HydroFlex Conference Publications, Public Workshops & Seminar Presentations

HydroFlex

Increasing the value of hydropower through increased flexibility

Deliverable 6.23 Conference publications 2

Work package	WP6 Communication, dissemination and exploitation
Task	Task 6.4 Publications and presentations
Lead beneficiary	Multiconsult
Authors	
Due date of deliverable	30.06.2020
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Type of deliverable	Websites, patents filling, etc.
Dissemination level	Public

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1 Introduction

The dissemination of HydroFlex results at relevant conferences, workshops and seminars is key for ensuring a high scientific standard, relevance, collaboration between research and industry, and overall visibility. The project has stated the quantitative target of more than 12 conference contributions. This deliverable lists the presentations held at conferences, workshops and seminars, and the workshops/seminars arranged by HydroFlex from the first 26 project months.

The peer-reviewed publications are listed in deliverable 6.19.

Due to the Corona virus, the workshops planned for April 22-24, 2020 in Uppsala had to be postponed and will take place in October 2020. Further, several conferences have been cancelled/postponed, so that presentations will take place later than originally planned.

2 Presentations held at conferences, workshops and seminars

Børresen, B: Presentation of HydroFlex at the PTK Conference in Trondheim. March 2-4, 2020.

Burman, A, Andersson, A & Hellström, G: *Inherent Damping in a Bypass River*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Charrassier, F: *Flexibility of Hydraulic Turbines – A Parametric Design Tool*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Felicetti, R, Abrahamsen, J & Lundin, U: *A salient pole rotor winding model for fast switching current control*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Felicetti, R, Abrahamsson J & Lundin, U: *Experimentally validated model of a fast switched salient pole rotor winding*. Presented at IEEE WEMDCD 19. Athens, April 22, 2019.

Foti, P: *Evaluation of the Strain Energy Density value with volume free FE model*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Foti, P & Berto, F: *Evaluation of the strain energy density value for welded joints typical of turbine runner blades*. Presented at Francis-99 workshop 3. Trondheim, May 28-29, 2019.

Joy, J & Cervantes, M: *Study of pressure pulsations and mitigation of RVR in Francis-99 Hydro Turbine*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Joy, J: Numerical Study on Reduced Francis-99 Turbine Model during Part Load Operation. Presented at 15th Asian International Conference on Fluid Machinery, Busan, South Korea. September 25-28, 2019.

Juarez, A & Alfredsen, K: *Hydraulic model for evaluation of peaking operation in Nidelva*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Juarez, A.: Assessing the impact of hydropeaking utilizing a 2D hydraulic model. Presented at The 6th Biennial Symposium of the International Society for River Science (ISRS) in Vienna. September 9-13, 2019.

Lazarevikj, M: *Influence of the guide vanes structural parameters on variable speed Francis turbine performance*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Lazarevikj, M., Stojkovski, F., Iliev, I & Markov, Z. (2019) *Influence of the guide vanes design on stress parameters of Francis-99 turbine*. Presented at Francis-99 workshop 3. Trondheim, May 28-29, 2019.

Markov, Z, Stojkovski, F, Lazarevikj, M & Iliev, I: *Investigation of the possibilities for development of a variable speed hydraulic turbine*. Presented at Energetics. Ohrid, October 04-06, 2018.

Sargazi, R: *The effect of Static Converters on Field Grading Materials in Rotating Machines*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Schönefeld, M & Hüllenkremer, J: *Dynamic frequency stability analysis*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Siemonsmeier et al. *Hydropower and flexibility - Defining Three European energy scenarios*. Presented at Post COP-24 How to unlock clean and flexible hydropower in Europe. Norway House. Brussels. December 18, 2018.

Stojkovski, F: *Mathematical and numerical modeling in order to optimize the hydrodynamic and geometrical parameters of guide vanes in Francis turbines with variable speed*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Tang, C: *Converter design for pumped-storage hydro power unit with large number of start-stops*. Poster presentation at HydroFlex Workshop 1. Trondheim, May 27, 2019.

Tang, C. & Thiringer, T: Thermal modelling of a multichip IGBT power module. Presented at 21st European Conference on Power Electronics and Applications (EPE '19 ECCE Europe) Genua, Italy. September 3-5, 2019.

Tørklep, A: Presentation of HydroFlex at RENEXPO INTERHYDRO, Salzburg, Austria. November 28, 2019.

3 Workshops/seminars arranged by HydroFlex

HydroFlex Webinar 1: Hydropower and Flexibility "Defining three European Energy Scenarios"
The first HydroFlex webinar is based on the WP2 report "Three European Energy Scenarios". HydroFlex researcher Marius Siemonsmeier (RWTH Aachen) presents three different future scenarios for the European energy system and the role of hydropower within them. The webinar is available on the HydroFlex YouTube channel.

HydroFlex Webinar 2: Hydropower and Flexibility "Overvoltage phenomena in the field winding of a hydropower generator".
Operational flexibility of hydropower stations is among the highest goal of the Hydroflex project. Faster and at the same time more efficient start-stop transients of generators and pumped–storage units are challenging a more than a century old technology. In particular, the coupling of faster and faster switching power electronics drives to the generator/motor

windings needs to be carefully assessed, in order to avoid the insurgence of prejudicial electric stress to the insulation. After introducing the reasons for the increased use of power electronics in the excitation system of synchronous machines, this webinar by Roberto Felicetti, Uppsala University, presents how WP4 is facing the issue of predicting and assessing overvoltage in the unit field winding.

HydroFlex Webinar 3: Hydraulic models in Nidelva and Ume Rivers
In HydroFlex webinar #3, HydroFlex researchers Ana Juárez (NTNU) and Anton Burman (LTU) present Hydraulic Models in Nidelva and Ume rivers in Norway and Sweden. These models will help to evaluate different scenarios for the operation of hydropower plants, including 30 starts and stops per day, to be able to assess environmental impacts.

HydroFlex Webinar 4: Flexibility of Hydraulic Turbines – A Parametric Design Tool
The future electricity market will have large contributions from renewable energy sources such as solar and wind. The intermittent nature of these energy sources creates a need for highly flexible operation of hydropower stations, and challenges the structural integrity of the turbines of the future.
In this webinar, Erik Tengs and Maria Rolstad Jordal from EDRMedeso present a framework for variable-speed Francis turbine design. To ensure that the turbine is less prone to fatigue, even at off-design operation, it must be optimized from a hydraulic point of view, as well as considering the structural integrity.
The presented process is fully automated, with no need for human interaction. A MATLAB design code and ANSYS simulation processes are coupled using the optimization software optiSLang.

HydroFlex plenary meeting 1

On May 27, 2019 more than 45 people gathered in Trondheim, Norway for the HydroFlex plenary meeting. The plenary meeting was an opportunity for all the research teams to update each other on the progress of the various work packages and an important social and scientific meeting place to ensure collaboration across teams and work packages.

A common language and a common understanding of key challenges for the different teams is important for enabling a good collaboration between the teams. Thus, in addition to the mandatory presentation on the progress for each work package, the program for the day included a number of popular science presentations of HydroFlex results. Futher, a poster session with HydroFlex PhD projects was organized.

A public summary of the workshop and an online poster exhibition is available on the HydroFlex website.

Third Francis-99 workshop: Fluid Structure Interactions

HydroFlex was co-organizer of the Third Francis-99 workshop, which took place in Trondheim on May 28-29, 2019. The scope of the workshop was fluid structure analysis under steady state operating conditions. In particular, parameters such as study of mode-shape, nodal-diameter, deformation, fatigue loading, estimation of fatigue life, individual/combined natural frequencies, hydrodynamic damping, harmonic response, etc. were investigated.

The workshop was chaired by HydroFlex WP3 lead Chirag Trivedi and several HydroFlex researchers participated in the workshop. First results from WP3 were presented by Marija Lazarevikj (UKIM) and Pietro Foti (NTNU).