

# IMPROVING CHANNEL FLOW WITH DEFLECTORS OPTIMIZED USING A GENETIC ALGORITHM

FUCAK, S.; CARIJA, Z. & MRSA, Z.

**Abstract:** *This paper summarizes the optimization process for deflectors designed to lower the water level and ceiling overflow in the S-shaped outflow channel of HPP Vinodol. Parameterized designs of deflectors were optimized using a genetic algorithm that evaluated each setup by running 2D CFD simulations. Optimal designs were chosen by considering total pressure loss and flow uniformity. The resulting best case design set provided a solid basis for simulations using 3D fluid flow numerical models of the channel. Two variants of 3D deflector designs were simulated and a two phase VoF model was used to simulate the free surface with and without deflectors. Both 2D and 3D simulation results show improvements in channel flow and a significantly lower water level justifies further development of deflector design for 3D optimization and a future prototype test.*

**Key words:** *genetic algorithm, channel flow, deflector, shape optimization, CFD*



**Authors' data:** Dipl. Ing. **Fucak**, S[anjin]; Doc. Dr. Sc. **Carija**, Z[oran]; Univ. Prof. Dr. Sc. **Mrsa**, Z[oran], Faculty of Engineering, University of Rijeka, Vukovarska 58, 51000 Rijeka, Croatia, sanjinf@riteh.hr, zcarija@riteh.hr, mrsa@riteh.hr

**This Publication has to be referred as:** Fucak, S[anjin]; Carija, Z[oran] & Mrsa, Z[oran] (2009). Improving Channel Flow with Deflectors Optimized Using a Genetic Algorithm, Chapter 70 in DAAAM International Scientific Book 2009, pp. 721-734, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-901509-69-8, ISSN 1726-9687, Vienna, Austria  
DOI: 10.2507/daaam.scibook.2009.70