ACI 345.2R-13

Guide for Widening Highway Bridges

Reported by ACI Committee 345

American Concrete Institute®

First Printing
July 2013

American Concrete Institute®
Advancing concrete knowledge

Guide for Widening Highway Bridges

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 www.concrete.org/committees/errata.asp. 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
U.S.A.
Phone: 248-848-3700
Fax: 248-848-3701

www.concrete.org

ISBN-13: 978-0-87031-827-6
ISBN: 0-87031-827-6

ACI 345.2R-13

Guide for Widening Highway Bridges

Reported by ACI Committee 345

Michael C. Brown, Chair

Rita K. Oglesby, Secretary

Jesse L. Beaver
Oliver K. Gepraegs
Robert J. Gulyas*
Yail Jimmy Kim†
Alan B. Matejowsky
Claudia P. Pulido
Harold R. Sandberg
Johan L. Silfwerbrand
Michael M. Sprinkel
Paul J. St. John
Richard E. Weyers
Mark Erik Williams†
Jerzy Z. Zemajtis

Consulting Members
James C. Anderson
Byron T. Danley
Fouad H. Fouad
Allan C. Harwood
Yash Paul Virmani
Jeffrey P. Wouters

*Deceased.
†Subcommittee Chairs.

Many highway bridges become functionally obsolete due to inadequate width before they become structurally deficient. Widening is generally more economical than complete replacement. Thus, there is a mandate to share the results of research and experience pertaining to bridge widening. This guide discusses technical issues related to the widening of concrete bridges and bridges with concrete decks. The primary focus of this document is on bridge decks, even though substructure issues are raised and discussed. The effects of differential movements between the existing and new portions are discussed, including movements due to traffic on the existing structure during construction. General recommendations are made pertaining to the choice of structure type, design details, and construction methods and materials.

The materials, processes, quality-control measures, and inspections described in this document should be tested, monitored, or performed as applicable only by individuals holding the appropriate ACI certifications or equivalent.

Keywords: bridge decks; bridge widening; bridges (structures); concrete construction; deflection; formwork (construction); reinforced concrete; reinforcing steel; substructure; superstructure; traffic vibration.

CONTENTS

CHAPTER 1—INTRODUCTION AND SCOPE, p. 1
1.1—Introduction, p. 1
1.2—Scope, p. 2

CHAPTER 2—DEFINITIONS, p. 2
2.1—Definitions, p. 2

CHAPTER 3—GENERAL DESIGN CONSIDERATIONS, p. 2
3.1—General, p. 2
3.2—Appearance and function, p. 3
3.3—Differential movement, p. 4

CHAPTER 4—DESIGN AND CONSTRUCTION DETAILS, p. 7
4.1—General, p. 7
4.2—Demolition, p. 7
4.3—Avoidance of damage due to dead load deflections, p. 8
4.4—Closure placement details, p. 11
4.5—Substructure details, p. 13

CHAPTER 5—SUMMARY OF RECOMMENDATIONS, p. 13

CHAPTER 6—REFERENCES, p. 13

CHAPTER 1—INTRODUCTION AND SCOPE

1.1—Introduction

Design and construction engineers should investigate several potential issues if a bridge is to be considered for widening. These include retention of bridge elements, traffic control, structural constraints, economy and feasibility, expected increase in traffic volume, life span, and construc-

ACI 345.2R-13 supersedes ACI 345.2R-98(05) and was adopted and published July 2013.