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Incorporating Sustainability into the Procurement Process

The production and use of construction materials for transportation projects have varying impacts on the environment based on factors such as production process, transportation and material inputs. To mitigate negative outcomes, MnDOT sought to incorporate environmental impacts into the procurement process for concrete mixtures and concrete pavement. This project provided a framework for considering environmental impacts and standardizing a reporting system to encourage the use of low-carbon construction materials in infrastructure projects.

What Was the Need?

Historically, transportation agencies have procured asphalt, concrete and other construction materials based on quality and cost. However, in 2023, Minnesota passed legislation that requires suppliers of certain construction materials to submit an environmental product declaration (EPD) for each applicable construction material as part of a project's procurement process. An EPD summarizes a product's potential impact on the environment and provides a standard reporting system that is consistent with rules set by product stakeholders.

Beginning in January 2028, a maximum global warming potential (GWP)—one of the impacts assessed within an EPD—will be established for materials commonly used in transportation projects. This study evaluated the robustness of EPDs for all applicable construction materials that could be procured beginning in 2028, as well as procedures and guidance for effectively integrating this information into the procurement process.

What Did We Do?

To better incorporate sustainability into project procurement and link GWP levels to transportation

“This project has contributed to a foundation and structure for assessing the environmental impacts of transportation projects using asphalt or concrete in preparation for new procurement requirements beginning in 2028.”

—CURT TURGEON, DIRECTOR, MnDOT OFFICE OF MATERIALS AND ROAD RESEARCH

projects, researchers developed and implemented a benchmarking methodology to establish reference values for procuring sustainable concrete mixtures. A data collection protocol and life cycle information model were also developed to integrate GWP into procurement practices. The life cycle information model was then applied to a sample of concrete pavement construction projects to assign GWP values to specific paving pay items. Incentives were identified to encourage sustainable practices and the use of materials with a GWP below designated thresholds. Researchers then developed specifications for an EPD submittal package to assist in the sustainable project procurement process.

What Did We Learn?

The benchmarking methodology evaluated MnDOT-approved concrete mixture designs to establish benchmark GWPs for paving concrete, high early strength concrete and all other applications to serve as reference values for procurement decisions.

A data collection spreadsheet was created to report life cycle data for transportation infrastructure projects. The protocol suggests data be collected within a few weeks of construction initiation for the highest degree of data specificity while allowing time for

review and feedback to the contractor on the project’s sustainability. Data should also be collected at the end of construction to determine the as-built environmental impact potentials.

The life cycle information model calculated numerous environmental impacts from a sample of projects and linked a GWP value to project pay items, including concrete pavement and placement, structural concrete, dowel bars and supplemental pavement reinforcement. Overall, projects can minimize environmental impacts by optimizing paving schedules primarily because of reduced fuel use for construction equipment and concrete production plants.

The EPD submittal specification package outlines requirements for construction material information that details the specific material mixture, application, use and quantity. Researchers further recommend the development of an EPD audit program to assist with verification.

The environmental impacts of transporting materials to the construction site and actual construction site operations are rarely, if ever, included in EPDs, but they are important for estimating impacts more comprehensively. Steps for incorporating

these tasks were developed as part of this project, including the collection of specific data to more accurately capture their effects.

What’s Next?

This work provides recommendations for using GWP values for acceptance and incentives, collecting pertinent data, integrating EPDs into the procurement process and estimating environmental impacts of different life cycle stages. Overall, the project provides guidance for integrating environmental impacts into the procurement process that is fair and consistent. The processes and procedures developed will be invaluable to efforts in preparation for 2028 when legally mandated GWP thresholds will be in place.

About This Project

REPORT 2025-24

“Development of Process to Lower Global Warming Potential of Construction Materials.”
Find it at mdl.mndot.gov.

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