

Probabilistic Life Cycle Cost Analysis in Pavement Design

Sponsored by the
Hawai'i Local Technical Assistance Program
in cooperation with
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Developed and Presented by
FHWA Office of Engineering,
Pavement Division and Resource Center Pavement Engineers
in Partnership with the Office of Technology Applications

When: April 27-28, 1999
Where: Hawaii DOT, Oahu District Conference Room
727 Kakoi Street
Time: 8:00 AM - 4:30 PM
Cost: FREE!!
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Keith Herbol
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Deadline to register is Wednesday, April 21, 1999
Class size is limited to 30 participants.

Workshop Overview

- Background
- LCCA Process
- Components and Issues
- User Costs
- Class Exercise
- Basic Statistics
- Risk Analysis
- Probabilistic Example
- Benefits and Implementation

DESCRIPTION

Life Cycle Cost Analysis (LCCA) is a tool that aids the manager in determining the most economical pavement design and rehabilitation strategies. Demonstration Project No. 115 (DP-115) is a two day, no fee, workshop that provides technical guidance on best practice on conducting LCCA in pavement design. It focuses on the issues associated with conducting traditional LCCA, provides a rational approach for determining work zone user costs, and introduces a probabilistic based approach in the treatment of uncertainty associated with LCCA input variables.

DP-115 is designed for individuals with responsibility for conducting, evaluating and using pavement design LCCA results. This includes State pavement design engineers, pavement management engineers, as well as district or area supervisors with responsibility for selecting pavement type and rehabilitation strategies. The workshop incorporates the latest advances in multimedia presentations, computer simulations, example problems, class exercise, and group discussions.

Traditional LCCA: The first day of the workshop focuses on traditional LCCA. It begins with background information supporting the need for conducting LCCA and introduces the fundamental principles of the LCCA process and the steps involved in conducting analysis. Each of the LCCA components (alternative development, costing, discount rates, work zone user costs, etc) and associated issues are then discussed in detail. Once the foundation is laid, the workshop moves on to several LCCA class exercises to stimulate participant participation as well as reinforce LCCA computational steps.

Work Zone User Costs: One of the more difficult aspects of LCCA is accounting for addressing the differential user costs associated with alternative pavement design strategies. DP-115 provides guidance on both conceptual and computation analysis procedures that can be used in determining work zone user costs. The workshop includes class in determining work zone user costs. The workshop includes class exercises to reinforce the user cost concepts and computational steps presented.

Probabilistic Approach: Day two of the workshop introduces Risk Analysis, a probabilistic approach, that combines probability descriptions of uncertain variables and computer simulation to quantify risk associated with LCCA results. Risk Analysis can be thought of as a rigorous sensitivity analysis. It uses Monte Carlo simulation to expose areas of uncertainty typically hidden in the traditional "deterministic" LCCA approach, and provides the decision maker with the opportunity to take mitigating action to decrease exposure to risk. Providing decision makers with information on the probability associated with LCCA results elevated the debate - from the validity of results - to deciding best public policy. The risk analysis sessions include a refresher on basic statistical concepts, an introduction to the fundamentals of risk analysis, and a demonstration of microcomputer based risk analysis software.

DP-115 concludes with a discussion of the benefits and limitations of both the traditional and probabilistic based LCCA, and a discussion of approaches to implements in current SHA LCCA procedures. A separate executive presentation of DP-115 highlights is also available in conjunction with DP-115 workshop presentation.

Agenda

Day 1

08:00 a.m.	Welcome
08:15 am	Workshop Overview
08:30 am	Background
09:00 am	LCCA Process Overview
09:30 am	Break
09:45 am	Components & Issues
10:45 am	Break
11:00 am	Class Exercise No. 1 or 2
12:00 am	Lunch
01:00 pm	Introduction to Work Zone User Costs
01:30 pm	Work Zone User Costs: Calculation Steps
02:45 pm	Break
03:00 pm	Class Exercise No. 1 or 2
04:00 pm	Class Exercise No. 1 or 2
04:30 pm	Close for Day

Day 2

08:00 am	Basic Statistics
09:00 am	Risk Analysis Approach
10:00 am	Break
10:15 am	Software Demonstration
12:00 am	Lunch
01:00 pm	Class Exercise Revisited
02:00 pm	Presentation Techniques
02:30 pm	Break
02:45 pm	Benefits & Implementation
03:30 pm	Workshop Summary
04:00 pm	Closeout