

Frequently Asked Questions: Inflation and LCCA

White paper by the Massachusetts Institute of Technology's Concrete Sustainability Hub: *The Effects of Inflation and Its Volatility on the Choice of Construction Alternatives*

What is LCCA?

Life cycle cost analysis (LCCA) is an economic method used to assess the total cost throughout the life of a construction project. In the case of a road or highway, it includes not just the cost of initial construction, but the future cost of maintenance and rehabilitation required during the useful life of the project.

Why is LCCA important?

LCCA has become one of the most important tools available to transportation agency officials in evaluating paving materials and in making informed choices that best serve the public interest. It is a process that is recommended by the Federal Highway Administration (FHWA) because it saves taxpayers millions of dollars, improves roadway performance, and makes decision-making a far more transparent process.

How does the process work?

An important factor in LCCA for highways and roads is estimating the future costs of materials for maintenance and rehabilitation, such as asphalt for overlays and patching. LCCAs have traditionally ignored the possibility of future changes in relative prices of building materials by assuming that the real prices of all construction inputs remain fixed. That is, a standard inflation rate is used for all building materials.

Why is the inflation rate important?

Getting to the lowest cost is certainly one of the mandates of LCCA. As noted by the FHWA: "In the face of public scrutiny, transportation agency officials are under great obligation to demonstrate their stewardship of taxpayer investments in transportation infrastructure. "

Transportation officials can much more accurately determine the overall life-cycle cost of their road construction projects by accounting for the effects of inflation in choosing either asphalt or concrete as the primary paving material.

MIT researchers conducted the construction industry's first comprehensive and credible study to measure the impact of inflation on the choice of paving materials over the life cycle of a road construction project.

What did MIT study find??

MIT researchers reviewed the data on real price changes of four basic construction materials: concrete, asphalt, steel, and lumber. The study examined historical data on real prices of construction materials and found that the assumption of constant real costs is seriously inconsistent with historical experience. Ignoring that experience can lead to serious cost overruns. To avoid such overruns, the study suggests the use of material-specific escalation rates.

Looking a fifty-year time frame, the researchers found that the mean real price of **concrete decreases by 20 percent.**

Over the same time period, the mean price of **asphalt increases by a whopping 95 percent.**

What 's the significance of the MIT findings?

Researchers found that the actual total life-cycle costs of using asphalt could be much higher than the costs that would be projected by life-cycle cost analyses that fail to consider the impact of inflation and price volatility. What's more, the disparity between the life-cycle costs between concrete and asphalt shifts dramatically in favor of concrete when the life-cycle cost analysis accounts for inflation.

Over their useful life, the real cost of asphalt roads is much higher than predicted by LCCA. **In fact, over a 30-year period the increasing cost of asphalt roads on the U.S. Interstate system alone will erode state transportation budgets by more than \$14 billion.**

What is the MIT Concrete Sustainability Hub?

The MIT Concrete Sustainability Hub is a research center established at the Massachusetts Institute of Technology in collaboration with the Portland Cement Association (PCA) and Ready Mixed Concrete (RMC) Research and Education Foundation. The Hub was founded in October of 2009 with the mission of accelerating emerging breakthroughs in concrete science and transferring the best available data into engineering practices.

Isn't the research biased because it was funded by concrete interests?

This study represents the best available data on paving materials from one of the world's preeminent institutions of higher learning. While funding for this research was provided by industry leaders, the mission of the MIT Concrete Sustainability Hub is and has always been to advance the best science on concrete and similar building materials and to translate that data into innovative engineering and design practices to account for and ultimately mitigate the environmental and economic impact of these materials.

MIT is an equal partner in its collaborative efforts with industry leaders and the world-class researchers of MIT will always strive for results that reflect the highest standards of academic integrity.