we can be proud and optimistic that IAHR as an international network of engaged professionals will continue its way of tackling our professional challenges and thus contribute to a positive future of water and environment for the whole world. ■

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2013 Honorary Members Ceremony at the 36th IAHR World Congress in Chengdu, China. From left to right: Roger A. Falconer, Nobuyuki Tamai, Wolfgang Rodi, Willi H. Hager and Christopher George.

From left to right: Jing Peng, Joseph H. Lee, Arthur Mynett and Zhaoyin Wang.