UNIVERSITY OF BELGRADE
TECHNICAL FACULTY IN BOR

# BOOK OF ABSTRACTS

## 8th INTERNATIONAL STUDENT CONFERENCE ON TECHNICAL SCIENCES

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*20-21 October, Bor Lake, Serbia*

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# RECYCLING OF END-OF-LIFE VEHICLES

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**Abstract**

End-of-life vehicles (ELV) have become a global problem as the number of vehicles is constantly increasing. ELV are vehicles that have reached the end of life because of obsoletion or as a result of traffic accidents or natural disasters. The management of ELV across the world is regulated by various policies mainly based on extended producer responsibility, and the base principles of circular economy. In the European Union, the Directive 2000/53/EC covers vehicles, and end-of-life vehicles, including their components and materials, as well as spare and replacement parts. Circular economy plays a key role in sustainable management of ELVs, as it encompasses end-of-life strategies (EoL), which include reuse, reparation, remanufacturing, and recycling, used in handling ELV waste. Despite regulations, the recycling flow of ELV can be attributed to the following six steps: collection, depollution, dismantling, shredding, separation, and refining/landfilling. A component presenting the major problem in the ELV management is automotive shredding residue (ASR), which is left after the separation of all recyclable materials, consisting of textile, plastics, various metals (such as Pb, Cr, Cd, Hg, As), rubber, cellulose, and fine particles less than 10 μm with heterogeneous composition. Tackling the issue of recycling ELVs requires revisiting the entire process of vehicle production, from the design phase and material selection for components manufacturing to the waste handling and treatment of ELVs. Additionally, by properly labelling components, the entire recycling process of ELVs can be improved, subsequently leading to reduction of ASR as well.

***Keywords***: *End-of-life vehicles, Circular economy, Recycling, Automotive shredder residue*

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**REFERENCES**

[1] V.J. Inglezakis, A.A. Zorpas, WIT Trans. Ecol. Environ., 120 (2009) 835-843.
[2] I. D'Adamo, M. Gastaldi, P. Rosa, Technol. Forecast. Soc. Change, 152 (2020) 119887.
[3] O.-C. Modoi, F.-C. Mihai, Energies, 15 (3) (2022) 1120.
[4] M. Despeisse, Y. Kishita, M. Nakano, M. Barwood, Procedia CIRP 29 (2015) 668-673.
[5] R. Cossu, T. Lai, Waste Manag., 45 (2015) 143-151.
[6] Official Journal of the European Communities, Directive 2000/53/EC, L 269/34, Available on the following link: https://eur-lex.europa.eu/resource.html?uri=cellar:02fa83cf-bf28-4afc-8f9f-eb201bd61813.0005.02/DOC_1&format=PDF


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