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Sustainable processes in aluminium, magnesium, and titanium alloys applied to the transport sector: a review

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Abstract-

**The reduction of consumption and pollutant emissions is a top priority for the transport sector. One working line is the substitution of conventional structural materials with lightweight materials such as metallic alloys of aluminium, titanium, and/or magnesium. For this reason, and considering that the number of related articles is lower than the existing number of other structural lightweight materials, it is considered very convenient and helpful to carry out a systematic analysis of their latest trends through Open Access literature. A methodology adapted from the PRISMA statement is applied, in order to guarantee unbiasedness and quality in selecting literature and research. The final selection is made up of the 40 most cited research papers from 2015–2020, with an average of 20.6 citations per article. Turning and drilling are the most trending machining processes, and there is particular interest in the study of sustainable cooling, such as dry machining, cryogenic cooling, and MQL. In addition, another trending topic is multi-materials and joining dissimilar materials with guarantees. Additive manufacturing has also been identified as an increasingly trending theme, appearing in 18% of the selected studies. This work is complemented with summary tables of the most cited Open Access articles on sustainable machining and cooling, multi-materials or hybrid components, and additive manufacturing. **

Index Terms- lightweight; magnesium; aluminium; titanium; multi-material; aerospace; automotive; sustainable; trends

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