Quality Control of Soil Compaction

Using ASTM Standards

ASTM INTERNATIONAL
Standards Worldwide

Quality Control of Soil Compaction Using ASTM Standards

Prepared by Committee D18 on Soil and Rock

ASTM Stock Number: MNL70

ASTM International
100 Barr Harbor Drive
PO Box C700
West Conshohocken, PA 19428-2959

Printed in U.S.A.

Library of Congress Cataloging-in-Publication Data

Talbot, James R., 1938-
Quality control of soil compaction using ASTM standards / James R. Talbot ; prepared by Committee D18 on Soil and Rock.
p. cm.
"ASTM stock number: MNL70."
Includes bibliographical references and index.
ISBN 978-0-8031-7023-0
1. Fills (Earthwork)–Testing. 2. Fills (Earthwork)–Standards. 3. Soil compaction–Quality control. I. ASTM Committee D-18 on Soil and Rock. II. Title.
TA715.T255 2011
624.15–dc23 2011012808

Printed in Bridgeport, NJ
October, 2011

Foreword

THIS PUBLICATION, ***Quality Control of Soil Compaction Using ASTM Standards***, was sponsored by Committee D18 on Soil and Rock. This is Manual 70 of the ASTM International manual series.

Acknowledgments

This manual is supported by subcommittee D18.08. The following members of that subcommittee submitted material to start the process of reviewing and editing for content in the manual:

James R. Talbot, USDA, Soil Conservation Service
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Jeff Farrar, USDI, Bureau of Reclamation
James Talbot and Jeff Farrar collaborated on the initial editing.

In 1999 on July 1–2, committee D18 sponsored a symposium titled "Constructing and Controlling Compaction of Earth Fills". The symposium was held in Seattle, Washington.

The symposium produced STP 1384 which was published in 2000.

Subcommittee D18.08 members Donald Shanklin, Keith Rademacher, and James Talbot were the editors of STP 1384. The final session of the symposium featured a review and discussion of the proposed manual, entitled, "Testing Compaction of Earth Fills Using ASTM Standards".

The final editing of the manual was passed to the Chairman of D18, Terry Hawk and Christopher Hardin. With the sudden death of Terry Hawk in 2004, the uncompleted manual was sent to Donald Shanklin. The bulk of the work remaining was putting together the visual aspects of the manual. This was accomplished with the help of Wendy Pierce, a computer graphical artist for USDA, Natural Resources Conservation Service. Jeff Farrar was also helpful in supplying visual materials from the Bureau of Reclamation.

Beginning with Terry Hawk, then Jim Horton, and finally Ron Ebelhar, all these Committee D18 Chairmen, supported the effort to complete this work. In addition, Bob Morgan, ASTM Staff Manager for D18, has been a continual supporter. Kathy Dernoga, ASTM Managing Editor for Books and Journals has been with the project from the very beginning and finally gets to see a product.

Dedication

This publication, "Quality Control of Soil Compaction Using ASTM Standards," is dedicated to the memory of former Committee D18 Chairman, Terry Hawk. Terry had risen to the leadership of Committee D18 through his 20 years of exemplary hard work and quality performance. He sometimes faltered in pronouncing the names of those receiving awards at Main Committee Meetings, but never faltered in his dedication and performance to the work of an ASTM volunteer. Terry rescued the "Compaction Manual," as it was commonly referred to, and recruited a young engineer, Chris Hardin, from Geo-Environmental Engineering, to work with him and tackle the final editing to keep the project moving forward. They completed the editing and identified most of the visuals needed for the manual. Then, suddenly, on January 24, 2004, Terry Hawk died, unable to complete the project he believed in and had nurtured along. Rest easy, Terry.

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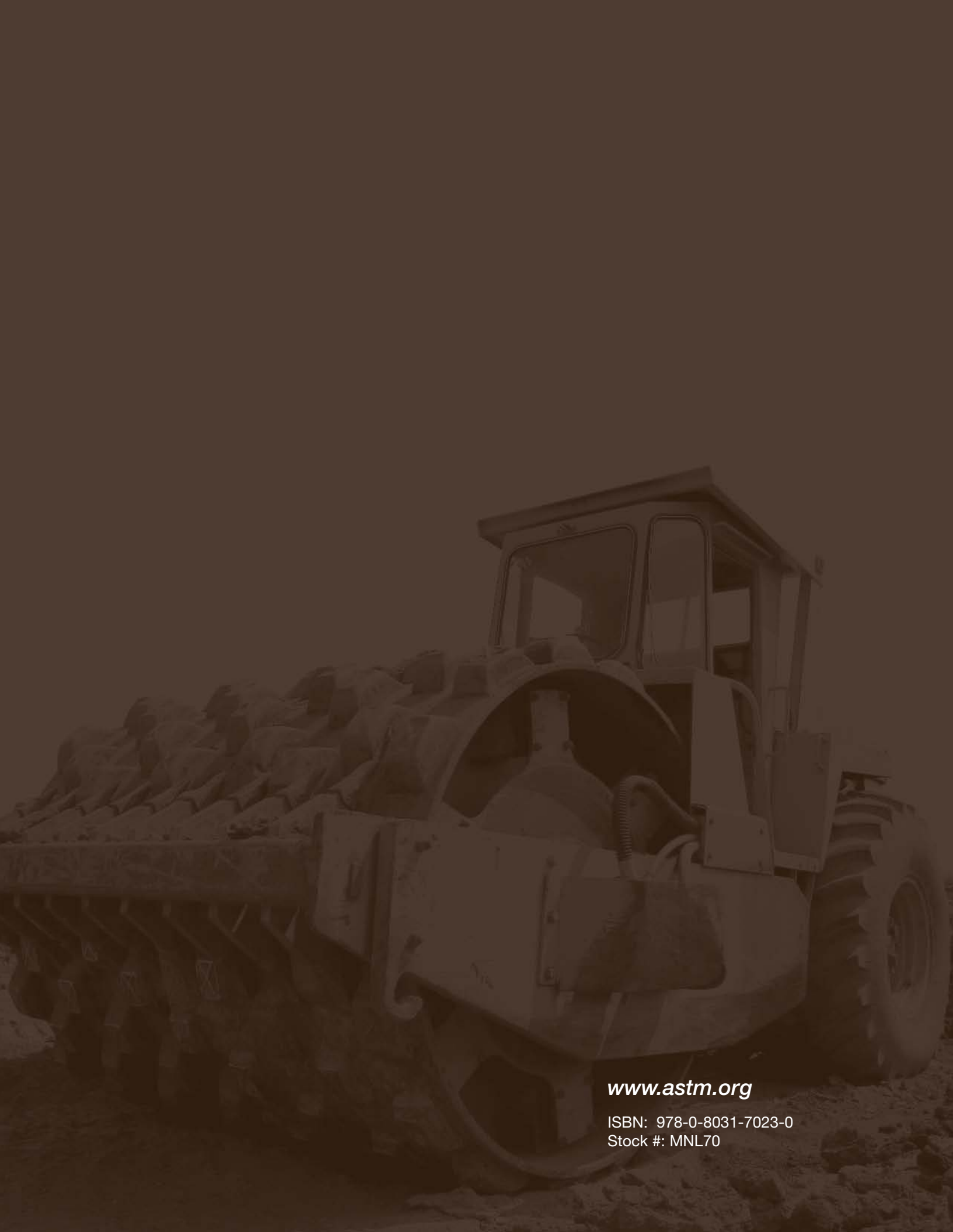
List of Referenced ASTM Standards

ASTM **C127**	Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM **D558**	Standard Test Methods for Moisture-Density (Unit Weight) Relations of Soil-Cement Mixtures
ASTM **D559**	Standard Test Methods for Wetting and Drying Compacted Soil-Cement Mixtures
ASTM **D560**	Standard Test Methods for Freezing and Thawing Compacted Soil-Cement Mixtures
ASTM **D698**	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM **D1556**	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand Cone Method
ASTM **D1557**	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))
ASTM **D1558**	Standard Test Method for Moisture Content Penetration Resistance Relationships of Fine-Grained Soils
ASTM **D2166**	Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
ASTM **D2167**	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM **D2216**	Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM **D2435**	Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
ASTM **D2487**	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM **D2488**	Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)
ASTM **D2850**	Standard Test Method for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
ASTM **D2937**	Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method
ASTM **D3017**	Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) (Withdrawn 2007)
ASTM **D3665**	Standard Practice for Random Sampling of Construction Materials
ASTM **D4253**	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM **D4254**	Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM **D4564**	Standard Test Method for Density and Unit Weight of Soil in Place by the Sleeve Method
ASTM **D4643**	Standard Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Heating
ASTM **D4718**	Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM **D4914**	Standard Test Methods for Density and Unit Weight of Soil and Rock in Place by the Sand Replacement Method in a Test Pit
ASTM **D4944**	Standard Test Method for Field Determination of Water (Moisture) Content of Soil by the Calcium Carbide Gas Pressure Tester
ASTM **D4959**	Standard Test Method for Determination of Water (Moisture) Content of Soil By Direct Heating
ASTM **D5030**	Standard Test Method for Density of Soil and Rock in Place by the Water Replacement Method in a Test Pit
ASTM **D5080**	Standard Test Method for Rapid Determination of Percent Compaction
ASTM **D5084**	Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
ASTM **D6938**	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)



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ISBN: 978-0-8031-7023-0
Stock #: MNL70