

Report on the 28th IAHR Symposium on Hydraulic Machinery and Systems July 4th-8th 2016, Grenoble (France)

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330 delegates, from 32 countries, were present for the symposium jointly organized by Grenoble Institute of Technology (Grenoble INP) and Société Hydrotechnique de France (SHF). Professor Régiane FORTES-PATELLA (Grenoble INP) chaired the Organizing Committee.

183 papers were selected by the Scientific Committee and presented during the conference in a plenary session and three parallel sessions. The scientific program included two specialized workshops:

- The first one concerned the PSP (Pumped Storage Plants)
- The second one was devoted to “hydro-abrasive erosion”

The symposium allowed for very good scientific and technical exchanges between delegates from Industry (47%) and from University (53%). It also brought together students, young researchers and experienced professionals.

A selection of papers will be published in IOP Conference Series: Earth and Environmental Science.

Pumps and turbines of various types, sizes and for a variety of usefulness were of course in the core of the symposium. Fluid mechanics remained the dominant point of interest. Most developments that have been presented concern the use of CFD for the efficient analysis of flows within the machines with regard to more and more complicated situations especially associated to: unsteady phenomena, instabilities, off-design, transients, cavitation. It seems for example that the use of LES is now possible even in complex machine geometries. There is still a need for experimental developments, especially regarding time resolved optical methods, in order to provide detailed data bases for the validation of numerical models and for the estimation of uncertainties associated to numerical simulation.

Of course, all what concerns the effects of interactions between machines and systems remains also in the core of the symposium. Here again, most of the presented papers in the field concern the development of accurate numerical approaches with efforts regarding the experimental validation especially about the complexity of the systems and the possible occurrence of multiphase flows and associated problems. One important topic concerns the accurate extrapolation from reduced model to prototype.

Furthermore, it is clear that interactions of fluid mechanics with other scientific or technical disciplines become a major point of interest, regarding especially:

- Effects of fluid flow, especially with cavitation but also when sediments are present in the flow, on material erosion, a problem of great importance for machines life cycle.

- Fluid structure interactions with reference to vibration problems and also damage and failure of structures: a special attention to risk, safety and lifetime prediction was discussed during these sessions.
- Optimal design of machines, of course a very important topic for pumps and turbines manufacturers, but with too few presentations probably due to competitive aspects.
- Development of sustainable hydropower, with presentations regarding various types of machines especially for Micro and even Pico-hydropower plants
- Examples of various problems linked to pumped storage plants, with especially environmental, economical and even contractual aspects.

The next Symposium on Hydraulic Machinery and Systems will be held in Kyoto, Japan, in September 2018 (September 17th – 21th). The symposium web site is already opened: <http://www.iahrkyoto2018.org/>