

**Plenary session**

8h30-9h	
9h00-10h	
10h00-10h30	
10h30-10h50	coffee break
10h50-11h20	000165.pdf M Coulaud, R Fraser, J Lemay, P Duquesne, V Aeschlimann, C Deschènes Preliminary Investigation of Flow Dynamics during the Startup of a Bulb Turbine Model
11h20-11h50	000237.pdf C. JACQUET, R. FORTES-PATELLA, L. BALARAC, J.-B. HOUELINE CFD Investigation of Complex Phenomena in S-shape Region of Reversible Pump-Turbine

**transfer to ENSE3 building**

11h50-12h20	
12h20-13h30	lunch

**Computational and experimental techniques.I**

13h30-13h55	000115.pdf V. HASMATUCHI, A.I. BOSIQC, C. MÜNCH-ALLIGNÉ On the Dynamic Measurements of Hydraulic Characteristics
13h55-14h20	000145.pdf I. MURGAN, C. IOANA, I. CANDEL, A. ANGHEL, B. REEB, G. COMBES (A new time of flight) Acoustic flow meter using wide band signals and adaptive beamforming techniques
14h20-14h45	000149.pdf I. MURGAN, I. CANDEL, C. IOANA, A. DIGULESCU, F. BUNEA, G. CIOCAN, A. ANGHEL Flow velocity profiling using acoustic time of flight flow metering based on wide band signals and beamforming techniques
14h45-15h10	000231.pdf V. FABRE, F. ANDRE, A. DUPARCHY, P-Y. LARROZE State of the art in hydraulic turbine model test
15h10-15h35	000176.pdf V. AUMELAS, G. MAJ, Y. LECOFFRE, J.-P. FRANC Micro-bubbles seeding for flow characterization

**Pumps.I**

000135.pdf K. Hirata, T Maeda , T Nagura, T Inoue Three-dimensional flow observation on the air entrainment into a vertical-wet-pit pump
000090.pdf Z. CHEN, Y.-B. LEE, K.-Y. KIM, Y.-D. CHOI Effect of suction pipe leaning angle and water level on the internal flow of pump sump
000108.pdf Y. YAMADE, C. KATO, T. NAGAHARA, J. MATSUI Numerical investigations of submerged vortices in a model pump sump by using Large Eddy Simulation
000141.pdf D. ZI, F. WANG, Z. YAO Numerical simulation on rectifying flow in intake system of a pumping station connected with headrace pipe
000221.pdf A. DE FOCKERT, F. VERHAART, Z. CZARNOA Verifying the effect of swirl angles on the pump efficiency by means of a 1:1 scale model test

**Workshop PSP.I**

000198.pdf C. VILADRICH, F. LEVEQUE, C. TOGNA, L. MELLOUKI PSPP's and their role for the integration of variable renewable energy sources in Morocco
000253.pdf C. STENS, S. RIEDELBAUCH Investigation of a Fast Transition from Pump Mode to Generating Mode in a Model Scale Reversible Pump Turbine
000216.pdf P.-T. STORLI A Novel Method of Increasing the Energy Storage at Existing Pumped Storage Power Plants.
000073.pdf M. YASUDA, S. WATANABE How to Avoid Severe Incidents at Pumped Storage Power Plants
000228.pdf P. MARUZEWSKI, Y. SAPIR, F. HENARD, T. SAUTEREAU, H. BARAK, J.-C. BLAIX GILBOA PSPP: The First Israeli Hydro-Electric Pumped Storage Power Plant

15h35-15h50	coffee break
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**Computational and experimental techniques.II**

15h50-16h15	000071.pdf R. FRASER, M. COULAUD, V. AESCHLIMANN, J. LEMAY, C. DESCHÈNES Method for experimental investigation of transient operation on Laval test stand for model size turbines
16h15-16h40	000245.pdf U. PIOMELLI, J. NICOLLE, A.-M. GIROUX, R. DUTTA Evaluation of turbulence models on roughened turbine blades
16h40-17h05	000242.pdf M. MELOT, B. NENNEMANN, C. Verification of transport equations in a general purpose commercial CFD code.
17h05-17h30	000154.pdf N. ADAM, G. DE CESARE, S. RICHARD, C. MÜNCH-ALLIGNÉ, A. SCHLEISS Head loss coefficient through sharp-edged orifices
17h30-17h55	000109.pdf L. Yang, S. Nadarajah A Low-Dissipation Monotonicity-Preserving Scheme for Turbulent Flows for Hydraulic Turbines
17h55-18h20	

**Pumps.II**

000005.pdf Y. HENG, A. DAZIN, N. OUARZAZI, Q. SI Experimental Study and Theoretical Analysis of the Rotating Stall in a Vaneless Diffuser of Radial Flow Pump
000049.pdf H.-S. SHIM, K.-Y. KIM Numerical Investigation on Hydrodynamic Characteristics of a Centrifugal Pump with a Double Volute at Off-Design Conditions
000062.pdf J.-H. KIM, B.-M. CHO, Y.-S. CHOI, K.-Y. LEE, J.-H. PECK Optimized Reduction of Unsteady Radial Forces in a Single-channel Pump for Wastewater Treatment
000263.pdf S. SUN, P. GUO, Y. HUANG, J. ZUO, X. LUO Three dimensional numerical analysis of the transient flow in a scroll hydraulic pump
000128.pdf C. XIA, L. CHENG, C. LIU, J. ZHOU, F. TANG, Y. JIN Hydraulic Performance of Diving Tubular Pump

**Workshop PSP.II**

000195.pdf Z. GIJEN, M. NEDELJKOVIĆ, Y. CHENG Pump-turbine characteristics for analysis of unsteady flows
000063.pdf X. YU, J. ZHANG, S. CHEN, J. LIU Stability Analysis of the Governor-turbine-hydraulic System of Pumped Storage Plant During Small Load Variation
000246.pdf B. GEISSELER Critical issues in the planning and execution phase of a pump storage or any other hydro power plant - possibilities and limits of contractual solutions.
Jean-Jacques HEROU Did Portugal run for four days on renewables alone? Thanks to more than 40 % of hydraulic, and by means of Spain.

**Tuesday July 5th**

**Computational and experimental techniques.III**

8h20-8h45	000232.pdf	R. LESTRIEZ, E. AMET, B. TARTINVILLE, C. HIRSCH	Non-Linear Harmonic flow simulations of a High-Head Francis Turbine test case
8h45-9h10	000205.pdf	R. CAPPATO, F. GUIBAULT, C. DEVALS, B. NENNEMANN	Numerical Study of Rotor-Stator Interactions in a Hydraulic Turbine with Foam-extend
9h10-9h35	000026.pdf	M. SCHLIPF, A. TISMER, S. RIEDELBAUCH	On the Application of Hybrid Meshes in Hydraulic Machinery CFD Simulations
9h35-10h00	000056.pdf	T. KRAPPEL, A. RUPRECHT, S. RIEDELBAUCH, R. JESTER-ZUERKER, A. JUNG, B. FLURL, F. UNGER	Turbulence Resolving Flow Simulations of a Francis Turbine in Part Load using Highly Parallel CFD Simulations

10h00-10h20 coffee break

**Computational and experimental techniques.IV**

10h20-10h45	000066.pdf	Q. CHATENET, A. TAHAN, M. GAGNON, J. CHAMBERLAND-LAUZON	Numerical model validation using experimental data: Application of the area metric on a Francis runner
10h45-11h10	000068.pdf	S. CHITRAKAR, B. THAPA, O. DAHLHAUG, H. NEOPANE	Numerical investigation of the flow phenomena around a low specific speed Francis turbine's guide vane cascade
11h10-11h35	000012.pdf	C. MENDE, W. WEBER, U. SEIDEL	Progress in Load Prediction For Speed No Load Operation in Francis Turbines
11h35-12h00	000082.pdf	C. BERGAN, R. GOYAL, M.J. CERVANTES, O. DAHLHAUG	Experimental Investigation of a High Head Model Francis Turbine During Steady-State Operation at Off-Design Conditions
12h00-12h25	000017.pdf	B. THAPA, O. DAHLHAUG, B. THAPA	Velocity and pressure measurements in guide vane clearance gap of a high head Francis turbine

12h25-13h30 lunch

**Pelton turbines**

13h30-13h55	000013.pdf	R. MACK, C. PROBST	Evaluation of the dynamic behavior of a Pelton runner based on strain gauge measurements
13h55-14h20	000130.pdf	B. SOLEMSLIE, O. DAHLHAUG	A reference pelton turbine - High speed visualization in the rotating frame
14h20-14h45	000143.pdf	T. KUMASHIRO, H. FUKUHARA, K. TANI	Unsteady CFD simulation for bucket design optimization of Pelton turbine runner
14h45-15h10	000197.pdf	M. RENTSCHLER, A. KARAKOLCU, J.-C. MARONGIU, M. NEUHAUSER, E. PARKINSON	Understanding casing flow in Pelton turbines by numerical simulation
15h10-15h35	000076.pdf	C. ZENG, Y. XIAO, J. ZHANG, Z. WANG, Y. LUO	Numerical Analysis of Pelton Nozzle Jet Flow Behavior Considering Elbow Pipe

**Pumps.III**

000118.pdf	Y. LONG, J. YIN, D. WANG	The Effect of the Channel Head on the Unsteady Pressure Pulsation Characteristics at the Inlet and Outlet of Reactor Coolant Pumps
000059.pdf	L. HAN, H. WANG, R. GONG, D. LI, J. ZHAO, Y. GAO	Dynamic Simulation in Guide Vane Opening Process of a Pump Turbine in Pump Mode
000148.pdf	L. ZHENG, H. DOU, X. CHEN, Z. ZHU, B. CUI	Numerical Simulation of Pressure Fluctuation around the Tongue Region in a Centrifugal Pump
000153.pdf	G. BOITEL, D. FEDALA, N. MYON	Tip clearance effects on loads and performances for different specific speed semi-open impeller centrifugal pumps

**Pumps.IV**

000016.pdf	S. MUNTEAN, A.I. BOSIQC, I. DRAGHICI, L.E. ANTON	Hydrodynamic Analysis of the Flow Field Induced by a Symmetrical Suction Elbow at the Pump Inlet
000219.pdf	R. PRUNIÈRES, Y. INOUE, T. NAGAHARA	Investigation of the Flow Field and Performances of a Centrifugal Pump at Part Load
000091.pdf	A.I. BOSIQC, S. MUNTEAN, I. DRAGHICI, L.E. ANTON	Hydrodynamic Analysis of the Flow in an Axial Rotor and Impeller for a Large Storage Pump
000006.pdf	A.-C. BAYEUL-LAINÉ, P. DUPONT, A. DAZIN	Investigations at low flowrates inside a vaned diffuser of a centrifugal pump
000182.pdf	S. HÖLLER, H. BENIGNI, H. JABERG	Investigation of the 4-Quadrant behaviour of a mixed flow diffuser pump with CFD-methods and test rig evaluation

**Pump turbines.I**

000067.pdf	M. GUGGENBERGER, F. SENN, H. JABERG, M. SALLABERGER, A. GEHRER	Experimental analysis of the flow pattern on the suction side of a pump turbine in pump mode
000100.pdf	D. LI, H. WANG, T.K. NIELSEN, R. GONG, X. WEI, D. QIN	Flow characteristics in pump mode under different guide vane openings of a pump turbine model
000214.pdf	X. ZHANG, R. BURGSTALLER, X. LAI, A. GEHRER, A. KEFALAS, Y. PANG	Experimental and Numerical Analysis of Performance Discontinuity of a Pump-Turbine under Pumping Mode
000139.pdf	L. XIA, Y. CHENG, J. YOU, Y. JIANG	CFD Analysis of the Runaway Stability of a Model Pump-Turbine
000211.pdf	U. JEŠE, R. FORTES-PATELLA	Unsteady Numerical Analysis of the Rotating Stall in Pump-Turbine

**Fluid/structure interactions.I**

000258.pdf	H. NISHIMURA, H. HORIGUCHI, T. SUZUKI, K. SUGIYAMA, Y. TSUJIMOTO	Sub- and Super-Synchronous Self-Excited Vibrations of a Columnar Rotor Due to Axial Clearance Flow
000121.pdf	Q. WU, G. WANG, B. HUANG	Physical and Numerical Investigation of the Flow Induced Vibration of the Hydrofoil
000114.pdf	J.-P. GAUTHIER, A.-M. GIROUX, S. ETIENNE, F. P. GOSSELIN	CFD evaluation of added damping due to fluid flow over a hydroelectric turbine blade
000282.pdf	D. VALENTIN, D. RAMOS, M. BOSSIO, A. PRESAS, E. EGUSQUIZA, C. VALERO	Influence of the boundary conditions on the natural frequencies of a Francis turbine

**Fluid/structure interactions.II**

000180.pdf	M. EICHHORN, E. DOUJAK, L. WALDNER	Investigation of the Fluid-Structure Interaction of a High Head Francis Turbine Using OpenFOAM and Code Aster
000202.pdf	B. NENNEMANN, C. MONETTE, A. COUTU	Hydrodynamic damping and stiffness prediction in Francis turbine runners using CFD
000010.pdf	B. HÜBNER, W. WEBER, U. SEIDEL	The role of fluid-structure interaction for safety and life time prediction in hydraulic machinery
000173.pdf	J. NICOLLE, J.-F. MORISSETTE	Simulation of air admission in a propeller turbine during transient events
000120.pdf	E. DOLMATOV, S. ILIN, I. KUZNECOV, A. NIKIFOROV	Experience of an assessment of the vertical Francis hydroturbines vibration state at heads from 40 to 300 m

**Damage and failures.I**

000119.pdf	A. LIPEJ, D. MITRUSEVSKI, B. ZAFOSNIK	Energetic, Structural and Thermal Fatigue Analysis of Heavy Duty Process Pumps
000226.pdf	J. OBROVSKÝ, J. ZOUHAR, M. FEILHAUER	Case Study and Numerical Analysis of Resonant Vibration and Runner Cracks for the Lipno I Hydroelectric Project
000077.pdf	A. LYUTOV, A. KRYUKOV, S. CHERNY, D. CHIRKOV	Modelling of a Francis Turbine Runner Fatigue Failure Process Caused by the Fluid-Structure Interaction.
000169.pdf	P. GAUVIN, P. HUARD	Hydrodynamic film thickness measurements and CFD analysis identify the root cause of repetitive thrust bearing failures on a 45 MW hydro generating unit at Hydro-Québec.
000069.pdf	I. DIAGNE, M. GAGNON, A. TAHAN	Modeling the dynamic behavior of turbine runner blades during transients using indirect measurements

15h35-15h50 coffee break

### Kaplan turbines

15h50-16h15	000188.pdf	M. ANGULO, A. RIVETTI, L. DIAZ, S. LISCIA	Air injection tests on a Kaplan turbine: prototype - model comparison
16h15-16h40	000194.pdf	A. RIVETTI, M. ANGULO, C. LUCINO, M. HENE, O. CAPEZIO, S. LISCIA	Implementation of pressurized air injection system in a Kaplan prototype for the reduction of vibration caused by tip vortex cavitation
16h40-17h05	000158.pdf	R. MADDAHAN, M.J. CERVANTES	Numerical Investigation of the Flow Structure in a Kaplan Draft Tube at Part Load
17h05-17h30	000111.pdf	B. WYKROTA, M. FORMAGGIO, E. WURM, S. WEISSENBERGER, E. GOMES, F. ZURHEIDE, D. BARDINET, R. TODESCO	Hydraulic design of the biggest Kaplan unit in Brazil
17h30-17h55	000161.pdf	P. KO, K. MATSUMOTO, H. DING	Design of a Kaplan turbine for a wide range of operating head
17h55-18h20			
18h20-18h45			

### Pump turbines.II

000116.pdf	X. WANG, D. ZHOU, B. ZHU, L. DENG, P. ZHOU	Mechanism Study on Pressure Fluctuation of Pump-turbine Rrunner with Large Blade Lean
000064.pdf	X. ZHAO, Y. XIAO, Z. WANG, Y. YAO	Unsteady Flow Analysis of Pump Mode Small Discharge Condition for a Francis Pump-turbine
000189.pdf	E. CASARTELLI, L. MANGANI, O. RYAN, A. SCHMID	Application of transient CFD-procedures for S-shape computation in pump-turbines with and without FSI
000047.pdf	C. WIDMER, M. SALLABERGER, A. GEHRER, H. JABERG, F. SENN, M. GUGGENBERGER	Comprehensive analysis of the saddle curve of pump turbines in pump mode using PIV and CFD
000020.pdf	M. LENARCIC, C. BAUER, M. GIESE, A. JUNG	Prediction of S-shaped Characteristics in reversible Pump-Turbines using different numerical Approaches
000147.pdf	Q. Liang, Y. Zhao, W. Liu, X. Deng, Q. Shi	Development of an Ultra High Head Reversible Pump Turbine
000033.pdf	D. Liu, Y Z Zhao, X B Liu	Numerical simulation hump characteristic of a low-specific speed model pump-turbine on pump mode

### Damage and faillores.II

000234.pdf	F. BOULOC, A. DUPARCHY, J. GUILLOZET, F. DUPARCHY, P-Y. LOWYS	Mechanical risks prediction on Francis runner by Spatial Harmonic Decomposition
000178.pdf	J.-F. MORISSETTE, J. CHAMBERLAND-LAUZON, B. NENNEMANN, C. MONETTE, A.-M. GIROUX, A. COUTU	Stress predictions in a Francis turbine at no-load operating regime
000200.pdf	H. GISSONI, A. D'AGOSTINI NETO, M. GONÇALVES, R. CARDOSO, A. JUNG, J. MENEGHINI	Engineering Diagnostics for Vortex-Induced Stay Vanes Cracks in a Francis Turbine
000199.pdf	C. MONETTE, H. MARMONT, J. CHAMBERLAND-LAUZON, A. SKAGERSTRAND, A. COUTU, J. CARLEVI	Cost of Enlarged Operating Zone for an Existing Runner
000124.pdf	O. SCHWYZER, N. SAENGER	Alternative Blade Materials for Technical and Ecological Optimization of a Hydraulic Pressure Machine

Wednesday July 6th

## Bulb and propeller turbines

8h20-8h45	000164.pdf	S. WILHELM, G. BALARAC, O. METAIS, C. SEGOUFIN	Head Losses Prediction and Analysis in a Bulb Turbine Draft Tube under different operating conditions using Unsteady Simulations
8h45-9h10	000025.pdf	B. JUNGINGER, S. RIEDELBAUCH	Influence of the Runner Gap on the Flow Field in the Draft Tube of a Low Head Turbine
9h10-9h35	000031.pdf	S. AHN, Y. XIAO, Z. WANG	Numerical analysis of the Coriolis effect on low-head hydraulic turbines
9h35-10h00	000156.pdf	Y. Enomoto, T. Nakamura, N. Ohtake, Y. Zhai, K. Kubo	Numerical simulation of turbulence flow in a Bulb turbine

10h00-10h20 coffee break

## Vortex rope.I

10h20-10h45	000191.pdf	D. RODRIGUEZ, A. RIVETTI, C. LUCINO	High Load Vortex Oscillations Developed in Francis Turbines
10h45-11h10	000035.pdf	A. FREY, O. KIRSCHNER, S. RIEDELBAUCH	Reference measurements on a Francis model turbine with 2D Laser-Doppler-Anemometry
11h10-11h35	000011.pdf	M. MANDERLA, W. WEBER, J. KOUTNIK	Model Measurement Based Identification of Francis Turbine Vortex Rope Parameters for Prototype Part Load Pressure and Power Pulsation Prediction
11h35-12h00	000260.pdf	I. MURGAN, A. DIGULESCU, F. BUNEA, G. CIOCAN, D. BUCUR, G. DUNCA, I. CANDEL, C. IOANA	Cavitating vortex characterization based on acoustic signal detection
12h00-12h25	000015.pdf	S. MUNTEAN, C. TANASA, A.I. BOSIUC	Investigation of the Plunging Pressure Pulsations in a Swirling Flow with Precessing Vortex Rope in a Straight Diffuser

12h25-13h30 lunch

## Vortex rope.II

13h30-13h55	000289.pdf	A. FAVREL, A. MÜLLER, C. LANDRY, K. YAMAMOTO, F. AVELLAN	Space and time reconstruction of the precessing vortex rope dynamics in Francis turbine draft tube by 2D-PIV
13h55-14h20	000008.pdf	R. SUSAN-RESIGA, S. MUNTEAN, C. POPESCU	Swirling Flow Computation at the Trailing Edge of Radial- Axial Hydraulic Turbines
14h20-14h45	000009.pdf	A. STUPARU, R. SUSAN-RESIGA	The Complex Dynamics of the Precessing Vortex Rope in a Straight Diffuser
14h45-15h10	000264.pdf	J. DECAIX, S. ALLIGNÉ, A. MÜLLER, C. NICOLET, F. AVELLAN, C. MÜNCH-ALLIGNÉ	3D RANS Computations used to Calibrated 1D Model: Application for a Vortex Rope at Full Load
15h10-15h35	000274.pdf	R. MATSUZAKA, T. NAKASHIMA, K. MIYAGAWA	Study on flow instability in a diffuser with swirling flow under several conditions of pipe length and swirl intensity

15h35-15h50 coffee break

## Unsteady flow phenomena in hydraulic machines

15h50-16h15	000238.pdf	S. BOUAJILA, T. DE-COLOMBEL, P-Y. LOWYS, T. MAITRE	Hydraulic Phenomena Frequency Signature of Francis Turbines Operating in Part Load Conditions
16h15-16h40	000024.pdf	M. MAGNOLI	Comparison of model measured runner blade pressure fluctuations with unsteady flow analysis predictions
16h40-17h05	000004.pdf	L. ZHOU, Z. WANG, M. LIU, D. LIU, Y. ZHAO	Investigation of Channel Vortices in Francis Turbines
17h05-17h30	000083.pdf	R. GOYAL, C. BERGAN, M.J. CERVANTES, B.K. GANDHI, O. DAHLHAUG	Experimental Investigation on a High Head Model Francis Turbine During Load Rejection
17h30-17h55	000290.pdf	K. YAMAMOTO, A. MÜLLER, A. FAVREL, C. LANDRY, F. AVELLAN	Numerical and experimental evidences of the inter-blade cavitation vortex development in the deep part load operation of a Francis turbine

## Systems.I

000210.pdf	Z. ZHANG	Transient Flows in Pipe System with Combined Pump Shut-off and Ball Valve Closing
000227.pdf	H. OLLIVIER, J.L. TORIBIO, B. SPENNATO	Modernization of EDF's BELIER Software for Analysis of Transients Phenomena in Hydroelectric Power Plants
000293.pdf	S. ALLIGNÉ, C. NICOLET, A. BÉGUIN, C. LANDRY, J. GOMES, F. AVELLAN	Hydroelectric System Response to Part Load Vortex Rope Excitation
000023.pdf	P. DOERFLER	Cavitation Influence in 1D Part-load Vortex Models

## Systems.II

000230.pdf	A. SIMON, J.-J. MARTINEZ-MOLINA, R. FORTES-PATELLA, C. REBATTET, R. BRILLAULT, A. KERNILIS	Acoustic characterization of hydraulic systems: application to POGO phenomenon
000106.pdf	M. GAGNON, J. NICOLLE, J.-F. MORISSETTE, M. LAWRENCE	A look at Francis runner blades response during transients
000065.pdf	Y. TENG, J. YANG, W. GUO, J. CHEN	The worst moment of superposed surge wave in upstream series double surge tanks of hydropower station
000163.pdf	A. BERGANT, U. KARADZIC	Dynamic Behaviour of Trapped Air Pocket in a Laboratory Pipeline Apparatus
000134.pdf	W C Guo, J D Yang, J P Chen, Z Y Peng, Y Zhang, C C Chen	Simulation for the transient processes of load rejection under different accident conditions of hydroelectric generating set

## Systems.III

000110.pdf	H. MESNAGE, M. ALAMIR, N. PERRISSIN-FABERT, Q. ALLOIN	Constrained, model based control, for minimum-time start of hydraulic turbines
000018.pdf	J. CHEN, J. YANG, W. GUO	Bifurcation Analysis of Hydraulic Turbine Regulating System with Saturation Nonlinearity for Hydropower Stations with Upstream and Downstream Surge Chambers
000138.pdf	Z. MA, Q. WU	The Dynamic Analysis of Hydropower House and Unit System in Coupled Hydraulic-mechanical-electric Factors
000265.pdf	B. SVINGEN	A Predictive Controller based on Transient Simulation for Controlling a Power Plant
000070.pdf	W. YANG, P. NORRLUND	Analysis on regulation strategies for extending service life of hydro power turbines

## Systems.IV

000007.pdf	Z. PENG, J. YANG, W. GUO	Transient characteristics of the hydro-turbine governing system under coupling action of surge tank and power grid
000113.pdf	F. DE KERRET, I. BENITO, C. BEGUIN, S. ETIENNE	Two-phase flow pattern recognition in a pipe with varying section using Artificial Intelligence.
000241.pdf	R. AUTRIQUE, E. RODAL	Experimental Verification of Steel Pipe Collapse under Vacuum Pressure Conditions
000060.pdf	X. Zhang, Y. Cheng, L. L. Xia and J. Yang	CFD simulation of reverse water-hammer induced by collapse of draft-tube cavity in a model pump-turbine during runaway process
000050.pdf	C. BRENNEN	On the dynamics of cavitating pumps

## Workshop hydro-abrasive erosion I

Introduction				
08:20	08:25	00:05	Welcome address and program of the day	Prof. Dr. R. M. Boes, VAW, ETH Zürich, Switzerland
08:25	08:55	00:30	Hydro-abrasive erosion of hydraulic turbines caused by sediment - a century of research and development	Prof. Dr. R. M. Boes, VAW, ETH Zürich, Switzerland
08:55	09:25	00:30	Forces acting on particles in a Pelton bucket and similarity considerations for erosion	A. Rai / Prof. Dr. A. Kumar, IIT Roorkee, India; / Prof. Dr. T. Staubli, Hochschule Luzern, Switzerland
Quantifying the sediment load				
09:25	09:55	00:30	Acoustic measuring techniques for suspended	Prof. Dr. P. Gruber, Hochschule Luzern, Switzerland

## Workshop hydro-abrasive erosion II

10:20	10:50	00:30	Field application of a multi-frequency acoustic instrument to monitor sediment for silt erosion study in Pelton turbine in Himalayan region, India	A. Rai / Prof. Dr. A. Kumar, IIT Roorkee, India; / T. Hies / H. Nguyen, Hydro Vision Asia Pte Ltd, Singapore
10:50	11:20	00:30	Technologies and Experience with Monitoring Sediments for Protecting Turbines from Abrasion	Dr. Y. C. Agrawal / W. Slade / C. Pottsmith / D. Dana; Sequoia Scientific Inc., USA
11:20	11:50	00:30	Real-time measurements of suspended sediment concentration and particle size using five techniques	Dr. I. Albayrak; VAW, ETH Zürich, Switzerland
11:50	12:20	00:30	Suspended sediment measurements and calculation of the particle load at HPP Fieschertal	D. Felix, VAW, ETH Zurich, Switzerland

## Workshop hydro-abrasive erosion III

Erosion and efficiency changes of Pelton turbines				
13:35	14:05	00:30	Erosion of Pelton buckets measured in the HPP Fieschertal	A. Abgottspon; Hochschule Luzern, Switzerland
14:05	14:35	00:30	Changes in turbine efficiency measured in the HPP Fieschertal	Prof. Dr. T. Staubli, Hochschule Luzern, Switzerland
Modelling of erosion				
14:35	15:05	00:30	Hydro-abrasive erosion on coated Pelton runners: Partial calibration on the IEC model based on measurements in HPP Fieschertal	D. Felix, VAW, ETH Zürich, Switzerland
15:05	15:35	00:30	Enhanced erosion prediction in the finite volume particle method using improved constitutive models	S. Leguizamon / E. Jahanbakhsh / A. Maertens / C. Vessaz / S. Alimirzazadeh / F. Avellan, LMH, EPFL, Lausanne, Switzerland

## Workshop hydro-abrasive erosion IV

HPP optimizations to deal with fine sediment				
16:00	16:30	00:30	Optimization of hydropower plants with respect to fine sediment focusing on switch-offs during floods	Prof. Dr. R. M. Boes, VAW, ETH Zürich, Switzerland
16:30	17:00	00:30	Design and maintenance of turbine parts subject to erosion (preliminary title)	M. Krause, Andritz Hydro, Switzerland
17:00	17:30	00:30	Development of a new methodology for hydro-abrasive erosion test and correlation with real penstock erosive flow (preliminary title)	Aumelas / Maj / Calve / Smith / Gambiez / Mourrat YLEC consultants /ANTICORRConseil / EXPRIIS / EDF/CIH
17:30	17:40	00:10	Discussion and concluding remarks	Prof. Dr. R. M. Boes, VAW, ETH Zürich, Switzerland

28th IAHR symposium on Hydraulic Machinery and Systems  
IAHR Grenoble July 4-8th, 2016  
Thursday July 7th

**Design and optimization**

8h20-8h45	000144.pdf	D. CHIRKOV, P. SCHERBAKOV, S. CHERNY, A. ZAKHAROV	Mitigation of self-excited oscillations at full load: CFD analysis of air admission and effects of runner design
8h45-9h10	000022.pdf	A. NEIPP, S. RIEDELBAUCH	Numerical Investigation of Blade Lean and Sweep affecting Secondary Flows in an Axial Expansion Turbine
9h10-9h35	000054.pdf	X. LAI, X. CHEN, X. ZHANG, M. LEI	An Approach to automatically optimize the Hydraulic performance of Blade System for Hydraulic Machines using Multi-objective Genetic Algorithm
9h35-10h00	000256.pdf	L. SHI, F. TANG, C. LIU, R. XIE, C. XIE	Multi-operation Conditions Optimization Design of Axial-flow Pump Device

**Cavitation.I**

000125.pdf	Y. CHEN, H. ZHANG, J. ZHANG, L. ZHU, Z. LIU	Application of Ultrasonic Sensors for Cavitation Monitoring in Model Turbine Experiments
000051.pdf	T. TANAKA	Overview of the Experimental Setup for Visualization of a Cryogenic Pump
000032.pdf	P. MOESSINGER, A. JUNG	Transient two-phase CFD simulation of overload operating conditions and load rejection in a prototype sized Francis turbine
000034.pdf	G. SEMENOV, K. BOICHUK, I. KUZNECOV, E. SPIRIDONOV	Numerical Investigation of Tip Clearance Cavitation in Kaplan Runners

**Sustainable Hydropower.I**

000181.pdf	I. SAMORA, V. HASMATUCHI, C. MÜNCH-ALLIGNÉ, M. FRANCA, A. SCHLEISS, H. RAMOS	Energy production with a tubular propeller turbine
000248.pdf	G. DELLINGER, P.-A. GARAMBOIS, A. TERFOUS, M. DUFRESNE, J. VAZQUEZ, A. GHENAIM	Numerical and experimental study of an Archimedean Screw Generator.
000159.pdf	B. BAIDAR, R. KOIRALA, H. NEOPANE, B. THAPA	Strategic Rehabilitation of the Earthquake Affected Micro- hydropower Plants in Nepal
000196.pdf	H. CHENG, L. GONG, Z. WANG, Q. WEN, Y. ZHAO, Y. WANG	Hydraulic Analysis and Optimization Design in Guri Rehabilitation Project

10h00-10h20 coffee break

**Pressure fluctuations**

10h20-10h45	000168.pdf	Y. TAMURA, K. TANI	Investigation on Inner Flow of Draft Tube at Overload Condition in Low Specific Speed Francis Turbine
10h45-11h10	000244.pdf	D. QIN, Y. XU, X. MENG, W. LIU	Experiment study of the influence of Thoma number on Francis turbine pressure fluctuation
11h10-11h35	000086.pdf	C. TANASA, S. MUNTEAN, A.I. BOSIQC, R. SUSAN-RESIGA	3D Numerical Simulation vs. Experimental Assessment of Pressure Pulsations Using a Passive Method for Swirling Flow Control in Conical Diffusers of Hydraulic Turbines
11h35-12h00	000084.pdf	P. GOGSTAD, O. DAHLHAUG	Methods of mitigating pressure pulsations in a Francis turbine
12h00-12h25	000036.pdf	V. SONIN, A. USTIMENKO, P. KUJIBIN, I. LITVINOV, S. SHTORK	Study of the velocity distribution influence upon the pressure pulsations in draft tube model of hydro-turbine

**Cavitation.II**

000021.pdf	J. WACK, S. RIEDELBAUCH	Two-Phase Simulations of the Full Load Surge in Francis Turbines
000037.pdf	B. CHARRIERE, E. GONCALVES	Study of the dynamic of a sheet cavitation
000192.pdf	L. HANIMANN, L. MANGANI, M. WIDMER, E. CASARTELLI	Cavitation modeling for steady-state CFD simulations
000137.pdf	M. NOHMI	A CFD Research considering the Geometry Change due to Cavitation Erosion
000096.pdf	C. LECLERCQ, A. ARCHER, R. FORTES-PATELLA	Numerical investigations on cavitation intensity for 3D homogeneous unsteady viscous flows

**Sustainable Hydropower.II**

000272.pdf	P. PELZ, T. FRÖHLICH	Free Surface Influence on Low Head Hydro Power Generation
000208.pdf	J. SCHMIDT, J. WIELAND, J. JENSEN, W. LOHR	Development of the cycloidal propeller StECon as a new small hydro-power plant for kinetic energy
000193.pdf	S. PAUDEL, N. SAENGER	Dethridge wheel for pico-scale hydropower generation: An experimental and numerical study
000254.pdf	T. SHIGEMITSU, Y. TAKESHIMA, Y. OGAWA, J. FUKUTOMI	Internal Flow of Contra-Rotating Small Hydroturbine at Off-Design Flow Rates
000030.pdf	E. KONTOLEONTOS, S. WEISSENBERGER	Annual Energy Production (AEP) optimization for tidal power plants based on Evolutionary Algorithms - Swansea Bay Tidal Power Plant AEP optimization

12h25-13h30 lunch

**Draft tube / Vibrations**

13h30-13h55	000184.pdf	T. VU, C. DEVALS, J. DOMPIERRE, Y. ZHANG, F. GUIBAULT	Mesh convergence study for hydraulic turbine draft tube
13h55-14h20	000029.pdf	O. KIRSCHNER, A. RUPRECHT, E. GÖDE, S. RIEDELBAUCH	Dynamic Runner Forces and Pressure Fluctuations on the Draft Tube Wall of a Model Pump-Turbine
14h20-14h45	000284.pdf	A. PRESAS, D. VALENTÍN, E. EGUSQUIZA, C. VALERO, U. SEIDEL	Natural frequencies and mode shapes of rotating submerged disk-like structures viewed from the stationary system
14h45-15h10	000236.pdf	S. CUPILLARD, J.-O. AIDANPää	Influence of the thrust bearing on natural frequencies of a 72 MW hydropower rotor
15h10-15h35	000170.pdf	S. ALEKSEENKO, P. KUIBIN, S. SHTORK, S. SKRIPKIN, V. SONIN, M. TSOY, A. USTIMENKO	A Novel Scenario of Aperiodical Impacts Appearance in the Turbine Draft Tube

**Computational and experimental techniques.V**

000239.pdf	K. SUGIYAMA	A Fixed-Mesh Approach for Gas-Liquid-Rigid Interaction Problems
000209.pdf	Qiang Guo, Lingjiu Zhou, Zhengwei Wang, Ruofu Xiao and Zhifeng Yao	Effect of the Endwall Motion on a Hydrofoil with Various Widths of Clearance
000043.pdf	P. GUO, L. SUN	Numerical simulation of flow field characteristics and noise for pressure reducing valve based on CFD
000088.pdf	Y. NAKANISHI, T. KITAHORA, S. SUZUKI, T. SUZUKI, K. SUGISHITA, R. SUZUKI, K. TANI	New JSME Standard S008 "Performance Conversion Method for Hydraulic Turbines and Pump-Turbines"
000223.pdf	P. JANDOUREK	Valve Exploiting Principle of The Side-Channel Turbine

**Sustainable Hydropower.III**

000206.pdf	N. GUILLAUD, G. BALARAC, E. GONCALVES, J. ZANETTE	Large Eddy Simulations on Vertical Axis Hydrokinetic Turbines and flow phenomena analysis
000229.pdf	K. NAKASHIMA, S. WATANABE, D. MATSUSHITA, S.-I. TSUDA, A. FURUKAWA	Performance Prediction of Darrieus-Type Hydroturbine with Inlet Nozzle Operated in Open Water Channels
000292.pdf	L. ANDOLFATTO, E. VAGNONI, C. MÜNCH-ALLIGNÉ, F. AVELLAN	Simulation of energy recovery on water utility networks by a micro-turbine with counter-rotating runners
000262.pdf	D. BINER, V. HASMATUCHI, D. VIOLANTE, S. RICHARD, S. CHEVAILLER, L. ANDOLFATTO, F. AVELLAN, C. MÜNCH-ALLIGNÉ	Engineering & Performance of DuoTurbo: Microturbine with Counter-Rotating Runners
000215.pdf	N. DELLINGER, P. FRANÇOIS, D. LEFEBURE	Development and optimization of a hydro-power conversion system based on vortex induced vibration

15h35-15h50 coffee break

15h50-16h30

**Closing ceremony**