



DEEP TECH 2M

# BOOK OF ABSTRACTS

**DEEP TECH OPEN SCIENCE DAY 2024**

1ST DEEP TECH OPEN SCIENCE DAY CONFERENCE

APRIL 5, 2024, KRAGUJEVAC, SERBIA



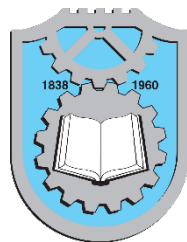
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**Editors:** Fatima Živić, Ana Kaplarević-Mališić,

Nenad Grujović, Boban Stojanović

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## 1st Deep Tech Open Science Day Conference 2024

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- Editors:** Fatima Živić, Faculty of Engineering, University of Kragujevac  
Ana Kaplarević- Mališić, Faculty of Science, University of Kragujevac  
Nenad Grujović, Faculty of Engineering, University of Kragujevac  
Boban Stojanović, Faculty of Science, University of Kragujevac
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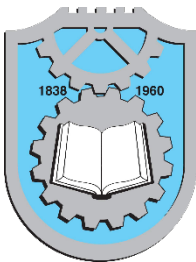
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## Evaluation of Deformation Strengthening in Modern Sheet Metals

Srbislav Aleksandrović\*, Đorđe Ivković, Marko Delić

Faculty of Engineering, University of Kragujevac, Serbia

email: [srba@kg.ac.rs](mailto:srba@kg.ac.rs)

### Abstract

Deformation strengthening i.e. strain hardening is very significant phenomenon in almost all metal materials especially in contemporary sheet metal materials. It consists in the increase of stress properties of strength, and appears as a consequence of realized plastic deformation. This extensive research includes 8 sheet metals of different materials. There are 4 steel sheets: low carbon steel DC04 (thickness 0.8 mm), austenitic stainless steel X5CrNi18-10 (2,0 mm), austenitic stainless steel X5CrNiMo17-12-2 (2,0 mm) and spring steel 51CrV4 (0.6 mm). Also there are sheets of following materials: brass CuZn37 (thickness 0.8 mm), Al alloy AlMg3 (1.5 mm), Al alloy AlCu4Mg1Mn (1.0 mm) and pure copper Cu-DHP (0.8 mm). The deformation strengthening was investigated through the strengthening curves and the exponent of the deformation strengthening i.e. strain hardening exponent.

Knowledge of formability is very important in the technological processes of modern sheet metal processing. Within that, the phenomenon of deformation strengthening has a special place. Knowledge of strengthening curves and strengthening parameters has a direct application in the formation of sheet metal processing technology, for example in the automotive industry and the vehicle industry in general.

## Graphical abstract

### EVALUATION OF DEFORMATION STRENGTHENING IN MODERN SHEET METALS

Srbislav Aleksandrovic, Djordje Ivkovic, Marko Delic

**Table 1.** Overview of total results

<b>Strengthening factor - Results in total</b>			
<b>1) Steel DC04</b>			
First method	0,173		
Second method	0,236		
Third method	/	/	/
<b>2) Steel X5CrNi18-10</b>			
First method	0,359		
Second method	0,377		
Third method	0,392	0,387	0,488
<b>3) Steel X5CrNiMo1712-2</b>			
First method	0,480		
Second method	0,463		
Third method	0.219	0.376	0.400
<b>4) Steel 51CrV4</b>			
First method	0,261		
Second method	0,257		
Third method	0.183	0.196	0.195
<b>5) Alloy AlMg3 (ENAW 5754)</b>			
First method	0,223		
Second method	0,221		
Third method	0.142	0.135	0.163
<b>6) Alloy AlCu4Mg1Mn (ENAW 2024 T3 air)</b>			
First method	0,204		
Second method	0,196		
Third method	0.136	0.152	/
<b>7) Copper Cu-DHP (DVP 1 Cu. 38)</b>			
First method	0,190		
Second method	0,186		
Third method	0.093	0.149	0.159
<b>8) Brass CuZn37</b>			
First method	0,521		
Second method	0,455		
Third method	0.452	0.535	0.558