



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 09-15 Technical Advisory

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

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SUBJECT Geotechnical Foundation Review

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

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

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. An editable version of this form appears 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 thereon should be placed on the Soil Borings sheet;
2. The minimum pile-tip elevation for scour, if applicable, should be shown on the General Plan sheet; and
3. The nominal driving resistance, R_{ndr} , should be shown on the General Plan's elevation view as follows: *Piles shall be driven to _____ kip [_____ kN] nominal resistance.* The value in the note should match R_{ndr} shown in the [Summary of Pile Loading](#) on the Soil Borings sheet. It will not be necessary to show R_{ndr} on the other details sheets.

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