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Decision-Support Software for Service Life Prediction and Rehabilitation of Concrete Bridge Decks

Objective
To develop analytical models and decision support software to help bridge owners optimize the life cycle design and maintenance management of reinforced concrete bridge decks.

Background
In order to select the most cost-effective strategy for rehabilitating concrete bridge decks, owners must predict the service life and total life-cycle costs of bridge decks. The service life depends on reliable predictions of chloride ingress into concrete, of corrosion of reinforcing steel and of damage initiation and accumulation in concrete decks. These in turn depend on several factors with considerable uncertainty. The development of decision support tools for service life prediction and life cycle cost analysis will therefore yield considerable benefits.

Progress to Date
- Developed analytical models to predict the times to damage initiation, to failure, to chloride contamination and to corrosion of concrete bridge decks.
- Developed a life cycle cost analysis model.
- Developed the SLAB-D – Service Life Analysis of concrete Bridge Decks – decision support software, which integrates the developed service life prediction and life cycle cost analysis models.
- Began alpha testing of the SLAB-D software.

Work Remaining
- Finish alpha testing of SLAB-D, prepare the user's manual, and deliver them to all partners for beta testing.

Outcomes
- A report describing the developed models for service life prediction and life cycle cost analysis of bridge decks, which has been delivered to the Partners.
- The SLAB-D software.

Partners
Alberta Transportation, Cement Association of Canada, Cities/Regions of Hamilton, Ottawa, Winnipeg, and Durham, Engineered Management Systems Inc., Federal Bridge Corporation Ltd., Manitoba Transportation and Government Services, Ministère des Transports du Québec, Nova Scotia Transportation and Public Works, Public Works and Government Services Canada
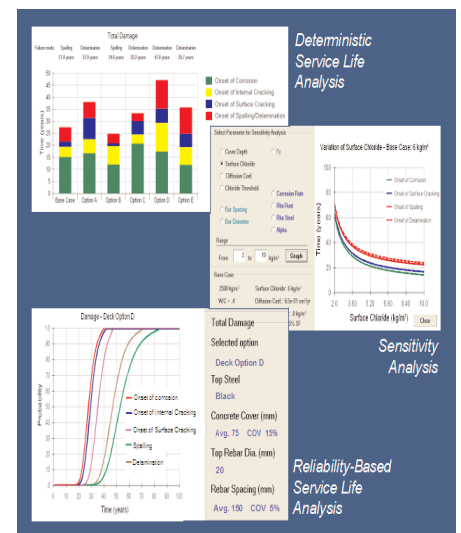
Start/Expected Completion Dates
This project began in April 2002 and will be completed in December 2006

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For more information, see http://irc.nrc-cnrc.gc.ca/ui/cs/decisionsupport_e.html

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User Interface of SLAB-D Software