

LIFE CYCLE COST ANALYSIS

INTEGRATED PAVING SOLUTIONS

WHAT IS IT?

The decision process for selecting paving materials is often based on the initial cost of placing the pavement rather than the total cost over the life of the pavement. Utilizing life cycle cost analysis (LCCA) of structurally equivalent pavements allows agencies to account for the economic benefits accumulated over time associated with the various alternatives. This in turn will allow for the selection of the most cost-efficient, and durable pavements for the motoring public.

Life-cycle cost analysis (LCCA) is a process for evaluating the total economic worth of a useable project by analyzing initial costs and discounted future costs. For pavements, these costs include initial construction, maintenance, user costs, reconstruction, rehabilitation, restoration, resurfacing, and salvage value. LCCA examines the economic benefits of competing alternatives and provides a means that agencies can use to make the most cost-effective pavement decision.

Why do it?

LCCA is a common sense, businesslike approach to building, maintaining, and modernizing roads. It provides a formalized process for evaluating pavement materials that is typically open and transparent and eliminates much of the arbitrary decision making process. Agencies using LCCA have saved taxpayers countless dollars by choosing the most cost-effective long-term pavement. Both asphalt and concrete industries have embraced LCCA because it is a more prudent method for making decisions about durable public assets.

When comparing construction alternatives, LCCA provides a level playing field. Moreover, LCCA is based on a consistent methodology applied across all products and at all stages of their production, transport, energy use, maintenance, and disposal or recycling at end of life.

Too often, roadway agencies place a high premium on initial costs and fail to recognize the long-term consequence of their action. A pavement is a long-term investment and its success or failure should be measured in terms of years of reliable performance.

The Federal Highway Administration promotes LCCA as an engineering economic analysis tool to quantify the differential costs of alternative investment options.

During the life of the pavement, a pavement that requires more frequent maintenance, rehabilitation, and resurfacing results in higher total roadway costs. In addition, whenever a pavement needs significant work, the driving public is exposed to major inconvenience and traffic congestion. Local businesses are adversely affected and worker safety is an issue. In the long run, agencies and elected officials need to factor in the long-term performance of their pavement investment rather than focus only on initial cost. In support of this concept, the Federal Highway Administration promotes LCCA as an engineering economic analysis tool to quantify the differential costs of alternative investment options.

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Concrete Solutions

Concrete pavements help extend the life of transportation systems by strengthening their individual components.

Because of its durability, concrete pavements can dramatically increase network service life, reducing the cost and frequency of repairs and spreading them out over longer time periods.

Less frequent maintenance translates into lower ownership costs.

- A recent PCA survey of DOT specifiers concludes that concrete pavement lasts 29.4 years on average before a major rehabilitation is required.
- Asphalt pavements required a major rehabilitation after 13.8 years.

Over time, the average asphalt pavement can cost up to three times more than an equivalent concrete pavement. Recent oil price volatility has increased asphalt's life-cycle costs and made it more unpredictable.

PCA estimates that by using concrete instead of asphalt, states could save as much as \$100 billion on roads built between from 2009 to 2015, based on the overall lifetime costs of the roads.

By 2015, PCA estimates concrete roads will enjoy a \$500,000 initial bid cost advantage over asphalt for a one mile, "standard" two-lane roadway — roughly a 41% savings. According the Bureau of Labor Statistics, the price of liquid asphalt has increased 251% in the past five years. Meanwhile, the price of concrete has largely kept pace with a 4% inflation curve.



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