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6TH INTERNATIONAL SYMPOSIUM ON HYDRAULIC STRUCTURES: A RETROSPECT

JUNE 27-30, 2016, PORTLAND OREGON, USA

BY BRIAN M. CROOKSTON, BLAKE P. TULLIS, MICHELE PALERMO & DANIEL B. BUNG

The gathering of engineers, practitioners, and scientists at the 6th International Symposium on Hydraulic Structures (ISHS2016), held in Portland, Oregon June 27-30, 2016, represented a valuable opportunity for knowledge exchange, perspectives, and networking regarding critical issues and design perspectives related to hydraulic structures. Co-sponsored by IAHR and the U.S. Society on Dams, a total of 136 participants attended the event, representing 18 countries and 5 continents. The largest delegation came from the host country (USA) with 94 participants. Experts from practice, research, and implementation were well represented and included delegates from key U.S. Federal entities U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, U.S. Federal Energy Regulatory Commission, U.S. Department of Agriculture, and the Tennessee Valley Authority.

The symposium began with a full-day workshop focused on stepped spillway hydraulics, team-taught by two leading experts: Prof. Dr. Hubert

Chanson (University of Queensland) and Dr. Sherry Hunt (USDA-ARS). About 40 individuals attended this specialty workshop, which emphasized hydrodynamics of stepped spillways, applied research, design, operational records, and group discussions.

The symposium also included four notable keynote speakers. Dr. Anton Schleiss, professor and Director of LCH at EPFL (Switzerland) and current ICOLD president, discussed Interaction of Hydraulic Structures with Air, Water, and Rock – the Challenges of Researchers and Designers. Dr. Vijay Singh, professor at Texas A&M, discussed Hydraulic Structures and Entropy-Based Modeling. Philip Burgi (U.S. Bureau of Reclamation-Retired) provided insights on Challenges in Design and Use of Hydraulic Structures in Response to New Realities. Thomas North (U.S. Army Corps of Engineers) discussed Hydraulic Structures, the Future of Design.

The symposium included 13 technical sessions featured 75 presenters, and covered a wide range of topics including:

- spillway hydraulics, stepped spillways, 3D weirs
- scour, erosion, and sedimentation
- energy dissipation
- canals and waterways
- coastal structures
- operation, maintenance, and dam safety risk assessments
- ship locks and spillway gates
- dam rehabilitation
- fish passage
- pressurized flows

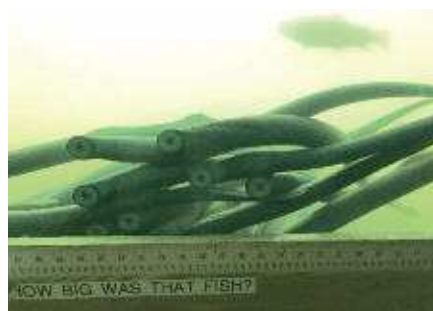
A highlight of the technical program also included the specialty session on large river basin management and the role of hydraulic structures. Three of the most significant river systems in the US were discussed: the Tennessee River System (Keil Neff, Tennessee Valley Authority), the Colorado River Basin (Daniel Bunk, U.S. Bureau of Reclamation), and the Columbia River Basin (Peter Dickerson, U.S. Army Corps of Engineers).

The Columbia River Basin represents one of the key waterways in the US. Dams have been built along the river course to improve navigation and generate hydropower while preserving natural resources such as fisheries. Bonneville Lock and Dam is one of the most significant structures on the river and is operated by the U.S. Army Corps of Engineers. A field tour took place on the last day of the symposium. Participants had the chance to visit the Bonneville Lock and Dam, including a close-up inspection of the power house, lock, and fish passage facilities. En route, the field tour stopped at Multnomah Falls, followed by the Bonneville Fish Hatchery operated by the Oregon Department of Fish and Wildlife. Special thanks to the U.S. Army Corps of Engineers for working closely with event organizers to arrange this memorable field tour!

A total of 77 manuscripts comprise the ISHS2016 Proceedings-Hydraulic Structures and Water Systems Management



Field Tour: Gated Spillway at Bonneville Dam and Multnomah Falls



Field Tour: Fish Ladder at Bonneville Dam

(ISBN 978-1-884575-75-4). Each paper was thoroughly peer-reviewed for technical quality and presented at the Symposium. 65 individuals formed the International Peer Review Panel. The Proceedings was published by Utah State University and is available open access at <http://digitalcommons.usu.edu/ishs/2016/>. Each manuscript includes the ISBN of the Proceedings as well individual direct object identifiers (DOI). Each manuscript is indexed by Scopus and Compendex. [During the first 2 months following publication, there have been over 2,200 downloads from six continents.] ■

ISHS2016 would not have been a success were it not for the support and involvement of the following organizations: American Academy of Water Resources Engineer of ASCE, Association of State Dam Safety Officials, Bechtel Corporation, École Polytechnique Fédéral de Lausanne, FH Aachen University of Applied Sciences, FH Lübeck University of Applied Sciences, Instituto Superior Técnico, International Association of Hydro-environment Engineering and Research, International Congress on Large Dams, Schnabel Engineering, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, U.S. Federal Energy Regulatory Commission, Université de Liège, United States Society of Dams, University of Queensland, University of Pisa, University of Coimbra, USDA Agricultural Research Service, Utah State University, Utah Water Research Laboratory and West Consultant. Special thanks to our financial sponsors: Schnabel Engineering, West Consultants, ACF Environmental, Gannett Fleming, and HDR.



Brian M. Crookston, PhD, PE, M.ASCE, (ISHS2016 Scientific Chair) is a Senior Engineer with Schnabel Engineering.

His consulting and research interests are focused on water conveyance, including the design of hydraulic structures, nonlinear spillways, flow acoustics, energy dissipators, scour, fish passage, dam breaches and flooding, and physical and numerical modeling of hydraulic structures. Prior to joining Schnabel, Brian obtained a PhD from Utah State University and was a researcher at the Utah Water Research Laboratory.



Blake P. Tullis, PhD, F.ASCE, (ISHS2016 Scientific Vice-Chair) is an associate director at the Utah Water Research Laboratory and professor at Utah State University.

He conducts research in the areas of labyrinth and piano key weirs, weir submergence, culvert hydraulics, and fish passage. Blake teaches courses on hydraulic structure design, pipeline hydraulics, and fluid mechanics.



Michele Palermo, PhD, is a Researcher at the University of Pisa, Italy. His main scientific interests are localized scour phenomena

downstream of hydraulic structures, design of eco-friendly structures for river restoration, scour control at bridge piers, plunge pool scour process, physical modeling of hydraulic structures, and hydraulic jump on rough beds.



Daniel B. Bung is a Professor for Hydraulic Engineering at FH Aachen University of Applied Sciences, Germany, since 2012. He finished his

studies in Civil Engineering at Bergische University of Wuppertal, Germany, where he was also awarded his doctoral degree in 2009. In his PhD project, he studied flow properties of self-aerated stepped spillway flows by means of experimental work. His main research interests are air-water flows, gas transfer, and experimental and numerical modeling with a focus on hydraulic structures.

W.A.T.E.R. Summer School

W.A.T.E.R.: Workshop on Advanced measurement Techniques and Experimental Research is a hands-on approach Summer School.

It is focused on experimental methods and measurement techniques used in Hydraulics, both in laboratory and field environments, using state of the art equipment. It is addressed to PhD and Master students interested and involved in research domain related to hydraulics (Maritime, Coastal, Fluvial, Environmental, etc.) in which the know-how of experimental techniques is required. Young professionals, engineers, and practitioners who are willing to get training in advanced measurement techniques are also welcome.

The 2nd edition will take place in Ostend, Belgium, from October 2nd to 6th, 2017.

Applications will open soon.

For more information: watersummerschool.wordpress.com



PIV measurements: flow around a cylinder.



Participants of the 1st edition on board of the research vessel Simon Stevin.

The W.A.T.E.R. Summer school is organized by:

