

## Pavement

**NOVEMBER 2024**

**Project Title:**

Partnered Pavement Research Center (PPRC) 23: Sustainability

**Task Number:** 4207

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DRISI provides solutions and knowledge that improves California's transportation system.

## Pavement Life Cycle Assessment (LCA)

Updating the database and implementing new models for LCA.

### WHAT IS THE NEED?

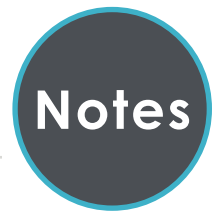
Over the last decade, the University of California Pavement Research Center (UCPRC) collaborated with Caltrans on multiple projects to gather data on pavement materials, construction methods, and energy sources. These data were used to develop a web based LCA tool called eLCAP.

Regular updates to database are crucial for conducting effective LCAs to support decision-making in project design, pavement management, and policy evaluation.

### WHAT ARE WE DOING?

This task order aims to enhance Caltrans' capabilities in addressing current and future environmental regulations, particularly greenhouse gas emissions and pollutant in alignment with California Assembly Bill AB32. Work includes:

- Updating existing life cycle inventory databases every three years using new data from government sources and industry-submitted environmental product declarations (EPDs).
- Exploration of EPDs' potential use in LCA tools and procurement via a pilot project.
- Development of additional data and algorithms for LCA, considering various design, construction, maintenance, and rehabilitation strategies, along with technological advancements like new materials and equipment.
- Inclusion of additional processes not currently considered in Caltrans' analysis, such as pavement vehicle interaction, radiative forcing from solar reflectivity, and new end-of-life processes.
- Capability to conduct LCA at the conceptual design



stage, considering various roadway structures and materials.

- Evaluation of policies and specifications on recycling and construction quality, including novel approaches to using recycled materials, renewable fuels, and performance-related specifications.
- Updating the eLCAP tool with new data, models, and features.
- Ensuring the developed database, models, and tool undergo outside critical review to instill confidence in the results produced.

## WHAT IS OUR GOAL?

The goal is to expand, update and enhance Caltrans' capabilities to address current and future issues required to meet California Assembly Bill AB32, greenhouse gas (GHG) emission targets and category pollutant regulations, and to make more informed decision-making with respect to environmental, energy and resource use impacts through LCA.

## WHAT IS THE BENEFIT?

The benefit is that by updating and enhancing Caltrans' ability to perform LCAs, they can make more informed decisions about transportation projects. This allows them to minimize environmental impacts, optimize energy use, and effectively manage resources, ultimately leading to more sustainable and efficient infrastructure development in California.

## WHAT IS THE PROGRESS TO DATE?

Updating existing LCA inventories, developing new material inventories, and expanding material models and data in OpenLCA for materials missing in the Federal LCA Commons' repositories have been ongoing since the start of the project. After conversations with the technical lead, additional priorities for the new eLCAP version were identified,

and comparisons between the existing eLCAP datasets and Federal LCA Commons' datasets are ongoing. UCPRC conducted internal meetings to discuss the new version of eLCAP and completed some user interface and data integration planning. Additionally, UCPRC has continued to participate in the Caltrans Environmental Product Declarations (EPD) committee meetings.