Recommendations for Concrete Members Prestressed with Single-Strand Unbonded Tendons

Reported by Joint ACI-ASCE Committee 423



First Printing
July 2017

ISBN: 978-1-945487-70-5

Recommendations for Concrete Members Prestressed with Single-Strand Unbonded Tendons

Copyright by the American Concrete Institute, Farmington Hills, MI. All rights reserved. This material may not be reproduced or copied, in whole or part, in any printed, mechanical, electronic, film, or other distribution and storage media, without the written consent of ACI.

The technical committees responsible for ACI committee reports and standards strive to avoid ambiguities, omissions, and errors in these documents. In spite of these efforts, the users of ACI documents occasionally find information or requirements that may be subject to more than one interpretation or may be incomplete or incorrect. Users who have suggestions for the improvement of ACI documents are requested to contact ACI via the errata website at http://concrete.org/Publications/DocumentErrata.aspx. Proper use of this document includes periodically checking for errata for the most up-to-date revisions.

ACI committee documents are intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. Individuals who use this publication in any way assume all risk and accept total responsibility for the application and use of this information.

All information in this publication is provided "as is" without warranty of any kind, either express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose or non-infringement.

ACI and its members disclaim liability for damages of any kind, including any special, indirect, incidental, or consequential damages, including without limitation, lost revenues or lost profits, which may result from the use of this publication.

It is the responsibility of the user of this document to establish health and safety practices appropriate to the specific circumstances involved with its use. ACI does not make any representations with regard to health and safety issues and the use of this document. The user must determine the applicability of all regulatory limitations before applying the document and must comply with all applicable laws and regulations, including but not limited to, United States Occupational Safety and Health Administration (OSHA) health and safety standards.

Participation by governmental representatives in the work of the American Concrete Institute and in the development of Institute standards does not constitute governmental endorsement of ACI or the standards that it develops.

Order information: ACI documents are available in print, by download, on CD-ROM, through electronic subscription, or reprint and may be obtained by contacting ACI.

Most ACI standards and committee reports are gathered together in the annually revised ACI Manual of Concrete Practice (MCP).

American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331 Phone: +1.248.848.3700

+1.248.848.3701

www.concrete.org

ACI 423.3R-17

Recommendations for Concrete Members Prestressed with Single-Strand Unbonded Tendons

Reported by Joint ACI-ASCE Committee 423

Carin L. Roberts-Wollmann, Chair

Amy M. Reineke Trygestad, Secretary

Martin J. Fradua
William L. Gamble
Harry A. Gleich
Pawan R. Gupta
William M. Hale
H. R. Trey Hamilton III
Carol Hayek*
Mohammad Iqbal
Donald P. Kline*

Larry B. Krauser
Jason J. Krohn
Theodore L. Neff
Sami H. Rizkalla
James Rogers
Brandon Ross
Bruce W. Russell
Thomas C. Schaeffer*
Richard W. Stone

Miroslav Vejvoda Jeffrey S. Volz H. Carl Walker Zuming Xia Paul Zia

Consulting Members

Kenneth B. Bondy* Robert N. Bruce Jr. Ned H. Burns Chunsheng "Steve" Cai Steven R. Close Henry J. Cronin Jr. Ward N. Marianos Jr. Hani Melhem Antoine E. Naaman

Thomas E. Nehil Andrea J. Schokker

This report provides information for the design of flexural concrete members in buildings post-tensioned with single-strand unbonded tendons. The report is intended to complement the commentary in ACI 318 and to provide suggestions for revisions and additions to ACI 318. Consideration is given to design for gravity and lateral loads, determination of fire endurance, design for seismic forces, and design for catastrophic loadings. Recommendations concerning details and properties of tendons, protection against corrosion, and construction procedures are presented.

Keywords: concrete slabs; cracking; fire resistance; joints; punching shear; unbonded post-tensioning.

ACI Committee Reports, Guides, and Commentaries are intended for guidance in planning, designing, executing, and inspecting construction. This document is intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. The American Concrete Institute disclaims any and all responsibility for the stated principles. The Institute shall not be liable for any loss or damage arising therefrom.

Reference to this document shall not be made in contract documents. If items found in this document are desired by the Architect/Engineer to be a part of the contract documents, they shall be restated in mandatory language for incorporation by the Architect/Engineer.

CONTENTS

CHAPTER 1—INTRODUCTION, p. 2

1.1—General, p. 2

1.2—Objective, p. 2

1.3—Scope, p. 2

CHAPTER 2—NOTATION AND DEFINITIONS, p. 2

2.1—Notation, p. 2

2.2—Definitions, p. 3

CHAPTER 3—MEMBER DESIGN, p. 3

3.1—General, p. 3

3.2—One-way systems, p. 3

3.3—Two-way systems, p. 4

3.4—Beams, p. 8

3.5—Effects of supporting walls and columns on prestress forces, p. 9

CHAPTER 4—ANCHORAGE ZONES, p. 10

4.1—Anchorage zone reinforcement, p. 10

All rights reserved including rights of reproduction and use in any form or by any means, including the making of copies by any photo process, or by electronic or mechanical device, printed, written, or oral, or recording for sound or visual reproduction or for use in any knowledge or retrieval system or device, unless yright proprietors.



^{*}Subcommittee members involved in updating this report.

ACI 423.3R-17 supersedes ACI 423.3R-05 and was adopted and published July 2017. Copyright © 2017, American Concrete Institute.