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16. Abstract

Motivated by the need to address challenges of global climate change, this study develops and implements a project based life cycle framework that can be used to estimate the carbon footprint for typical construction work-items found in reconstruction, rehabilitation and Capital Preventive Maintenance (CPM) projects. The framework builds on existing life cycle assessment methods and inventories. The proposed framework considers the life cycle emissions of products and processes involved in the raw material acquisition and manufacturing phase, and the pavement construction phase. It also accounts for emissions due to vehicular use and maintenance operations during the service life of the pavements. The framework also develops and implements a method to calculate project level construction emission metrics. Finally, the research provides a web-based tool, the Project Emission Estimator (PE-2) that can be used to benchmark the CO_2 footprint of highway construction projects. In conclusion, the research suggests ways of implementing the proposed framework within MDOT to help reduce the CO_2 footprint of highway construction projects.

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carbon footprint, GHG, emission calculator, LCA, decision-making, construction, project inventory, use phase, material emissions	No restrictions. This document is available to the public through the Michigan Department of Transportation.

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