

## MICROSTRUCTURE - MECHANICAL PROPERTIES RELATIONSHIP FOR METALLIC FOAMS

### Goal of the project

Intensification of the already existing, up to date on volunteer basis, international scientific and technological cooperation between Universitatea POLITEHNICA din Timisoara (UPT) ROMANIA and Institute of Materials and Machine Mechanics (IMMM) from Slovak Academy of Sciences (SAS) Bratislava, SLOVACIA. This will be achieved by elaboration of common journal papers, and reciprocal sustain of scientific events organised on the partner country, preparation of joint international projects on European basis.

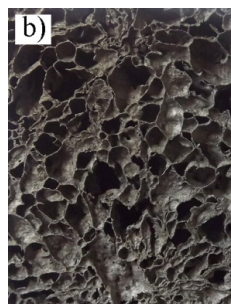
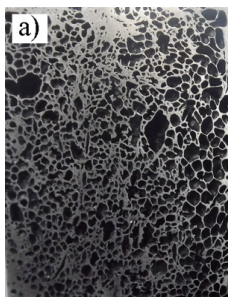
### Short description of the project

The technology for foaming of aluminum alloys has been considerably improved in last decade worldwide.

Aluminum foam can undergo static loading, and accidentally dynamic or impact loading during the crash accident. Unfortunately, there is still missing detailed connection between static and dynamic mechanical behaviour of foams.

The project investigates the mechanical properties of metallic foams under dynamic and static loading with respect to foam microstructure.

The project belongs to the priority domain "7 New Materials, Micro and Nanotechnologies – 7.1 Advanced Materials". Cellular metals are a class of advanced materials and investigation on graded cellular metals (cellular structures with different densities in different part of the piece) will also be investigated in present project.



### Project implemented by

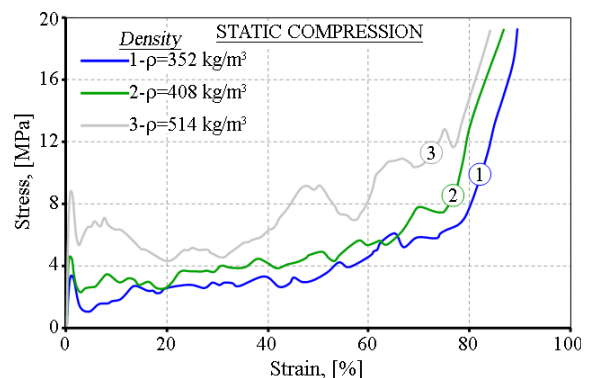
- Politehnica University of Timișoara, ROMANIA
- Institute of Materials and Machine Mechanics (IMMM) from Slovak Academy of Sciences (SAS) Bratislava, SLOVAKIA

### Main activities

- Production of aluminium foams by the Slovak partners.
- Mechanical testing of aluminum foams under static loading. Compression, tensile and bending tests will be carried on aluminum foam specimens. The relation between manufacturing parameters, density and mechanical properties will be investigated.

- Mechanical testing of aluminum foams under dynamic loading. Impact compression tests will be performed on aluminum foam specimens.

- Investigation of fatigue behavior of aluminium foam.



### Results

Journal Papers:

- E. Linul, T. Voiconi, L. Marșavina, J. Kováčik, A comparison between static and dynamic compression behavior of metal foams, International Journal of Impact Engineering (submitted)

Conference Papers:

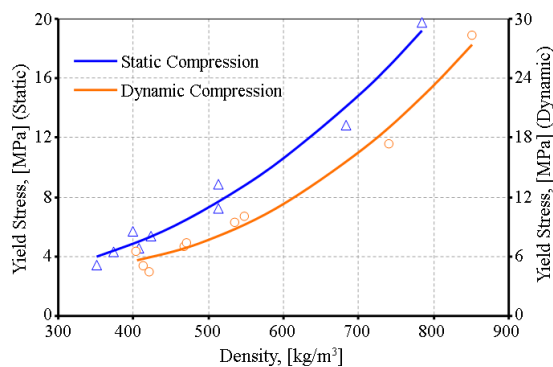
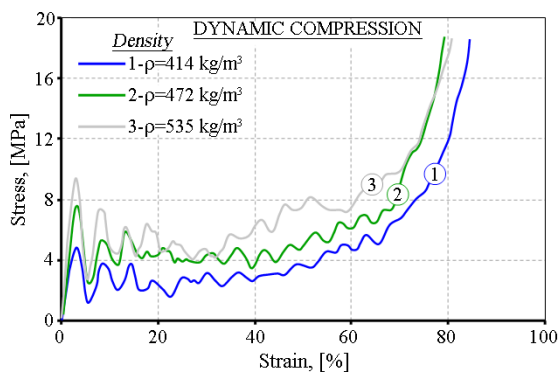
- T. Voiconi, E. Linul, L. Marșavina, J. Kováčik, M. Kneć, Experimental determination of mechanical properties of aluminium foams using Digital Image Correlation, Key Engineering Materials (in press accepted paper).

### Implementation period

01.03.2013 – 10.12. 2014

## Applicability and transferability of the results

Results will be used by metallic foams manufacturers. Also, companies using foam components from automotive industry will benefit by our results in order to design better foam components as energy absorbers.



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## Research centre

R research Centre for Processing and Characterization of Advanced Materials

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