ASCE STANDARD

ASCE/SEI

19-16

Structural Applications of Steel Cables for Buildings





ASCE/SEI

19-16

Structural Applications of Steel Cables for Buildings





PUBLISHED BY THE AMERICAN SOCIETY OF CIVIL ENGINEERS

This is a preview. Click here to purchase the full publication.

Library of Congress Cataloging-in-Publication Data

Names: American Society of Civil Engineers, issuing body.

Title: Structural applications of steel cables for buildings / American Society of Civil

Engineers.

Description: Reston: American Society of Civil Engineers, 2016. | Series: ASCE standard | "ASCE/SEI 19-16." | Includes bibliographical references and index.

Identifiers: LCCN 2016043932 (print) | LCCN 2016044815 (ebook) | ISBN 9780784414392 (pbk.) | ISBN 9780784479759 (pdf)

Subjects: LCSH: Cable structures—Standards—United States. | Cables—Standards—United States. Classification: LCC TA660.C3 S77 2016 (print) | LCC TA660.C3 (ebook) | DDC 690/.1–dc23 LC record available at https://lccn.loc.gov/2016043932

Published by American Society of Civil Engineers 1801 Alexander Bell Drive Reston, Virginia, 20191-4382 www.asce.org/bookstore | ascelibrary.org

This standard was developed by a consensus standards development process that has been accredited by the American National Standards Institute (ANSI). Accreditation by ANSI, a voluntary accreditation body representing public and private sector standards development organizations in the United States and abroad, signifies that the standards development process used by ASCE has met the ANSI requirements for openness, balance, consensus, and due process.

While ASCE's process is designed to promote standards that reflect a fair and reasoned consensus among all interested participants, while preserving the public health, safety, and welfare that is paramount to its mission, it has not made an independent assessment of and does not warrant the accuracy, completeness, suitability, or utility of any information, apparatus, product, or process discussed herein. ASCE does not intend, nor should anyone interpret, ASCE's standards to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this standard.

ASCE has no authority to enforce compliance with its standards and does not undertake to certify products for compliance or to render any professional services to any person or entity.

ASCE disclaims any and all liability for any personal injury, property damage, financial loss, or other damages of any nature whatsoever, including without limitation any direct, indirect, special, exemplary, or consequential damages, resulting from any person's use of, or reliance on, this standard. Any individual who relies on this standard assumes full responsibility for such use.

ASCE and American Society of Civil Engineers—Registered in U.S. Patent and Trademark Office.

Photocopies and permissions. Permission to photocopy or reproduce material from ASCE publications can be requested by sending an e-mail to permissions@asce.org or by locating a title in ASCE's Civil Engineering Database (http://cedb.asce.org) or ASCE Library (http://ascelibrary.org) and using the "Permissions" link.

Errata: Errata, if any, can be found at http://dx.doi.org/10.1061/9780784414392.

Copyright © 2016 by the American Society of Civil Engineers. All Rights Reserved.

ISBN 978-0-7844-1439-2 (print) ISBN 978-0-7844-7975-9 (PDF)

Manufactured in the United States of America.

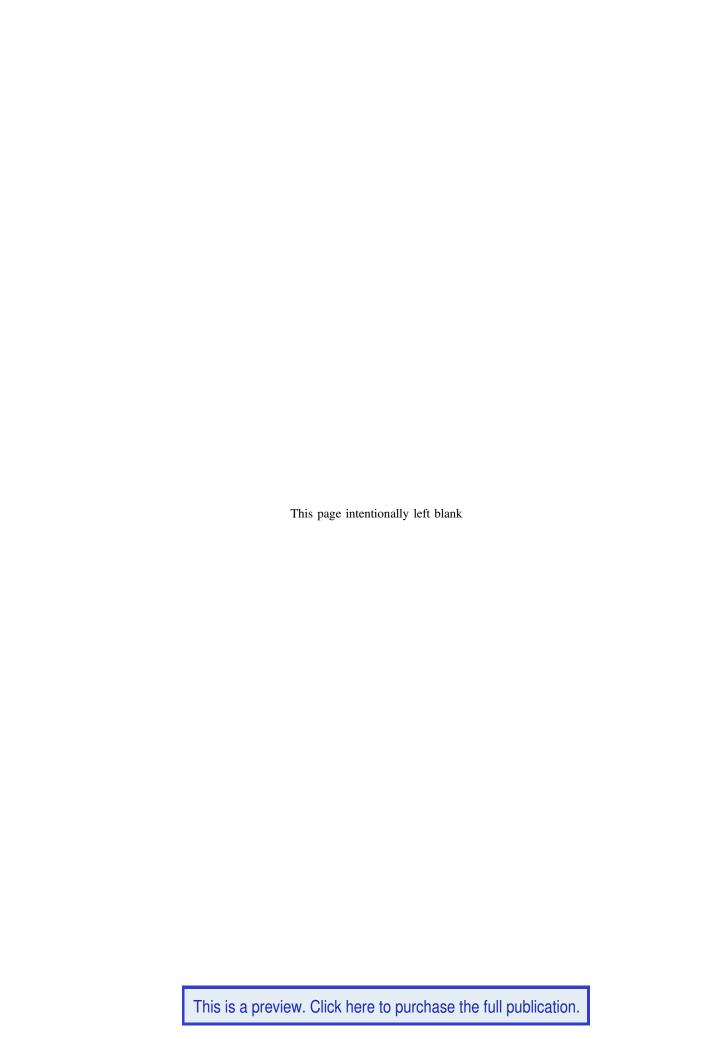
21 20 19 18 17 16 1 2 3 4 5

ASCE STANDARDS

In 2014, the Board of Direction approved revisions to the ASCE Rules for Standards Committees to govern the writing and maintenance of standards developed by ASCE. All such standards are developed by a consensus standards process managed by the ASCE Codes and Standards Committee (CSC). The consensus process includes balloting by a balanced standards committee and reviewing during a public comment period. All standards are updated or reaffirmed by the same process every 5 to 10 years. Requests for formal interpretations shall be processed in accordance with Section 7 of ASCE Rules for Standards Committees, which is available at www.asce.org. Errata, addenda, supplements, and interpretations, if any, for this standard can also be found at www.asce.org.

This standard has been prepared in accordance with recognized engineering principles and should not be used without the user's competent knowledge for a given application. The publication of this standard by ASCE is not intended to warrant that the information contained therein is suitable for any general or specific use, and ASCE takes no position respecting the validity of patent rights. The user is advised that the determination of patent rights or risk of infringement is entirely their own responsibility.

A complete list of currently available standards is available in the ASCE Library (http://ascelibrary.org/page/books/s-standards).



CONTENTS

יש	NOWI	LEDGMEN	JTC													
X J	NOWL	EDGMEN	N15	• • • •				• •	 		 	 	 	 • •	 •	• •
	GENE	RAL							 		 	 	 	 		
	1.1															
	1.2															
	1.3 1.4		and Notate e Standard													
	CONT	RACT DO	OCUMEN'	ΓS AND S	SHOP I	DRAW	INGS .				 	 	 			
	2.1		Documen													
			Contract 1													
		2.1.2	Contract S	Specificati	ons				 		 	 	 	 		
	2.2	Shop Dra	awings						 		 	 	 	 	 •	
	DESIG	GN CONSI	DERATIO	ONS					 		 	 	 	 		
	3.1		Basis													
		3.1.1	Structural	Integrity.					 		 	 	 	 		
			Replacem													
	3.2		oadings.													
			Loads													
			Load Cor													
	2.2		Load Cor													
	3.3		sembly St													
		5.5.1	Required 3.3.1.1	Fitting F												
			3.3.1.2	Deflecto												
			3.3.1.3	Elevated												
			3.3.1.4	Fatigue												
			3.3.1.5	Creep E												
		3.3.2	End Fittir													
	3.4	Structura	l Analysis						 		 	 	 	 		
			General C													
			Serviceab	•												
		3.4.3	Vibration													
		3.4.4	Deflection													
		3.4.5	Erection A	Analysis .					 	• •	 	 	 	 	 •	
	CABL	E MATER														
	4.1	Cable Sp	ecification	ıs					 		 	 	 	 	 •	
	FITTI	NGS							 		 	 	 	 		
	5.1		S													
	5.2		n													
	5.3		ngs													
		5.3.1	Zinc-Pour	red and M	ischmet	tal-Pou	ired Fit	tings	 		 	 	 	 		
			Resin-Pou													
	<i></i>	5.3.3	Swaged F	ittings					 		 	 	 	 		
	5.4	Saddles a	and Clamp	os					 		 	 	 	 		

6	PROTI	ECTIVE COATINGS	11
	6.1	Corrosion Protection	11
	6.2	Fire Protection	11
		6.2.1 Fire-Resistance Ratings and Fire Tests	11
		6.2.2 Alternative Methods for Determining Fire Resistance	11
		· ·	
7	EADDI	CATION CHIRDING AND DECEMBE	12
/		ICATION, SHIPPING, AND RECEIVING	13
	7.1	Socketing	13
	7.2	Proof Loading of Assemblies	13
	7.3	Prestretching	13
	7.4	Cable Length Measurements	13
	7.5	Striping	13
	7.6	Shipping	13
	7.7	Receiving	13
8	EREC	ΓΙΟΝ	15
	8.1	Erection Procedure.	15
	8.2	Cable Installation	15
	8.3	Intermediate Fittings.	15
	0.5	intermediate Fittings	13
9	POST-	CONSTRUCTION CONSIDERATIONS AND INSPECTION	17
	9.1	Maintenance Considerations	17
	9.2	Routine Inspections	17
	9.3	In-Depth Inspections	17
	9.4	Emergency Inspections	17
	9.5	Special Inspection and Testing	17
	9.6	Inspection Results	17
4 DDI		A CARLEG AND EXTENDED	10
APPI		A: CABLES AND FITTINGS	19
	A.1	Cable Cross Sections	19
	A.2	Socket Fittings	20
	A.3	Swaged Fittings	21
	A.4	Mechanical Loop Splice with Sleeve and Thimble	21
APPI	ENDIX	B: SADDLES	23
ΔDDI	ENDIX	C: CLAMPS	25
ЛП	LINDIA	C. CLAWI S	23
APPI	ENDIX	D: CABLE FATIGUE	27
APPI	ENDIX	E: SMALL DIAMETER CABLE FOR EARTHQUAKE RESISTANCE	29
	E1.0	General	29
	E1.1	Glossary	29
	E1.2	Symbols and Notation	29
	E2.0	Contract Documents and Shop Drawings	29
	E2.1	Contract Documents	29
	112.1	E2.1.1 Contract Drawings	29
		E2.1.2 Contract Specifications	29
	E2.2	Shop Drawings.	29
	E2.2 E3.0		29
		Design Considerations	
	E3.1	Design Basis	29
	E2 2	E3.1.1 Replacement of Members	29
	E3.2	Design Loadings	29
		E3.2.1 Loads	29
	F2.2	E3.2.2 Load Combinations	30
	E3.3	Cable and Fitting Assembly Strength	30

		E3.3.1 Required and Allowable Strengths
		E3.3.1.1 Elevated Temperature Effect
		E3.3.2 End Fittings and Intermediate Fittings
		E3.3.2.1 Cable Loop Connections
	E3.4	Structural Analysis
	E4.0	Cable Materials
	E4.1	Cable Specifications
	E4.2	Prestretching
	E4.3	Cable Verification Testing
	E5.0	Fittings
	E5.1	Materials
	E5.1 E5.2	
	E5.2 E5.3	1
	E6.0	C
	E6.1	
	E6.2	Fire Protection
	E7.0	Fabrication, Shipping, and Receiving
	E7.1	Assembly Fabrication
	E7.2	Testing of Cable and Fitting Assemblies
	E7.3	Prestretching
		E7.3.1 Test Method for Determining Modulus of Elasticity (Young's Modulus) for Cables with Diameters
		1/4 in. and Smaller In Lieu of Prestretching
	E7.4	Color Coding
	E7.5	Shipping
	E7.6	Receiving
	E8.0	Erection
	E8.1	Cable Installation
	E8.2	Intermediate Fittings
	E9.0	Post-Construction Considerations and Inspection
	E9.1	Emergency Inspections
C1	GENE	RAL
∪1	C1.1	Scope
	C1.1	Glossary
	C1.2	Symbols and Notation
	C1.5	Symbols and Notation
C2	CONT	RACT DOCUMENTS AND SHOP DRAWINGS
	C2.1	Contract Documents
	02.1	C2.1.1 Contract Drawings
		C2.1.2 Contract Specifications
	C2.2	Shop Drawings
	02.2	2. a.m. 1. a.m
C3	DESIG	N CONSIDERATIONS
	C3.1	Design Basis
		C3.1.1 Structural Integrity
	C3.2	Design Loadings
		C3.2.1 Loads
		C3.2.2 Load Combinations
	C3.3	Cable Assembly Strength
	03.3	C3.3.1 Required and Allowable Strengths
		C3.3.1.3 Elevated Temperature Effect
		C3.3.1.4 Fatigue Strength
		C3.3.1.5 Creep Effect
		C3.3.1.5 Creep Effect
	C3.4	C
	C3.4	
		[13.4.] Ganaral Considerations
		C3.4.1 General Considerations
		C3.4.1 General Considerations