

April 26, 2019 Research Seminar: Integral Abutment Details for ABC Projects, Phase II

#	Questions	Responses
1	I must have missed Part I. Do you have a recording for Part I?	Part 1 was presented in July 2016. The recording of the presentation can be viewed in the ABC-UTC Research Seminar Archives (https://abc-utc.fiu.edu/mc-events/abc-techniques-to-improve-durability-sustainability-and-efficiency/?mc_id=147); it is the second of the two presentations.
2	What strength parameters and mix design were used for the UHPC joints? What type of fibers were used?	IowaDOT has literature regarding LaFarge Ductal UHPC mix design and strength parameters, which consisted of (grey/dark grey) premix, water, LaFarge SuperPlasticizer (150), and LaFarge steel fibers.
3	Can you comment on the details of the anchorage of the girder bottom flange to the abutment, and how the corner connection is analyzed?	Girder to abutment was only an embedded girder within integral diaphragm.
4	How would you take the abutment apart for rehab or repair?	This was not investigated during the research since it was assumed that the connection would not have to be taken apart due to not having any joints or bearings that could face deterioration.
5	Is there a way to determine if ABC integral abutments will be more economical than conventional methods of bridge construction?	A cost/benefit analysis would have to be done specifically for ABC integral abutments.
6	What do you do for seismic connections and considerations for integral abutments?	Further investigations are needed to properly answer this question.
7	Are there any previous projects that used these details, that are being monitored for how well they are functioning?	There is literature showing the use of grouted couplers like that seen in the Pile Coupler design for pile to pile-cap connections. Also, grouted sleeves have been used for pier-cap to pier column connections. But there is no field data for integral abutment connections like the ones tested for this research.
8	Can you discuss unexpected results and lessons learned?	Cracking pattern of Pile Coupler leading to excessive cracking about pile cap-joint interface. Learned that possible confinement reinforcement around CMP's may be required.

	Questions during Research Seminar	Responses
9	For the GRBC, how did you model the ABC slide/roll activity? It looks like you just lifted the upper section and lowered onto the cap. How is that ABC?	A simulated slide was done with the diaphragm section suspended above the cap section and 'slid' into place using the overhead crane. In the field, the diaphragm section could be elevated and slid into place on rollers and then lowered with pancake jacks; this has been done for other ABC projects in the past not using GRBC .
10	For the CMP method, I'm assuming a pile will be coming up through the bottom of the cap, so why did you use a CMP plug?	The CMP's for the Pile Coupler connection details are designed to only encase the steel section that is acting as a coupler for the abutment elements. There would be a separate pile(s) coming up from the bottom of the pile cap to connect the abutment to the driven piles, but not at the same location of the CMP's used for the integral abutment connection.
11	Can you please share the UHPC mix design?	I used the mix design the IowaDOT was given by LaFarge North America for the Ductal JS 1000 Concrete. This document is available through the IowaDOT "Special Provisions for UHPC."
12	Have you considered external post-tensioning for the front face reinforcement, i.e., a dwyidag bar and surface bracket on the front (exposed) face as external reinforcement?	This was not considered. The goal for these designs was to have a final product that would feature a joint below the surface of the deck to avoid any surface interfaces that could lead to infiltration of water or deicing chemicals.
13	Were there any construction issues with the UHPC placement?	Other than the layering shown during the presentation, there were no issues.
14	For integral abutments, Minnesota requires 3-ply waterproofing at the back face of the construction joint. The manufacturer of these says 3-day wait on green concrete.	Being that the pile cap and abutment diaphragm would be precast, 3 days likely wouldn't be an issue; one would need to check if that 3 days is also required on a narrow grout joint or UHPC joint.
15	Are any of the three connection details ready for implementation and, if so, do you have recommendations for the design and construction details?	UHPC-Joint is ready for implementation. I would suggest possibly changing the notched section, or revise the type of slide-in design to account for the issue of the pile cap coupler bars knocking into the bottom of the girder. By changing either the physical or installation design, the use of threaded couplers can be avoided.