Bridges and Structures ~~???? ??, 2001~~September 13, 2001

All Employees 521.1

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Substructure Design-MM No. 14 (Prebore Lengths for Integral and Stub Abutments)

When determining pile lengths for integral and stub abutments, downdrag forces may need to be included in the design. To help reduce the effects of the downdrag forces, the designer may consider increasing the prebore depths (standard length 8 ft. (2400 mm)) for the integral abutment piling or providing prebore for stub abutments piling.

If the prebore length is increased, the maximum prebore lengths should be as follows.

1. For integral abutments, a maximum prebore length of 15 ft (4500 mm).
2. For stub abutments, a maximum prebore length of 20 ft (6000 mm).

These lengths are based on the office's experience with longer prebores and stability checks of the piling using the following assumptions:

1. A maximum deflection of 1 ½ inch (40 mm) or 3 inches (75 mm) total movement for the integral abutments. Note: This deflection includes setting factors of 1.5 for prestressed beams and 1.33 for steel girders.
2. No lateral deflection of the stub abutment.
3. Using HP10 x 42 (250 x 62) steel piles with a maximum bearing of 55 tons (489 kN)
4. No lateral support from the bentonite slurry that is currently used as back fill in the prebore.
5. A minimum pile length of 2.5 times the prebore length. If this length cannot be reached than a special analysis needs to be done.

In situations, where the prebore needs to be increased or included in the abutment design, please check with you section leader for approval.

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