

IBT/ABC-UTC 2024 November Long Term Performance of Prefabricated Deck Level Connections

#	Questions	Responses
1	What long term maintenances issues have you observed at the deck joints using these techniques (leakage, deterioration, etc.)?	To date, we have not seen any need for maintenance of the joints between prefabricated deck panels. Deck expansion joints are still problematic. Since post-tensioned decks are made with bonded tendons, it is feasible to patch a post-tensioned deck using standard deck patching methods.
2	What is the traffic vibration impact in staged bridge deck reconstruction, and do you have any insight on the implications of its long term performance?	This is really not an prefabricated deck issue. There have been studies on deck vibrations going back over 30 years. The most important issue is to eliminate differential deflections between adjacent decks. This can be done by closing the bridge (not practical in most cases), or connecting the cross frames between the adjacent girders.
3	What is the durability of crack sealer on longitudinal joints and are there any issues from movement and deflection?	We have not seen issues with longitudinal joints on prefabricated elements. It is important to note that the case studies presented all had waterproofing membranes and overlays. The data shows that this system does a very good job with protection of the deck connection joints.
4	Given your understanding on the history and trajectory of AI, do you think it is being over-marketed and used as a buzz word?	This question is not applicable to this presentation.
5	In Canada, fully continuous composite superstructures are very common and link slabs are not. Why does the USA seem to generally avoid fully continuous bridges?	We are not against continuity, which is still the most common approach. Link slabs are a tool for the following situations: 1. Replacing a deck on existing multi-simple-span bridges: Link slabs allow the designer to make the bridge jointless without changing the beams. 2. Prefabricated superstructures: This allows a design with span-by-span construction similar to prestressed girders. It eliminates the complicated continuity connections and bolted splices in the girders (in most cases). See Piece-by-piece article in Modern Steel Construction Magazine, Sept. 2014 (https://lsc-pagepro.mydigitalpublication.com/publication/?i=221310&p=0&view=issueViewer). 3. Multi-span bridges with unbalanced short-end spans: This scenario often leads to uplift at the abutments. By using link slabs, the uplift is eliminated and you still end up with a jointless deck.
6	Will diamond grinding the deck or overlay for ride quality result in performance issues?	This has been done in several states. It is effective and recommended if you have a bare concrete deck.
7	The link slab in the Medford, MA bridge has minor cracking - is that due to shrinkage cracking or due to end rotation of the bridge girders? Would adding fibres to the link slab concrete mix be beneficial to mitigate these cracks?	It is believed to be shrinkage cracking as it is emanating from the corners of the precast deck. In theory, fibers would help, but in my opinion they are not necessary. The cracking seen in the link slabs is no worse than typical tension cracking in negative moment regions of continuous girder bridges and typical shrinkage cracking in all bridges.
8	What was the radius and maximum / minimum overhang for the ramp bridge?	The bridge had a compound curve. The radii were 1600 feet and 3000 feet. The overhangs ranged from about 1.5 feet to 2.5 feet.

9	Do you have any recommendations for specifying either spray applied membrane or sheet membrane for deck protection?	The state DOTs specify the membranes for designers. Both types of membranes have been and are being used. Personally, I prefer the spray applied, but it does come at a price.
10	How will the future with truck platooning affect our concrete bridge decks?	This is not the subject of this presentation. FHWA is investigating this potential affect.
11	What was the stress across the joints where post-tensioning was used?	AASHTO specifies 250 psi net prestress. We accounted for the negative moments at their piers by increasing the PT to get to 250 psi with the negative moment stresses. This is conservative as the position of the truck to cause the negative moent is away from the joint being investigated. I have heard of designs that allowed the stress to decrease to 50-100 psi compression for this loading case.
12	What are the high quality overlays used in Europe?	I am not aware of the specific materials. I believe is is normal asphalt.
13	How much more or less expensive are the modular units (two steel girders with precast deck) compared to traditional construction (ignoring costs associated with construction duration)?	We do not have this data. I believe that construction time is the largest factor affecting price. Still, the shipping and handling costs would make these units more expensive than conventional construction. The cost of forming and pouring the joints also would contribute to higher costs.