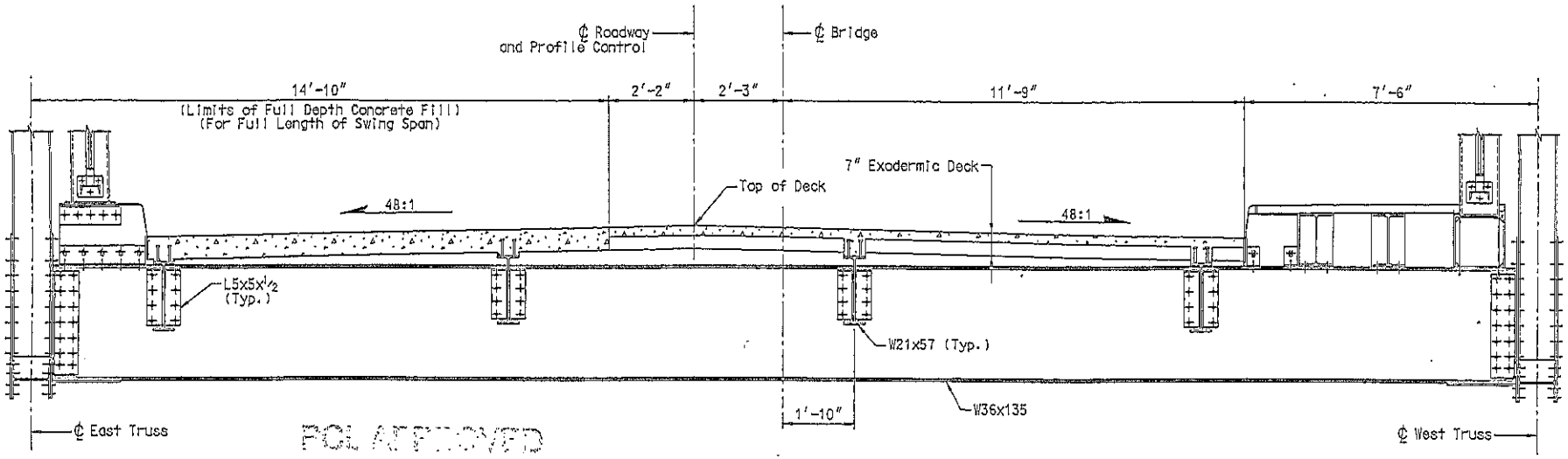
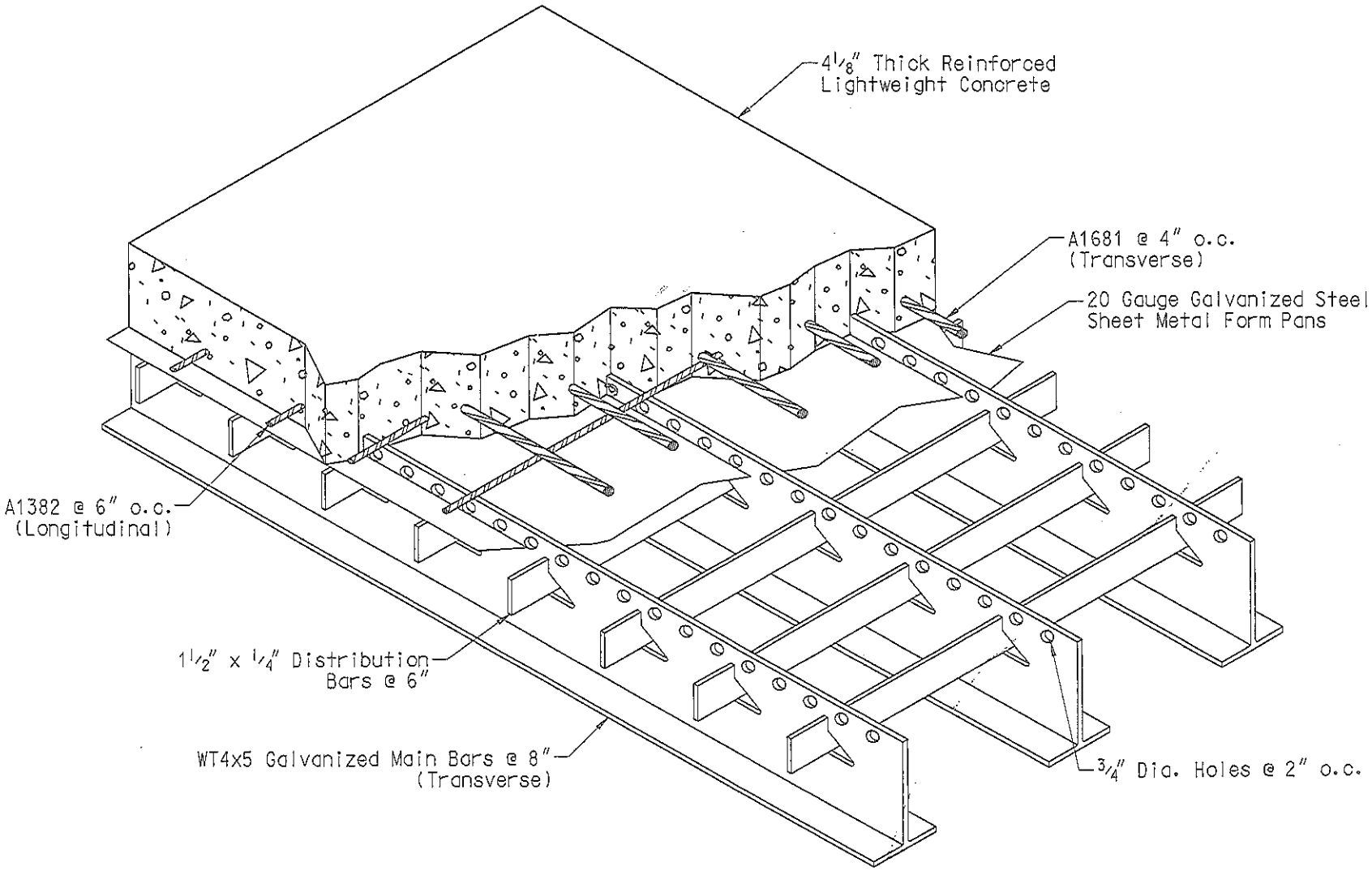


TYPICAL FLOORBEAM SECTION

(Limit of Full Depth Concrete)



UNFILLED GRID DECK COMPOSITE WITH REINFORCED CONCRETE SLAB ON STEEL BEAMS

(Isometric view - Not to Scale)

1.5 Lessons Learned

a database created by Jeff Mosher on 12/30/2009 5:27:16 PM

Number	Item	Contractor Action	Correction	Desired Outcome
	PDF Submittal Requirements	In order to expedite the submittal review process, SCDOT accepted PDF copies of the submittals in addition to hard copies. During the first partnering session, the team agreed that PCL would provide a PDF with every submittal but the contract review time of three or four weeks would not begin until the hard copy was received in the field office. The PDF copies were often submitted before the hard copies to give the design review team additional time for review. However, somewhere along the process, PCL wanted to change the terms of the submittal process to favor them, which caused confusion in timing of reviews for submittals.	Include a special provision that clearly and plainly explains the submittal process, the number of hard copies required, the distribution, that all design drawings submitted in PDF need to be printed to PDF instead of scanned to PDF, and stating that the review time clock does not begin until hard copies are received in the field office.	Enhance submittal review and acceptance.
	Up Front list of submittals and dates	PCL would not provide SCDOT/PB with a list of dates on when to expect submittals for review.	One of the first submittals should be a list of submittals and the expected date of their arrival.	This will allow the review team the ability to manage staff and work loads to prevent people from being burned out and provide the owner with the best product at the best price.
	Technical Special Provision (TSP)	The TSP developed by the EOR were not accepted until late in the project creating problems with the design, review, and	Require the TSP to be part of the bid or require it to be an early sbumittal with acceptance prior to the start of any design work.	To prevent the technical requirements from changing during the construction process and

		installation of items. As an example, PB observed PCL installing galvanized and stainless steel fittings to attach galvanized conduit to the structural steel. Instead of removing the galvanized fittings and replacing with stainless steel (per the original TSP), PCL revised the TSP to allow both materials types for the conduit fittings.		allow items to be properly designed and inspected.
	One Week Notice on Inspection and Testing Items	PCL would not give PB exact dates for when items were to be tested. This occurred frequently, but was particulary difficult over the holidays. PB was required to have out of town people present during holidays in case testing was performed. PB also had to book many last minute flights to watch testing, which was an increased expense to the SCDOT.	Require one week notice on all (with dates of start and finish) - Inspection items - Start of new construction processes - Test This could be handled with a spreadsheet submittal listing the off site fabrication shop, contact name and phone number.	This will allow the owner to schedule manpower to the needs of inspection levels.
	Pre-Construction Meeting for All Activities	PCL only had pre-construction meeting for items that PB required. PCL did not always inform SCDOT/PB that a new activity was beginning. PB would hear from the field of dates when new subcontractors were to appear on site. This was not always in time to hold a pre-con meeting.	Require pre-construction meeting prior to the start of all activities. Schedule one week prior to the start of the activity. An example would be the start of SIP deck pans and reinforcing steel placement.	This will aid in communication and insure nothing is missed with construction activities.
	Communications	PCL was inconsistent in relaying information and discussions with outside agencies and other stakeholders with SCDOT and PB. This made it difficult to determine if PCL was coordinating	Require the contractor to copy communications with agencies/stakeholders to owner/rep. The list of agencies/stakeholders can be predetermined at the start of the contract.	

		with all the required parties. An example was PCL's failure to copy SCDOT/PB on conversations with USCG and with SCE&G.		
	Enhanced PB Service - Daily Work Reports		- Inspectors will do daily work reports in Word, adding daily photos, and copy to SiteManager. - Reports will be printed to pdf and emailed daily to appropriate staff. - Every field person will be assigned a project camera. - Inspector will take daily photos and put them in their daily reports. - Inspector will take photos of non-compliant installations and submit to office staff. - Office engineer will take weekly progress photos.	This will allow project staff to have a searchable record of reports. Managers will have instant access to reports to keep abreast of what is going on in the field.
	Fabrication of Long Lead Items	During first partnering session, PCL requested a variance from the contract to start fabrication of three items that had a long lead time. Without a system in place, this opened the door to a number of other components that began fabrication without accepted plans.	Add a special provision to address long lead items for known components (brass center rings, brakes) that a) limits the number of components avaliable for variance, and b) requires the contractor to submit their request in writing so it can be reviewed through the submittal process.	Placing control over those items that require legitimate long lead times allows these items to move forward without opening the gate for many items to be fabricated for the contractor's convenience.
	Stop Work Orders	By its very nature, the advanced bridge construction method involves an aggressive schedule. However, often times haste does make waste, and the Stop Work order is a good tool to restrain a specific operation without impacting the overall project. There were times when PCL failed to follow the process required by the specifications. These instances would	SCDOT should agree up front to allow the CEI team the ability to write a Stop Work Order without going through an involved commuincaiton process.	This level of authority granted to the CEI would enable the contractor to continue work on all operations except for the one in question, and give an extra day or two to make sure the operation in question is proceeding along terms acceptable to SCDOT.

		coincidentally occur on weekends or holidays when SCDOT personnel were not readily available.		
	Completion of 11-Day Closure	Without a detailed definition of what was required to be completed prior to the re-opening of the bridge to traffic after the 11-day closure, PCL negotiated for an earlier opening time most of the day on Feb 18, 2010. Had PCL taken more time to check and adjust mechanical measurements, we could have prevented months of discussions about whether the specifications were met. PCL was faced with significant liquidated damages so they were understandably motivated to open the bridge as soon as they could. The only guidance from the contract was that the swing span needed to be fully operational.	In the case of the Ben Sawyer Bridge, with the swing span being constructed offsite, the contract should detail which electrical and mechanical components need to be checked prior to the start of the closure that will permit to closure to beging, and which electrical and mechanical components need to be checked again during the closure before the bridge can be opened to traffic.	The SCDOT can verify with more confidence that the bridge is truly ready to open to traffic.
	Design & Shop Drawing Submittals	PCL submitted many design packages in pieces making it difficult and costly to perform a proper review.	Require in advance the contractor to break out what design items will be submitted with what groups. As an example, separate the mechanical, electrical and structural items. Require the contractor to develop a submittal schedule that is built logically instead of using a piecemeal process. Allow SCDOT to determine, or at least accept, a thorough submittal plan process.	This will create more continuity in the design review and provide for a higher quality product.
	QC Testing	Since the contract did not require PCL to perform their own QC material testing, PCL was dependent on SCDOT testing. In some cases, work proceeded without confirmation of passing test	Require the contractor to perform QC testing and submit test results to the SCDOT/CEI weekly on the conventional materials used on site.	SCDOT/CEI still retains the role of acceptance testing but does not impact the contractor's schedule.

		results. An example was reforcing steel that failed to meet some of the new criteria required by the 2007 specification.		
	Final Surface Pavement	PCL did not install the final asphalt on the approaches because they did not want to mark the final asphalt surface with equipment while closing the project. The contractor intended to place the surface asphalt shortly after the removal of all temporary trestles. While the contractor's intentions were good, there was delay in final surface pavement due to retrofitting the abutments. The temporary wedges placed at abutments were not intended to last 12 months and were a problem to the traveling public.	Require final surface asphalt placement within 60 days of opening the bridge to traffic.	A number of residents and frequent users of the bridge should not have to endure a rough pavement condition for an extended period of time. The placement of a smooth riding surface sooner than later retains good will with the public.

Comments