

parameters in one physical experiment. The upstream boundary conditions are determined by the power plant operation as well as by the natural fluctuations of the flow rate whereas the downstream boundary conditions are determined by the water level of the Neckar River. Investigations into the influence of the different parameters will lead to a deeper understanding of the wave formation mechanisms, which is vital to adapt the prospective wave to naturally fluctuating boundary conditions. The experimental setup comprises a height-adjustable ramp to impound water in order to gain potential energy and to accelerate the flow towards the wave. At the end of the ramp, a deflector is attached for the fine-tuning of the wave surface. Both the deflector and the ramp are variable in length and angle to examine whether the step height beneath the deflector or the inclination of the ramp is more important for the wave formation. In addition, other aspects of the design, such as the influence of the ramp's length, have not been addressed in the literature to the authors' knowledge. It is noted that different studies on surfing facilities do not show good agreement on whether a deflector only balances the tailwater fluctuations, or if it can actually increase the wave height [5, 8].

Numerical simulations

The experimental work is supported by numerical simulations performed at the Institute of Aerodynamics and Gas Dynamics at the University of Stuttgart. The open-source code OpenFOAM is used to simulate the wave using the finite volume method. Two approaches are used to simulate the interfaces of air and water, namely the volume-of-fluids method and the isoAdvector method. The simulations are first verified with a simple geometry against the experimental data and will then be extended to more complex geometries at a later stage of the project.

Future work

The results of the experimental and numerical studies will provide information for the conceptual design of a hydraulic structure that produces surfing waves for the varying boundary conditions at the Neckar River. Many additional investigations of non-technical aspects of the planned Neckarwelle are currently ongoing such as looking at water quality, ecological aspects, safety, legal issues and financing. This work is performed in close cooperation with the City of Stuttgart, Neckar River authorities, the hydropower company and

residents. The social impact of the surfing wave facility on Stuttgart will be immense. The goal of the team of surfers and scientists working on this project is to bring together all groups of different ages and social backgrounds interested in this exciting sport.

Acknowledgements

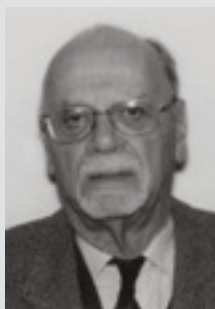
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Pavel Novak (1918-2018)

Professor Pavel (Paul) Novak passed away on the 24th of February 2018 at the age of 99. He was born on the 7th of September 1918 in Stribro, now located in the Czech Republic. He lost family to the Holocaust and first came to England during WW2, studying engineering at the University of London, and making a contribution to the war effort by interrogating German POWs and as a member of the Home Guard. He met his future wife Elizabeth (Eli) in 1943 while staying in Nottingham. After the war he returned to Czechoslovakia, was from 1950 to 1955 Deputy Director of the Water Research Institute in Prague and later Director of the Institute of Hydrodynamics, the Czechoslovak Academy of Sciences. In 1968, when the Soviet army invaded Czechoslovakia, he returned to Britain where he was offered a position at Newcastle University.



Prof. Novak was an internationally leading hydraulic engineer, and wrote several noteworthy books on the subject. He was Professor of Civil and Hydraulic Engineering in the Department of Civil Engineering from 1970-1983 and was Head of Department 1981-83. Pavel retired then and was accorded the title of Emeritus Professor. By then, the Water Resources Group was the largest such postgraduate group in the UK. His contribution to Newcastle was immense and he continued until recent times as an author and mentor. He held the University and city in his greatest affection as a place where he found freedom from the difficulties in central Europe in his earlier life. This affection is reciprocated.

Prof. Novak was the first official Editor of the *Journal of Hydraulic Research (JHR)* from 1983, following Johannes T. Thijsse (1893-1984), who had done this job as IAHR Executive Director from JHR foundation in 1963. Pavel has taken this

position for 8 years until 1991, from when JHR Editors serve for 5 years. Pavel must be credited for having made JHR an internationally accepted journal, one of the few then published in Europe. In parallel, Pavel was a successful book author. Of note is his book *Models in hydraulic engineering* (1981) written jointly with Jaroslav Cabelka (1906-1989), his *Hydraulic Structures* (2001) and his *Hydraulic Modelling* (2010). In addition, he was the editor of the book series *Developments in Hydraulic Engineering*. He also authored more than 100 journal and congress papers. Pavel Novak was an Honorary IAHR Member and awarded the ASCE Hydraulic Structures Medal, among others. He was awarded in 2008 the highest honorary medal 'De Scientia et Humanitate optime Meritis' of the Academy of Sciences of the Czech Republic.

In his retirement, Paul painted landscapes with great enthusiasm and continued to write text books. He travelled widely and enjoyed many years of activity, only giving up skiing in his 70s.

Following the death of Eli after 70 years of marriage, he spent his last years in The Philip Cussins House in Gosforth he communicating from there with family, friends and colleagues often via email. Those, who were present at the 2017 ICE Seniors Annual Lunch will recall how he spoke, still with clarity and strength.

Pavel is survived by his son Michal, daughter Zuzana, and over 50 grandchildren and great grandchildren. He will be greatly missed by all who knew him.

Eric Valentine and Willi H. Hager