


FINAL PROJECT ASSIGNMENT

CLASSIFIED

Identification	Name: Kanczler Tamás Károly		ID: 73220229603		
	Code of the Curriculum: 2N-MW0		Specialisation:	Document ref. number:	
	Curriculum: Master Program in Mechanical Engineering Modelling		2N-MW0-FM	GEÁT:2021-T:2N-MW0:PTF8P8	
	Final Project issued by: Department of Fluid Mechanics		Final exam organised by: Department of Fluid Mechanics		
	Supervisor: Balázs Havasi-Tóth (79649277576), senior lecturer				

Project Description	Title	Numerical flow simulation of a high energy water jet breakup using the SPH method Nagyenergiájú szabad vízszög felbomlásának numerikus modellezése az SPH-módszerrel
	Details	In the petroleum industry liquid jet cutting tools are used to remove petroleum coke residue from large size vessels. This technology is called hydraulic decoking. The jet created by the cutting tool is energetic, therefore experimental investigation of the flow is difficult, meaning that only a limited number of parameters can be measured accurately and it requires expensive test equipment. Project related tasks: 1. Carry out a comprehensive study of the literature in terms of modeling the effects of the gaseous phase in single phase numerical models. 2. Using different inlet velocity profiles, investigate the effects of the velocity distribution on the breakup mechanics without the drag force. 3. Perform the same numerical computations of the free jet implying the drag force model and compare the results focusing on the breakup phenomena. 4. Compare the results to physical or numerical experiments found in the literature, and calibrate the SPH-model based on the comparison. 5. Build a numerical model of the broken water jet colliding with the contamination or the wall of the tank and estimate the effectiveness of the jet based on different circumstances including the velocity profiles, drag force etc.
	Advisor	Advisor's Affiliation: FlowServe Hungary Services Kft. 1097 Budapest, Gubacsi út 6B. Advisor: Péter Tóth, simulation engineer

Final Exam	1 st subject (group)	2 nd subject (group)	3 rd subject (group)	4 th subject (group)
	ZVEGEÁTNW02 Computational Fluid Dynamics	ZVEGEÁTNW03 Fluid Mechanics Measurements	ZVEGEÁTNW08 Building and Environmental Aerodynamics	ZVEGEÁTNW19 Vehicle Aerodynamics

Authentication	Handed out: 8 February 2021		Deadline: 14 May 2021	
	Compiled by: Balázs Havasi-Tóth (79649277576) Supervisor		Verified by: <i>Dr. János Vad</i> (signed) Head of Department	
	Approved by: <i>Dr. Péter Bihari</i> (signed) Vice-Dean			
The undersigned declares that all prerequisites of the Final Project have been fully accomplished. Otherwise, the present assignment for the Final Project is to be considered invalid. <i>Kanczler Tamás Károly</i>				