

Environmental Impact Assessment of Conventional Tyre Manufacturing Process

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Abstract : The popularity of vehicles in both industrialized and developing economies led to a rise in the production of tyres. People have become increasingly concerned about the tyre industry's possible environmental impact in the last two decades. The life cycle assessment (LCA) methodology was used to assess the environmental impacts of industrial tyres throughout their life cycle, which included four stages: manufacture, transportation, consumption, and end-of-life. The majority of prior studies focused on tyre recycling and disposal. Only a few studies have been conducted on the environmental impact of tyre production process. LCA methodology was employed to determine the environmental impact of tyre manufacture process (gate to gate) at an Indian firm. Comparative analysis was also conducted to identify the environmental hotspots in various stages of tyre manufacturing. This study is limited to gate-to-gate analysis of manufacturing processes with the functional unit of a single tyre weighing 50 kg. GaBi software was used to do both qualitative and quantitative analysis. Different environmental impact indicators are measured in terms of CO₂, SO₂, NO_x, GWP (global warming potential), AP (acidification potential), EP (eutrophication potential), POCP (photochemical oxidant formation potential), and HTP (toxic human potential). The results demonstrate that the major contributor to environmental pollution is electricity. The Banbury process has a very high negative environmental impact, which causes respiratory problems to workers and operators.

Keywords : life cycle assessment (LCA), environmental impact indicators, tyre manufacturing process, environmental impact assessment

Conference Title : ICAMME 2022 : International Conference on Applied Mechanics and Mechanical Engineering

Conference Location : Auckland, New Zealand

Conference Dates : December 02-03, 2022