

ABC Closure Joint Alternatives Considering Durability and Service Life

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ABSTRACT

Bridge owners are concerned about the long-term durability and service life of “joints” used for prefabricated elements in Accelerated Bridge Construction (ABC) projects. Examples include the deck-level longitudinal closure joints between prefabricated modular decked beam (MDB) elements that are commonly used in ABC projects. When MDB elements are used, steel or concrete girders are pre-topped with a concrete deck. The units are transferred to final bridge locations and joined together using longitudinal closure pours. The emphasis of the current work presented is the development of a guideline focused on the service life design of deck-level longitudinal closure joints for MDB elements.

This presentation will provide an overview of the most common closure joint types used in practice and will discuss the durability and service life of each alternative. The durability and service life of each detail will be discussed based on available data and information developed and collected. The conclusions to be presented are based on the available information collected from the performance of existing ABC bridges, non-destructive tests that have been carried out on longitudinal closure joints of two in-service ABC bridges, laboratory tests used to study the durability of various alternatives, and an investigation that is underway to develop design recommendations for new detail envisioned by ABC-UTC. The new detail consists of a 12- to 14-inch-wide joint, normal strength concrete, and a 90 degree bend at the end of transverse reinforcement within the joint as an economical and constructible alternative to the common joints that are currently in use. This alternative is for owners who may be reluctant to use UHPC, while providing many design advantages, consisting of regular transverse reinforcement with 90 degree bend at the end and use of normal strength concrete.