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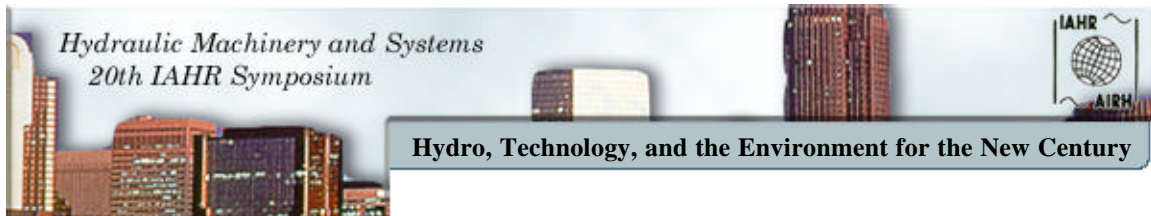
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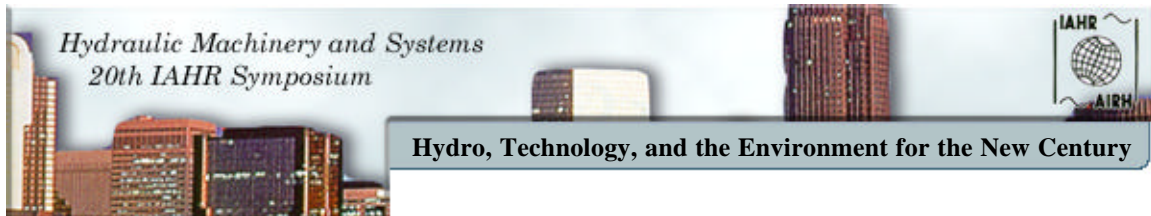
1. CAVITATION IN HYDRAULIC PRESSURIZED SYSTEMS AND COMPONENTS

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- CAV-02 [Experience With Model and Field Testing of Cavitation of Low Head Kaplan Turbines](#)
By: Igor Kern, B. Sc.; Tomaz Rus, M. Sc.; Djelic Vesko, M.Sc., Manager of Turbine R&D, Turboinstitut
- CAV-03 [The Prediction of Cavitation Hydrodynamic Aggressiveness](#)
By: Antoine St-Hilaire, Eng., IT, Design Specialist and Michel Sabourin, Eng., Chief Engineer, ABB ALSTOM POWER Canada Inc.; Prof. Claire Deschenes, Ph.D., Laboratoire de machines hydrauliques, Laval University
- CAV-04 [Unsteady Operation Due to Cavitation](#)
By: Prof. Roger E.A. Arndt, University of Minnesota, St. Anthony Falls Laboratory; Andreas Keller, Associate Professor of Mechanical Engineering, Technical University of Munich; Morten Kjeldsen, Research Associate, Norwegian University of Science and Technology

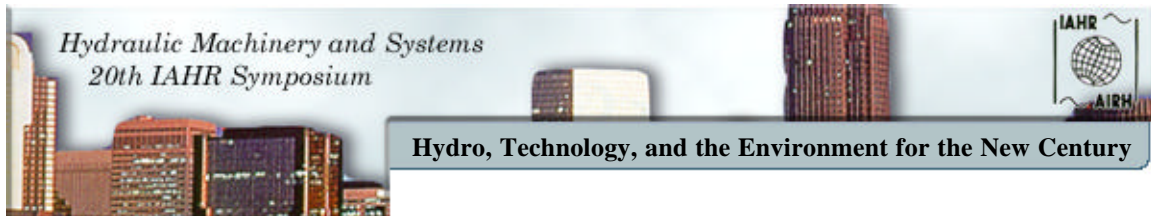
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- CFD-F02 [Separate and Coupled CFD Simulation of a Flow in a Francis Turbine](#)
By: Dragica Jost, M.Sc., Turboinstitut; Prof. Leopold Skerget, Ph.D., Faculty for Mechanical Engineering, University of Maribor
- CFD-F03 [Effect of Grid Size in CFD Code on Flow Through Francis Turbine](#)
By: Prof. Dr. Takashi Kubota, Kanagawa University; Prof. Dr. Fengqin Han, Huazhong University; Tomokazu Kuwayama, Hydr. Engineer, and Jun Masuda, Vice Director, Nippon Koei
- CFD-F05 [Boundary Shear Stress, Velocity Distribution and Wall Functions in Smooth 3-D Channels](#)
By: Shu-Qing Yang, Department of Civil Engineering, The National University of Singapore



- CFD-F06 [Computation of Fluid Flow in a Model Draft Tube Using Mesh Adaptive Techniques](#)
By: Thi C. Vu, Senior Development Engineer, GE Hydro; Francois Guibault, Assistant Professor, Ecole Polytechnique de Montreal, Julien Dompierre, Research Professional, CERCA; Paul Labbe, Research Professional, CERCA, Ricardo Camarero, Head Mechanical Engineering Department, Ecole Polytechnique de Montreal
- CFD-F08 [Improving Efficiency of a 195 MW Francis Turbine Using Numerical Simulation Tools](#)
By: Bernard Masse, Maryse Page, Anne-Marie Giroux and Robert Magnan, Institut de recherche d'Hydro Quebec
- CFD-F09 [CFD-Calculation of Swirlflow in a Conical Diffuser and Bend](#)
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- CFD-F10 [Report from Turbine-99 -- Workshop on Draft Tube Flow in Porjus, Sweden, 20-23 June 1999](#)
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- CFD-F15 [Three-Dimensional Turbulent Flow Analysis Through a Pump-Turbine Runner at Pump Modes](#)
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By: Manfred Sallaberger and Marcello Fisler, VA Tech Escher Wyss; Manuel Michaud, Klaus Eisele, and Michael Casey, Sulzer Innotec
- CFD-F20 [Numerical and Experimental Analysis of Pelton Turbine Flow Part 2: The Free Surface Jet Flow](#)
By: Felix A. Muggli and Zhengji Zhang, Sulzer Ltd., Fluid Dynamics Laboratory; Christoph Scharer and Lothar Geppert, VA Tech Escher Wyss Ltd.



- CFD-F21 [Numerical and Experimental Analyses of Pelton Turbine Flow Part 1: Distributor and Injector](#)
By: Mirjam Sick, Marc Schindler, Peter Drtina, Christoph Scharer and Helmut Keck, VA Tech Escher Wyss Ltd.

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By: Dipl.-Ing. Wondwossen Aysheshim, Prof. Dr.-Ing. Bernd Stoffel, Institute of Turbomachinery and Fluid Power, Darmstadt University of Technology
- CFD-G02 [Numerical and Experimental Investigations on a Centrifugal Pump Stage With and Without a Vaned Diffuser: Numerical Part](#)
By: Dipl.-Ing R. Skoda, Research Assistant and Prof. Dr.-Ing. R. Schilling, Head of Institute, Institute of Hydraulic Machinery, University of Technology
- CFD-G03 [A Numerical Method for Predicting the Cavitation Inception of a Submerged Vortex in Pump Sumps](#)
By: Takanori Shibata and Ryuichiro Iwano, Power & Industrial Systems R&D Lab, Hitachi Ltd.; Takahide Nagahara and Tomoyoshi Okamura, Industrial Machinery Systems Division, Hitachi Ltd.

2C. Unsteady Calculations in Turbines and Pumps

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- CFD-S03 [Numerical Simulation of a Complete Francis Turbine Including Unsteady Rotor/Stator Interactions](#)
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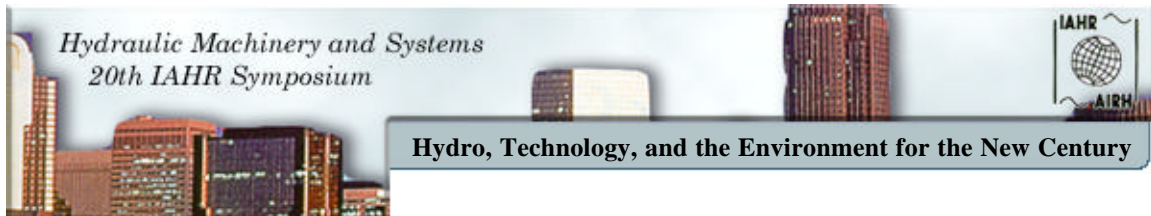


- CFD-S05 [Experimental and Numerical Study of Pressure Fluctuations in High Head Pump-Turbine](#)
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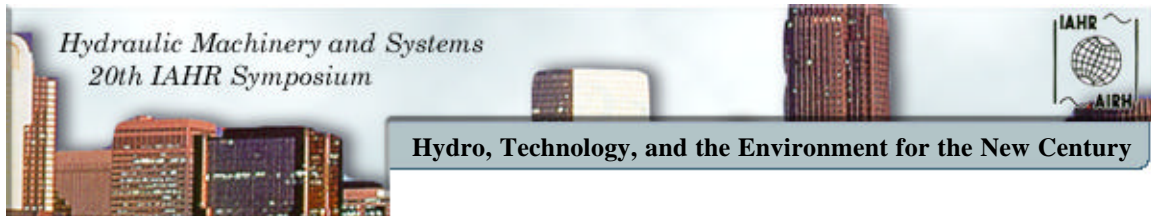
3. PRACTICAL APPLICATIONS OF HYDRAULIC MACHINERY/INNOVATIVE TECHNOLOGY FOR SMALL AND LARGE HYDROELECTRIC POWER PLANTS AND PUMPING STATIONS

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- B-04 [The Development of PTFE Faced Thrust Bearing for Dinorwig Pumped Storage Power Station](#)
By: Eur.Ing. Robert T. Knox, Michell Bearings, and William O. Moss, First Hydro Company, Dinorwig Power Station
- B-05 [Hooped Pelton Runners](#)
By: B. Michel, Hydraulic Engineer, Deputy Head of Francis/Pelton Group; G. Rossi, Mechanical Engineer; P. Leroy, Hydraulic Engineer; P. Y. Lowys, Mechanical Engineer, ABB Alstom Power Hydro
- B-06 [Deviation Angle of a Free Jet in Pelton Turbines](#)
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By: Ramesh Chander, Director (Hydro), and Suneel Grover, AEE (Electrical), H.P. State Electricity Board



- DES-03 **Runner Design Considerations for the Bankhead Hydroelectric Runner Replacement Project**
By: Hung Do, Hydraulic Design Engineer, Andre Coutu, Senior Mechanical Engineer, Philippe Seguin, Senior Hydraulic Engineer, GE Hydro; Danny Minor, Project Manager, Alabama Power Company
- DES-04 **Model Development for the Grand Coulee Turbine Upgrade**
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- DES-11 **Dynamic Pressure Measurements on a Model Turbine Runner and Their Use in Preventing Runner Fatigue Failure**
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By: Kazuyoshi Miyagawa, Takasago R&D Center, Mitsubishi Heavy Industries, Ltd.; Kunio Yasuda and Yoshihiro Iwasaki, Takasago Machinery Works, Mitsubishi Heavy Industries, Ltd.



DES-14 **Competitive Design of High Performance Pelton Turbines**
By: Stale Risberg, Research Engineer, Olav Rommetveit, Research Engineer, Jan Otto Haugen, Senior Research Engineer, GE Energy (Norway); Prof. Hermod Brekke, Norwegian University of Science and Technology

DES-15 **Challenges for the Next Generation of Turbine Designs**
By: Hua Jian, Hu Donyu, Jiang Dengyun, Chengdu Hydroelectric Investigation and Design Institute of State Power Corporation

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By: R.J.H. Dijkers, Hydraulic Engineer; F.C. Visser, Section Head Product Design & Development; and J.G.H. op de Woerd, Senior Hydraulic Engineer, Flowserve, R.E.D.

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By: J. Kurokawa, K. Matsumoto, J. Matusi, and H. Imamura, Department of Mechanical Engineering, Yokohama National University

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By: Prof. Juh-hu Yang, Hydraulic Machinery Division, Gansu University of Technology

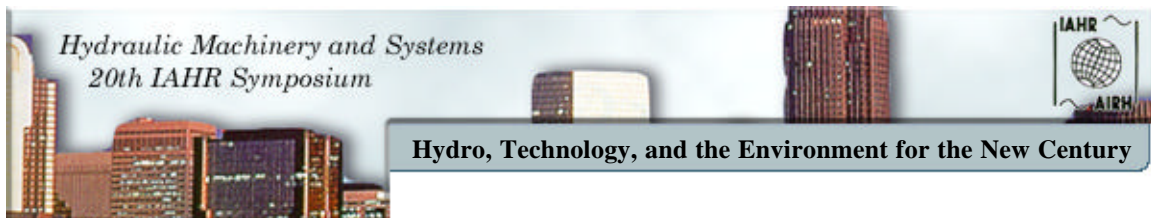
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By: Anton Anton and Andrei Georgescu, Technical University of Civil Engineering Bucharest; Gabriel Dan Ciocan and Jean-Louis Kueny, Grenoble University of Technology

PD-05 **Analysis of a Standard Pump in Reverse Operation Using CFD**
By: MSc. A. Tamm, Prof. Dr.-Ing. B. Stoffel and Dr.-Ing. G. Ludwig, TU Darmstadt, Institute of Turbomachinery and Fluid Power, Mech. Ing. A. Braten, NTNU Trondheim, Faculty for Mechanical Engineering

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By: J. Kurokawa, A. Kajigaya, J. Matusi, H. Imamura, Department of Mechanical Eng., Yokohama National University

DY-02 **Pressure Pulsation Measurements on a Prototype Francis Turbine**
By: Thomas Vekve, Ph.D. student, and Professor Hermod Brekke, Norwegian University of Science and Technology; Per Egil Skare, Ph.D., SINTEF Energy Research



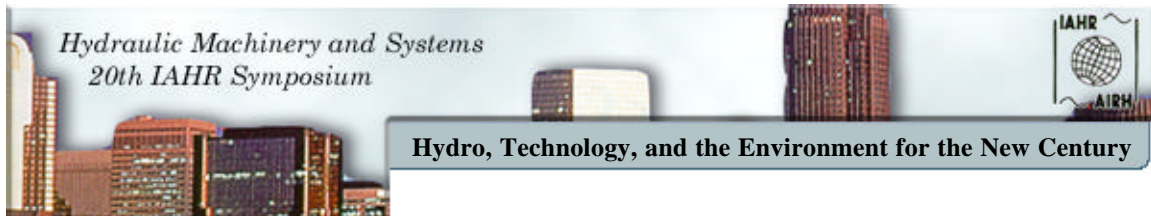
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By: Paul Fetfatsidis, Steven Sommer and Salaiyur Thirumalaisamy, Northern Research and Engineering Corporation; George Hecker and Stuart Cain, Alden Research Laboratory
- ENV-03 **Fish Friendly Kaplan Turbine**
By: Maryse Francois, Head of Technology Center; Phong Vinh, Dr. Eng., Hydraulic Expert Engineer, Technology Center; Patrice Mora, Hydraulic Engineer, Technology Center, AAP Hydro

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By: Benoit Papillon, M.Sc., Design Specialist, Juliusz Kirejczyk, Ph.D., Design Specialist, and Michel Sabourin, M.Sc.A., Chief Engineer, ABB Alstom Power Canada, Inc.



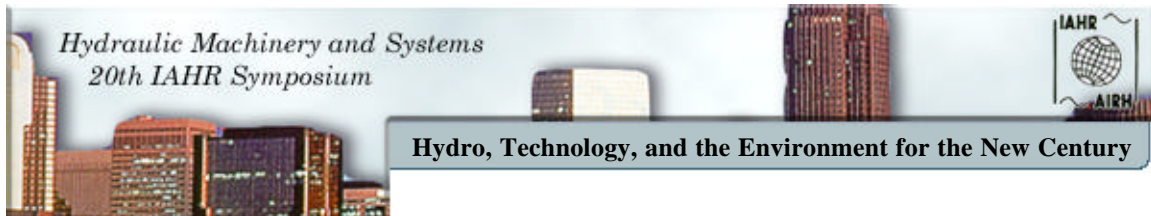
- GU-03 [Experimental Analysis of Velocities in the Outlet Part of a Radial Flow Pump Impeller and the Vaneless Diffuser Using Particle Image Velocimetry](#)
By: G. Wuibaut, P. Dupont, G. Caignaert and M. Stanislas, Laboratoire de Mecanique de Lille

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By: E. Egusquiza, A. Estevez, J. Cabrera, and R. Vega, Department of Fluid Mechanics, UPC
- MON-06 [Control of CAM Characteristics of the Kaplan Turbine by On-Site Measurements](#)
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- I-2 [Unsteady Flow Analysis in Hydraulic Turbomachinery](#)
By: Albert Ruprecht, Institute of Mechanics and Hydraulic Machinery, University of Stuttgart