

ABC-UTC July 2022 Research Seminar: Development of User-friendly Tools and Decision-making Algorithms for Service Life Design of ABC Bridges

#	Questions	Responses
1	Do you think this algorithm is applicable to all bridge components or specific components?	Yes, it can be implemented for other bridge components as well.
2	Did you think about the automated decision-making based on the bridge rating data (i.e., deck rating, etc.) for DOTs?	In this project, bridge rating data are not used in the decision-making process. The tool is primarily intended to provide guidance for new designs. A webpage is designed for collecting inspection data for future research.
3	Have you considered all service design life parameters?	Yes, the procedure is based on philosophy developed under SHRP2 R19A. However, only time to corrosion initiation was used as the basis of service life estimation in the tool.
4	Can the research output be used for existing bridges to do rehabilitation work?	This particular project is focused on closure joints in new construction. The general framework can be applied to rehabilitation and to other elements as well.
5	Have you determined the efficiency and reliability of this research?	This project follows the steps presented in the ABC-UTC guide. The algorithms and database are tested and are fully functional. It is expected that the web-based tool will help bridge engineers use the guide in their design and decision-making process.
6	Does the research output include geographical data to consider seismicity or similar effects?	Geographical data is used for determining chloride exposure characteristics. Seismic design is not a service life issue. During design for strength, one would consider seismic issues.
Questions during Seminar		
7	What is the definition of "Service Life" used in this study?	The Service Life is defined as the time period during which the bridge will continue to provide its intended function.
8	Is the software for this research project available for use now?	The software for this research project is not available at the moment. We are finalizing host settings and security measures. A webpage is currently dedicated to the project on the ABC-UTC website, and the tool will be available there soon.

9	<p>The differential equation used for this analysis is the second Fick's law that considers the diffusion of chloride occurring following one direction. The reality is the diffusion of the chloride will occur in different directions. If the second Fick's law is used, usually the probabilistic approach is preferred over the deterministic one in order to optimize the increase of the concrete cover. Is there any particular reason that led to avoid using the probabilistic approach for the resolution of the second order differential equation (second Fick's law) in your assessment of the increase of the concrete cover?</p>	<p>There are different procedures to calculate service life using Fick's second law. We used mean values in the interest of computational efficiency for trade-off analysis and ranking mitigation strategies.</p>
10	<p>What can be done for corrosion control?</p>	<p>In the tool, service life estimation is based on initiation of corrosion from chloride intrusion. There are several alternatives considered by the tool that can help extend the time to corrosion initiation/control corrosion. Some of these include increased concrete cover, UHPC overlays, stainless steel rebar, waterproofing membranes, effective drainage, and cathodic protection.</p>
11	<p>Can the software be used for other decision-making tools like Life-Cycle Cost analysis?</p>	<p>The tool only calculates initial costs, which can be used as an input for life-cycle cost analysis.</p>
12	<p>When the software becomes available, will it be a downloadable software or a webpage software?</p>	<p>The software is a web-based tool.</p>
13	<p>Why was a bottom sealer used in the program? Usually bottom sealers are considered detrimental to deck life.</p>	<p>Bottom sealers were considered as an option for coastal regions subjected to spray from jet skis. This option was included in the ABC-UTC Guide on which the tool is based.</p>
14	<p>Do you plan on extending the study to other elements so that Service Life of Bridges at the system level can be assessed?</p>	<p>Yes, we are planning to extend the tool to include other bridge elements.</p>