



POLISH NATIONAL AGENCY
FOR ACADEMIC EXCHANGE



STER
PROGRAMME

<p>name of the unit:</p> <p>DIVISION OF PRODUCTION ENGINEERING</p> <p>Institute of Machine Tools and Production Engineering, Lodz University of Technology</p>		<p>symbol:</p> <p>I-13</p> <p>http://www.ioitbm.p.lodz.pl</p>
<p>head of the unit:</p> <p>Marcin Gołabczak, PhD, DSc, TUL Prof.</p>	<p>potential promoters:</p> <p>Marcin Gołabczak, PhD, DSc, TUL Prof.</p>	<p>contact person:</p> <p>Robert Świącik, PhD phone: 42-631-22-88 robert.swiecik@p.lodz.pl</p>
<p>scope of activities:</p> <p>The main areas of interest and research directions are the following problems falling within the general concept of Mechanical Engineering:</p> <ul style="list-style-type: none"> • research on the improvement of methods and tools for abrasive, discharge and electrochemical machining as well as monitoring and optimization of these processes, • methods of electrochemical and electrodischarge dressing of superhard grinding wheels, • measurements and evaluation of the surface topography and properties of surface layer, • research on diagnostics of abrasive materials and tools, including theoretical and experimental foundations of designing and testing the strength of grinding wheels, • tests of functional properties of wear resistant and low friction coatings (PVD and CVD) on cutting tools and aerospace alloys, • ecology in abrasive machining, post-grinding waste management and processing, • computer-aided technology and design of technological processes (CAM, CIM), • numerical simulations: the geometric structure of the treated surfaces, temperature in the surface layer during electrodischarge grinding, thermoelasticity of thin cylindrical shells, • environmental protection and health and safety care in industrial enterprises. 		  
<p>present activities:</p> <p>We develop a new method of measuring the temperature in the surface layer during the process of electrodischarge grinding of difficult-to-machine aerospace alloys. We conduct research on the improvement of the processes of electrodischarge dressing of superhard grinding wheels with a stationary, rotating and segment tool electrode. Safety of the grinding wheels: we examine the effect of the conditions of use on the dynamic strength of cut-off wheels. In numerical tests, we determine the stability of thin micro-periodic cylindrical shells and the scale effect in the stability of thin bi-periodic cylindrical shells.</p>		
<p>future activities:</p> <p>Developing the current and building new, more comprehensive numerical models that will better describe the properties of the surface layer of the machined surfaces.</p>		



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[publications/patents/awards/projects:](#)

- Gołąbczak M., Gołąbczak A., Tomczyk B. (2021). Electrochemical and X-ray examinations of erosion products during dressing of superhard grinding wheels using alternating current and ecological electrolytes of low concentration of chemical compounds, *Materials*, 14(1375), 1-23.
- Dębkowski R., Gołąbczak M., Skowron M., Urbaniak M. (2019). Lifetime increase method of cutting ability of grinding wheels in the process of magnesium alloy grinding, *Materialwissenschaft und Werkstofftechnik*, 50(11), 1343-1352.
- Sutowski P., Świącik R. (2018). The estimation of machining results and efficiency of the abrasive electro-discharge grinding process of Ti6Al4V titanium alloy using the high-frequency acoustic emission and force signals, *The International Journal of Advanced Manufacturing Technology*, 94(1-4), 1263-1282.
- Gold medal at the International Invention Show INPEX XIII, USA, for developing a method for monitoring the grinding wheel condition.
- Gold medal at the International Fair INTERTECHNOLOGY for developing the technology of rotating dressers manufacturing.

[list of internship proposal in this research team:](#)

- Co-operation during tests for electro-erosion grinding and polishing of magnesium, nickel and titanium alloys as well as metrology of the surface layer after machining processes.