INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 09-16
Technical Advisory

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TO: **All Design, Operations, and District Personnel, and Consultants**

FROM: ***/s/ Anthony L. Uremovich***
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SUBJECT **Geotechnical Foundation Review**

REVISES: ***Indiana Design Manual*** **Section 66-1.05(02) and Figure 66-1A**

EFFECTIVE: **Structure for which Foundation-Review Submission Has Not Yet Been Made**

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The geotechnical engineer is not initially provided with the factored design axial loads for each pile or bridge support. Therefore, the designer selects a common pile type and size, and, based on these, calculates the pile's maximum design factored axial load capacity, $Q_{F\ max}$, and the available maximum factored soil resistance, $R_{R\ max}$. This is the selected pile's load-carrying, or structural, capacity, and the pile's resistance, or geotechnical, capacity. However, the load-carrying capacity of a friction pile is controlled by the maximum factored soil resistance, $R_{R\ max}$.

Once the structure is designed, the actual factored design load, Q_F, is determined for a particular foundation. This value must always be less than or equal to $R_{R\ max}$, and also less than $Q_{F\ max}$ reported in the geotechnical report for that particular pile.

The geotechnical report provides the maximum structural and geotechnical factored loads that the pile can carry or resist, and the geotechnical losses. If Q_F per pile is less than $R_{R\ max}$, the equations shown in Summarization 66-1A can be used to determine R_n and R_{ndr}.

The nominal design load, Q_N, should be set equal to the calculated nominal soil resistance, R_n.

These values should be entered in the revised version of Summarization 66-1A, Foundation Review, Summary of Pile Loading for Geotechnical Testing. Editable versions of this form, one for load factor design, and one for load resistance factor design, appear on the Department's website at www.in.gov/dot/div/contracts/design/dmforms/.

Once Summarization 66-1A is completed, it should be transmitted to the manager, Office of Structural Services for review, concurrence, and signature.

The information to be shown on the plans is as follows.

1. The Summary of Pile Loading for Geotechnical Testing shown on Summarization 66-1A should be placed onto the Soil Borings sheet.

2. The minimum pile-tip elevation for scour, if applicable, should be shown on the General Plan.

3. The nominal driving resistance, R_{ndr}, should be shown on the General Plan's elevation view using the notation as follows: *Piles driven to _____ kip [kN] nominal resistance.* The note's value should match that shown in the table on the Soil Borings sheet. It will not be necessary to show the nominal driving resistance on the details sheets.

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