A PCI Standard

ANSI/PCI 142-24

SPECIFICATION FOR PRECAST, PRESTRESSED CONCRETE PILES

PCI® Precast/Prestressed Concrete Institute

ANSI Accredited Standards Developer

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Specification for Precast, Prestressed Concrete Piles

Foreword

This standard governs the design and construction of precast, prestressed concrete piles used to support most types of structural systems. Although the vast majority of pile applications are expected to be building, bridge, or pier/wharf related, the provisions are also applicable to other structures. The provisions of this standard are consistent with the recommendations of the 2019 PCI Committee Report titled *Recommended Practice for Design, Manufacture and Installation of Prestressed Concrete Piling*. The intent of the 2019 report was to reflect best practices, to include significant information relevant to seismic design (such as detailing requirements based on the results of recent research), and to recommend procedures for performance-based design. Given the more rigorous consensus process used to develop this standard, and permitting the general public to have input into standards development, some of the provisions vary slightly from those in the 2019 document. This standard was developed for use with U.S. Customary Units. Soft metric conversion equivalents are shown in parentheses after the U.S. Customary Units.

Preface

This standard was developed following the protocols required by the Precast/Prestressed Concrete Institute (PCI) Group Operations Manual. The provisions were first generated and balloted in the PCI Prestressed Concrete Piling Committee. A review and comment by the PCI Technical Activities Council (TAC) followed and resulted in additional modifications to the document. These changes were balloted by the PCI Prestressed Concrete Piling Committee and finally accepted by the PCI TAC. The document was then submitted to the PCI Standards Committee, where additional review and balloting took place. The membership of that committee is balanced according to the rules of American National Standards Institute (ANSI) accreditation. In addition, a public review period was provided and public comments were resolved through the PCI Standards Committee. Development of this standard is a consensus process involving PCI members, nonmembers of PCI, and the general public.

This document was developed with the oversight of the PCI Prestressed Concrete Piling Committee and the PCI Technical Activities Council as well as the support of members of the PCI Pile Producers Committee and PCI staff. The following is a list of the active voting members of the Prestressed Concrete Piling Committee at the time this document was balloted.

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The following are consulting members of the PCI Prestressed Concrete Piling Committee. Consulting members are not held to the same strict attendance standards as voting members set forth in the PCI Group Operations Manual. Many of the consulting members listed below attended numerous meetings and participated in committee work including oral and written reviews of the documents.

CONSULTING MEMBERS

Bill Augustus	Saad Eldin Moustafa	Joe Rose
John S. Dick	Nesil Normile	Chad A. Saunders
Jan Landreth-Smith	James Parkins	David A. Tomley

Table of Contents

Chapter 1—General Requirements

1.1 Scope

1.1.1 This standard provides minimum requirements for the design and construction of precast, prestressed concrete piles. Except where the requirements of this standard are more stringent, prestressed concrete piles shall conform to the provisions in the general code. If the provisions in this standard related to materials, design, and construction conflict with the referenced standards in 1.5, the provisions in this standard shall apply.

1.2 Applicability

12.1 This standard shall apply to the design and installation of both fully laterally braced and partially laterally braced prestressed concrete piles.

1.2.2 This standard shall apply to the seismic design of prestressed concrete piles.

1.2.3 This standard does not apply to the design or construction of pile-to-pile cap connections.

1.2.4 This standard does not apply to the design or construction of pile caps.

1.2.5 This standard does not apply to the design or construction of pile points, pile shoes, pile splices, pile buildups, and pile stingers. This standard does not prohibit their use.

1.2.6 This standard does not apply to the design or construction of precast concrete piles that are not prestressed or post-tensioned before installation.

1.2.7 Hollow piles used for non-seismic extreme events where the piles are designed beyond the elastic limit state shall be designed and detailed per the general code.

1.3 Definitions The following definitions shall apply for the purposes of this standard:

allowable geotechnical capacity—the nominal geotechnical capacity of the pile divided by a factor of safety in accordance with 3.2.

bearing stratum—the rock or soil stratum receiving load transferred to it by a pile.

competent soil—as defined by the general code.

design geotechnical capacity—the nominal geotechnical capacity of the pile multiplied by a strength reduction factor or resistance factor in accordance with the general code.

down-drag—negative skin friction or condition where downward moving soil pulls downward on a pile due to skin friction.

expected material strength—the most likely material strength (for example, concrete compressive strength, yield strength of reinforcement) used in the concrete pile.

fluid soil—soil not capable of providing lateral resistance to pile buckling.

general code—legally adopted code, standard, or specification governing the design of the overall structure.

geotechnical engineer—licensed engineer in responsible charge of geotechnical design and geotechnical recommendations.

group actions—modifications to pile vertical load distribution, lateral load distribution, or both among individual piles that are part of pile groups based on pile spacing.

intermediate concrete pile—pile designation used for seismic design of piles with an expected curvature ductility capacity of at least 12.

kinematic bending—bending in a pile caused by soil-structure interaction during an earthquake.

lateral spreading—fluid-like flow of sloping soil occurring during an earthquake.

licensed design professional—licensed engineer in responsible charge of the structural design.