Designation: D 3966 – 90 (Reapproved 1995)

AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Piles Under Lateral Loads[1]

This standard is issued under the fixed designation D 3966; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers procedures for testing vertical and batter piles either individually or in groups to determine the load-defection relationship when subjected to lateral loading. It is applicable to all deep foundation units regardless of their size or method of installation. This test method is divided into the following sections:

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1.2 This test method only describes procedures for testing single piles or pile groups. It does not cover the interpretation or analysis of the test results or the application of the test results to foundation design or the use of empirical or analytic procedures for determining the magnitude and variation of the coefficient of horizontal subgrade reaction, bending stresses, and bending movements over the length of the pile. The term "failure" as used in this test method indicates a rapid progressive lateral movement of the pile or pile group under a constant or decreasing load.

1.3 Apparatus and procedures designated "optional" are to be required only when included in the project specifications and, if not specified, may be used only with the approval of the engineer responsible for the foundation design. The word "shall" indicates a mandatory provision and "should" indicates a recommended or advisory provision. Imperative sentences indicate mandatory provisions. Notes and illustrations included herein are explanatory or advisory.

1.4 The values stated in inch-pound units are to be regarded as the standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific safety precautions, see Section 8.

2. Referenced Documents

2.1 *ASTM Standards:*

A 36/A 36M Specification for Structural Steel[2]

A 240 Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels[2]

A 441/A 441M Specification for High-Strength Low-Alloy Structural Manganese Vanadium Steel[2]

A 572/A 572M Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality[2]

D 1143 Test Method for Piles Under Static Axial Compressive Load[3]

D 3689 Test Method for Individual Piles Under Static Axial Tensile Load[3]

2.2 *ANSI Standards:*[4]

B30.1 Safety Code for Jacks

B46.1 Surface Texture

3. Significance and Use

3.1 The actual lateral load capacity of the pile-soil system can best be determined by lateral testing. Such testing measures the response of the pile-soil system to lateral loads and may provide data for research and development, engineering design, quality control, and acceptance or rejection under specifications.

3.2 Under the iterative elastic method of analysis that considers the nonlinear response of the soil,[5] lateral testing combined with proper instrumentation can be used to determine soil properties necessary for the structural design of the pile to resist the lateral load to be applied.

3.3 Lateral testing as covered herein, when combined with

[1] This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.11 on Deep Foundations.

Current edition approved May 25, 1990. Published July 1990. Originally published as D 3966 – 81. Last previous edition D 3966 – 81.

[2] *Annual Book of ASTM Standards,* Vol 01.04.

[3] *Annual Book of ASTM Standards,* Vol 04.08.

[4] Available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

[5] Reece, L. C., "Design and Evaluation of Load Tests on Deep Foundations," *Behavior of Deep Foundations, ASTM STP 670,* Am. Soc. Testing Mats., 1979.

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