



# INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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## CONSTRUCTION MEMORANDUM 15-08

TO: District Deputy Commissioners  
District Construction Directors  
District Technical Services Directors  
District Area Engineers  
District Project Management Director  
Project Management Director  
District Traffic Engineers  
District Testing Engineers  
District LPA Coordinators  
Project Engineers/Supervisors  
Field Engineers  
Office of Material Management

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

SUBJECT: Use of "INDOT Construction Verification Chart for Factored Bearing  
Resistance Based on DCP Blow Counts" for MSE Wall

Recently INDOT's Office of Geotechnical Services circulated a chart titled as above. A copy of this chart is attached for your information. This memo was prepared to let Construction field personnel know what they should be doing now that they have this information.

In the currently active recurring special provision 731-B-205 MSE Retaining Wall Requirement, and in the 2016 Standard Specifications, effective September 01, 2015, 731.07 Foundation Preparation requires the following:

*Prior to wall construction, the foundation for the structure shall be graded for a width equal to or exceeding the length of the ground reinforcement or as shown on the plans. The foundation, if not in rock, shall then be compacted in accordance with 203. After the foundation has been compacted, the resulting grade of the foundation shall be 1 in. per foot sloped from the back of the foundation downward toward the leveling pad. The portion of the foundation beneath the leveling pad shall not be sloped. The foundation shall be proofrolled in accordance with 203.26. If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.*

*After proofrolling has been completed and all unsuitable foundation material has been removed and replaced, compaction of the portion of the foundation beneath the reinforced backfill zone will be verified by dynamic cone penetrometer, DCP, testing in accordance with ITM 509.*

*One DCP measurement for every 500 sq ft within the reinforced backfill zone and five DCP measurements per end bent will be performed.*

*A DCP measurement is defined as the number of blows per 6 in. increment for a total penetration of 30 in., based on five sets of DCP readings at each location. A minimum of five blows of the DCP for each 6 in. increment is considered acceptable.*

In short, as of now the Contractor needs to grade under the wall, which is the reinforced backfill zone, compact the soil, slope the grade, proofroll the grade, remove soil INDOT determines is unsuitable, replace with B borrow and compact the soil.

INDOT personnel then run a DCP test for every 500 sq ft of reinforced backfill zone. If a minimum of 5 blows for every 6 inch increment of soil for a total of 30 inches is attained then it is ok to place the wall.

Now that the chart exists for the factored bearing resistance we can put a numerical value to the blow count for fine grained (cohesive) soils and see if this value meets what is called out for on the Contractor's working drawings/calculations for the MSE wall.

**Moving forward** inspection personnel should be following the most updated section for 731.07 as above and use the table in place of the 5 blows per 6 inches as stated above for acceptance.

The Designer is responsible for confirming that the factored contact pressure shown in the working drawings does not exceed the maximum factored bearing resistance shown in the contract documents. The maximum factored bearing resistance in the contract documents is taken directly from the geotechnical report, as approved by the Office of Geotechnical services. Construction inspection personnel will then perform DCP testing at the frequency shown in 731.07 as per ITM 509. Acceptable DCP values will be based on the factored contract pressure shown in the Contractor's working drawings.

**For example**, if the Contractor's working drawing for a particular area of the wall shows that the factored bearing resistance needed is 5900.00 psf, then when the inspector takes the tests, the blow count per 12 inches will need to be at least 16 for a total depth of 30 in. (16 blows for each of the first two 12 in. increments and 8 for the last 6 in. increment), which correlates to a factored bearing resistance of 6,000.00 psf. If at least the 16 blows, 6,000.00 psf is attained, then the Contractor can move forward with the work.

If the value is not met than additional moisture, drying or compaction may be required. If it is found that the value cannot be met then it is recommended that the Office of Geotechnical Services be contacted for further direction.

If there is any question on the value that you need to have, you will need to discuss this with the Office of Geotechnical Services and/or the Designer.

For *coarse grained soils* (sand and gravel) the PE/S will need to contact the Office of Geotechnical Services for further assistance.

If you should have any questions on this memo, please contact your Central Office Field Engineer.

ATTACHMENT: INDOT Construction Verification Chart for Factored Bearing Resistance based on DCP Blow Counts

MAM/GGP

# INDOT Construction Verification Chart

## For Factored Bearing Resistance Based on DCP Blow Counts

DCP Blows for 12 inches	Factored Bearing Resistance (psf)	DCP Blows for 12 inches	Factored Bearing Resistance (psf)
10	4,000.00	21	7,600.00
11	4,300.00	22	8,000.00
12	4,600.00	23	8,300.00
13	5,000.00	24	8,600.00
14	5,300.00	25	9,000.00
15	5,600.00	26	9,300.00
16	6,000.00	27	9,600.00
17	6,300.00	28	10,000.00
18	6,600.00	29	10,300.00
19	7,000.00	30	10,600.00
20	7,300.00	31	11,000.00

**Note: This table is applicable only for fine grained (cohesive) soils.  
For sand & gravel, please contact the Office of Geotechnical Services.**