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Spare Part Carbon Footprint Reduction with Reman Applications

Authors : Enes Huylu, Sude Erkin, Nur A. Özdemir, Hatice K. Güney, Cemre S. Atılgan, Hüseyin Y. Altıntaş, Aysemin Top, Muammer Yılman, Özak Durmuş

Abstract : Remanufacturing (reman) applications allow manufacturers to contribute to the circular economy and help to introduce products with almost the same quality, environment-friendly, and lower cost. The objective of this study is to present that the carbon footprint of automotive spare parts used in vehicles could be reduced by reman applications based on Life Cycle Analysis which was framed with ISO 14040 principles. In that case, it was aimed to investigate reman applications for 21 parts in total. So far, research and calculations have been completed for the alternator, turbocharger, starter motor, compressor, manual transmission, auto transmission, and DPF (diesel particulate filter) parts, respectively. Since the aim of Ford Motor Company and Ford OTOSAN is to achieve net zero based on Science-Based Targets (SBT) and the Green Deal that the European Union sets out to make it climate neutral by 2050, the effects of reman applications are researched. In this case, firstly, remanufacturing articles available in the literature were searched based on the yearly high volume of spare parts sold. Paper review results related to their material composition and emissions released during incoming production and remanufacturing phases, the base part has been selected to take it as a reference. Then, the data of the selected base part from the research are used to make an approximate estimation of the carbon footprint reduction of the relevant part used in Ford OTOSAN. The estimation model is based on the weight, and material composition of the referenced paper reman activity. As a result of this study, it was seen that remanufacturing applications are feasible to apply technically and environmentally since it has significant effects on reducing the emissions released during the production phase of the vehicle components. For this reason, the research and calculations of the total number of targeted products in yearly volume have been completed to a large extent. Thus, based on the targeted parts whose research has been completed, in line with the net zero targets of Ford Motor Company and Ford OTOSAN by 2050, if remanufacturing applications are preferred instead of recent production methods, it is possible to reduce a significant amount of the associated greenhouse gas (GHG) emissions of spare parts used in vehicles. Besides, it is observed that remanufacturing helps to reduce the waste stream and causes less pollution than making products from raw materials by reusing the automotive components.

Keywords : greenhouse gas emissions, net zero targets, remanufacturing, spare parts, sustainability
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