

## Ing. Jaromír Dvořák, Ph.D.

E-mail: [dvorak.j@fme.vutbr.cz](mailto:dvorak.j@fme.vutbr.cz)  
Dept.: Institute of Manufacturing Technology  
Dept. of Machining Technology  
Position: Lecturer  
Room: A1/1432  
Phone: +420 54114 2556



### Education and academic qualification

- 2001, Ing., Faculty of Mechanical Engineering, Master study programme Manufacturing Technology, Branch Manufacturing Technology - specialization Machining Technology
- 2002-till now, Faculty of Mechanical Engineering, Doctoral study programme Manufacturing Technology, Branch Manufacturing Technology

### Career overview

- 2003-2008, Technician, Faculty of Mechanical Engineering, Brno University of Technology, Institute of Manufacturing Technology, Department of Machining Technology
- 2008-till now, Lecturer, Faculty of Mechanical Engineering, Institute of Manufacturing Technology, Department of Machining Technology

### Pedagogic activities

- Technology of Production
- Technology of Machining

### Scientific activities

- Optimization of AWJ cutting process.
- Using of IT technology in AWJ cutting.

### Projects

- Faculty project FSI n. FP320038, year 2002 - Environmentální vztahy v technologických procesech
- Faculty project FSI n. BD1343039, year 2004 - Návrh elektronického datového skladu sloužícího jako podpůrný expertní systém TPV
- Faculty project FSI, year 2006 - Tvorba multimediální znalostní báze expertního systému sloužícího jako nástroj pro volbu optimálních řezných podmínek AWJ technologie

### Publications:

- SLANÝ, M.; DVOŘÁK, J.; DVOŘÁKOVÁ, J.:  
**Statistical analysis of input data in AWJ cutting technology,**  
Moderní výrobní technologie pro 21.století, pp.51-56, ISBN 978-80-214-3914-6,

(2009), Akademické nakladatelství CERM, s.r.o. Brno  
*conference proceedings*

*akce: New Manufacturing Technologies for The 21st Century, Brno, 15.10.2009-15.10.2009*

- DVOŘÁKOVÁ, J.; DVOŘÁK, J.; SLANÝ, M.:  
**Aplikace umělé inteligence na analýzu vstupních parametrů a materiálových charakteristik pro technologii AWJ,**  
Výrobné inženýrstvo, Vol.2009, (2009), No.1, pp.24-28, ISSN 1335-7972, Fakulta výrobných technologií Technické univerzity v Košiciach so sídlom v Prešov, Bayerova 1, 080 01 Prešov, Slovensko  
*journal article*
- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**Technologie WJM/AWJ pro řezání pevných materiálů vodním paprskem II.,**  
Glassreview.com, Vol.2008, (2008), No.15, pp.1-13, ISSN 1802-8497,  
www.glassreview.com  
*journal article*
- DVOŘÁK, J.; DVOŘÁKOVÁ, J.; SLANÝ, M.; PÍŠKA, M.:  
**ARTIFICIAL INTELLIGENCE IN DEFINITION OF MATERIAL ENTER DATA THAT DETERMINE QUALITY FINISH AFTER AWJ CUTTING PROCESS,**  
Annals of DAAAM for 2007 & Proceedings of the 18th International DAAAM Symposium in Zadar, pp.263-264, ISBN 3-901509-58-5, (2007), Published by DAAM International  
*conference paper*  
*akce: Intelligent Manufacturing and Automation: Focus on Young Researches and Scientists, Vienna, 19.10.2005-22.10.2005*
- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**Technologie WJM/AWJ pro řezání pevných materiálů vodním paprskem,**  
Glassreview.com, Vol.2007, (2007), No.21, pp.3-4, ISSN 1802-8497,  
www.glassreview.com  
*journal article*
- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**FRÉZOVÁNÍ A GRAVÍROVÁNÍ NEKONVENČNÍ TECHNOLOGIÍ AWJ,**  
MM Průmyslové spektrum, Vol.2007, (2007), No.4, pp.84-95, ISSN 1212-2572, MM publishing, s. r. o.  
*journal article*
- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**Frézování a gravírování nekonvenčních technologií AWJ,**  
Frézování IV, pp.183-186, ISBN 80-214-3239-X, (2007), FSI VUT v Brně  
*conference paper*  
*akce: Frézování IV, FSI VUT v Brně, 31.01.2007-31.01.2007*

#### **Abstracts of most important papers:**

- [SLANÝ, M.; DVOŘÁK, J.; DVOŘÁKOVÁ, J.:](#)  
**Statistical analysis of input data in AWJ cutting technology,**  
Moderní výrobní technologie pro 21.století, pp.51-56, ISBN 978-80-214-3914-6,  
(2009), Akademické nakladatelství CERM, s.r.o. Brno

*conference proceedings*

*akce: New Manufacturing Technologies for The 21st Century, Brno, 15.10.2009-15.10.2009*

Paper provides the research focused on analysis of input data for supporting AWJ technology. There is immediate relation between species of workpiece material and final results obtained after AWJ cutting. Many variables and characteristics have big influence on quality finish and all characteristics of material kerf after abrasive water jet cutting (AWJ) process. That is why we need to make list of all inputs, set down their influence on AWJ process and make quantification and qualification also. We can say that only experiences of elder workers or specialists allow to get right setting of all input parameters AWJ machine and to get effective production also. This output should be used for better prediction of secondary inputs (cutting conditions for setting AWJ machine), and for studying of relationship and resemblance between input "unknown" material characteristics and known material obtained from made experiments, saved into base of data.

- **DVOŘÁK, J.; DVOŘÁKOVÁ, J.; SLANÝ, M.; PÍŠKA, M.:**  
**ARTIFICIAL INTELLIGENCE IN DEFINITION OF MATERIAL ENTER DATA THAT DETERMINE QUALITY FINISH AFTER AWJ CUTTING PROCESS,**  
Annals of DAAAM for 2007 & Proceedings of the 18th International DAAAM Symposium in Zadar, pp.263-264, ISBN 3-901509-58-5, (2007), Published by DAAM International

*conference paper*

*akce: Intelligent Manufacturing and Automation: Focus on Young Researches and Scientists, Vienna, 19.10.2005-22.10.2005*

Tolerance of setting AWJ cutting parameters on each material have big influence on quality finish and all characteristics of material kefr after cutting process. There is direct relation between species of workpiece material and final results obtained after AWJ cutting. Thus there is a need to have a tool for right material setting, choosing optimal cutting parameters and finding relations between each variables of cutting process. Using of information technology specially machine learning methods should be the right way. From all methods the Receptive Field Weighted Regression (RFWR) can be used as a function approximator for different mapping tasks like learning the value function for reinforcement learning. After learning process we can do several operations with obtained data base, like a choosing of cutting conditions for new or incomplete deffined material or finding relations between each properties of AWJ process.

- **DVOŘÁKOVÁ, J.; DVOŘÁK, J.; SLANÝ, M.; PÍŠKA, M.:**  
**CREATING OF KNOWLEDGE BASE AS A SUPPORT FOR CHOOSING OPTIMAL CUTTING CONDITIONS IN AWJ TECHNOLOGY,**  
Annals of DAAAM for 2007 & Proceedings of the 18th International DAAAM Symposium in Zadar, pp.265-266, ISBN 3-901509-58-5, (2007), Published by DAAM International

*conference paper*

*akce: Intelligent Manufacturing and Automation: Focus on Young Researches and Scientists, Vienna, 19.10.2005-22.10.2005*

There are many variables and characteristics of water jet and abrasive water jet that have influence on stock removal and surface finish. Thus there is a need to use old experiences for new cases especially by creating database with all variables and knowledges. It is easy to get optimal solution by using knowledge base of acquired

data and information. It allows us to find new trends in characteristics; new relations between material characteristics and cutting process and to choose optimal cutting conditions also.

- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**FRÉZOVÁNÍ A GRAVÍROVÁNÍ NEKONVENČNÍ TECHNOLOGIÍ AWJ,**  
MM Průmyslové spektrum, Vol.2007, (2007), No.4, pp.84-95, ISSN 1212-2572, MM publishing, s. r. o.  
*journal article*

The description of advantages that cutting with waterjet and abrasive-waterjet technology brings. New possibilities of using this unconventional technology are outlined - milling and engraving. Basic parameters that have influence on cutting process, cutting depth setting up and finally on quality of edge finish are summarized too.

- DVOŘÁKOVÁ, J.; DVOŘÁK, J.:  
**Usage of information relations in processes of AWJ machine building technologies for better computerized production,**  
Intelligent Manufacturing and Automation: Focus on Young Researches and Scientists, Vol.16., (2005), No.1, pp.109-110, ISSN 1726-9679, Published by DAAM International  
*journal article*

*akce: Intelligent Manufacturing and Automation: Focus on Young Researches and Scientists, Vienna, 19.10.2005-22.10.2005*

There is a structure description of information system that can be used in technology of machine building. Especially for choosing and creating of the best optimized cutting conditions in AWJ technology processes.