Podobszar POB3: 3.2 Ultralight and highly resistant materials in automotive construction and aviation

Tytuł prezentacji: Welding and surfacing of modern light metal alloys used in the aviation industry

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Abstrakt:

Foundry magnesium alloys and aluminum alloys are currently used, among others for large-size castings, high-pressure castings and precision castings. In castings of these alloys, casting defects often occur (shortcomings, scars and cracks). These defects are repaired by surfacing and welding methods. There is also a need to join castings and modify their surfaces. The aim of the work carried out by the team is to determine the impact of metallurgical, constructional and technological factors on the weldability of these alloys, and thus to determine the possibility of joining, surfacing and repairing. The experience so far resulting from the implementation of several projects, including FSB/34/RM2/2009: "Modern material technologies used in the aviation industry", FSB/71/RM3/2010: "Advanced materials and technologies for their production", INNOLOT/I/8/NCBR/13 under the program: "Advanced foundry technologies" and cooperation, among others with ZM WSK Rzeszów, WSK Rzeszów and Nemak Bielsko Biała allowed to define the direction of further research, including:

- assessment of the possibility of welding new magnesium alloys with the addition of rare earth elements used for gravity and precision cast elements,
- development of a technology for joining complex thin-walled precision castings used in aviation structures and in the automotive industry,
- development of solid-state mixing welding (FSW) and adhesive technology
- development of a technology for joining metal composites, including those cast centrifugally
- the use of laser technologies for joining and modifying the surface layer of light metal alloys.

Research and further development of the joining technology will be carried out in cooperation with the Łukasiewicz Research Network - The Welding Institute in Gliwice and the Warsaw University of Technology, Gdańsk University of Technology and AGH as well as with industrial companies, including ZM WSK and Lincoln Electric, IPG Photohronics, Enitec sp. o.o.