



# INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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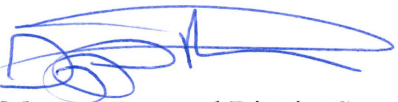
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**Michael R. Pence, Governor**  
**Brandye L. Hendrickson,**  
**Commissioner**

October 13, 2016

## CONSTRUCTION MEMORANDUM 16-09

TO: District Deputy Commissioners  
District Construction Directors  
District Technical Services Directors  
District Area Engineers  
District Project Management Director  
Project Management Director  
District LPA Coordinators  
Project Engineers/Supervisors  
Field Engineers

FROM:  Mark A. Miller, Director  
for Division of Construction Management and District Support

SUBJECT: Reinforced Concrete Three-Sided Structures Installation Instruction

It has come to the attention of Construction Management that, in some cases, reinforced concrete three-sided structures are not being installed in accordance with the Standard Specifications. There are concerns with standard practice that a manufacturer's representative has not been onsite during the installation of the three sided structure which is stated in 723.03, "*For precast three-sided structures, the manufacturer's representative shall provide technical instruction and on-site technical assistance to the Contractor during the erection of the members.*" Recent inspections have also discovered failures within the leg section of the three-sided structures. There have been three main causes for the failures that have occurred within the leg sections:

- 1) An issue has been found with the keyway joint between the footing and bottom of each leg section. Some keyway joints have not been properly grouted in accordance with the Standard Specifications. 723.11 states: "*Each wingwall that is not precast as one unit with the footing shall be set on masonite or steel shims. A minimum gap of 1/2 in. shall be provided between the footing and the bottom of each section or wingwall. Once the wingwalls or structure sections are placed, the space underneath the wingwall or structure leg section to the top of the keyway sides shall be filled with prepackaged grout....*" Some keyway joints only show evidence of grouting on the inside faces as those have the easiest access and only visible part of the keyway post installation and backfill. The leg section will want to slide on the keyway joint but the inside face will resist since it has been grouted. This error has caused the leg sections to crack through the reinforcing steel mat.

Design has been instructed to place a detail on the plan sheets showing the keyway joint between the footer and leg sections. The detail will specifically show where the grout is to be applied and the thickness of the grout. Ultimately, the Contractor's designer shall produce shop drawings from the plans. The shop drawings shall be expected to show the same detail revealing how the grout is to be applied in the keyway section.

- 2) Due to the design of the three-sided structures, lateral movement in the leg sections is another cause for concern for initial installation. RSP 723-B-300 was created to help address this issue. It states, "*Details for providing horizontal restraint of the structure legs during installation until after the completion of backfill placement shall be included unless the analysis indicates such details are not needed.*" The inspector should observe this process in order to reduce the risk of lateral movement.
- 3) Poor compaction on each side of the structure can lead to lateral movement of the leg sections. Attention should be directed to 723.15, "*Structure backfill shall be placed and compacted on each side of the structure to the fill line shown on the plans. During the backfill operation, the difference in elevations of the fill on each side of the structure shall not exceed 24 in.*" Also, it is important to note in the next paragraph, the specification states that the first two lifts on top of the structure must be hand compacted. The inspector should observe this process in order to reduce the risk of damage to the structure.

Any questions should be directed to your Construction Management Field Engineer.

MAM/ajp