

EPFDC 2016, July 06-09, 2016 Warsaw - Poland





FREE SURFACE FLOW IN VICINITY OF IMMERSED SMOOTH AND **GROOVED CYLINDERS-EXPERIMENTS AND SIMULATIONS**

Nicoleta Octavia Tanase, Diana Broboana, Corneliu Balan

REOROM - "Politehnica" University, Bucharest, Romania



The study is concerned with flows investigation in the vicinity of separation points using a CFD analysis based on the experiments performed for smooth and grooved immersed cylinders. The main goal of the work is to evaluate the influence of the grooved surfaces of the immersed bodies on the local hydrodynamics and wake configuration.



$$Re = \frac{\rho V_0 d}{\eta} \qquad \qquad Fr = \frac{V_0}{\sqrt{g}}$$

Comparison between smooth cylinder and grooved cylinder experimental and computed flow spectrum. The decreasing of turbulent

Vorticity flux distribution in the wake of the bodies

CFD analysis of the flow



The results indicates that a grooved geometry with small aspect ratio on the surface of the immersed cylinders induces significant changes of the flow spectrum downstream the cylinders, especially in the structure of the separated shear-layers which delimit the wake. It is expected to have a decreasing of the drag force in this this case, results confirmed by the numerical computations.

The numerical simulations are performed with the FLUENT code using the turbulent model coupled with VOF for the computation of the free surface

"Nicoleta Octavia Tanase's work has been funded by the Sectoral Operational Programme Human Resources Development 2007-2013 of the Ministry of European Funds through the Financial Agreement POSDRU/159/1.5/S/132395. This work was supported by grant of the Romanian National Authority for Scientific Research, CNDI-UEFISCDI, project number PN-II-PT-PCCA-2011-3.1-0052 and grant of the Ministry of National Education, CNCS – UEFISCDI, project number PN-II-ID-PCE-2012-4-0245".