Guide for Strengthening and Repairing Existing Structures

1st Edition

Prepared by the American Welding Society (AWS) D1 Structural Welding Committee

Under the Direction of the AWS Technical Activities Committee

Approved by the AWS Board of Directors

Abstract

This guide provides information on strengthening and repairing existing structures. Included are sections on weldability, evaluation of existing welds, testing and sampling, heat straightening, and damage repair.
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On occasion, text, tables, or figures are printed incorrectly, constituting errata. Such errata, when discovered, are posted on the AWS web page (www.aws.org).

Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the appropriate technical committee. Such requests should be addressed to the American Welding Society, Attention: Managing Director, Technical Services Division, 550 N.W. LeJeune Road, Miami, FL 33126 (see Annex B). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. These opinions are offered solely as a convenience to users of this standard, and they do not constitute professional advice. Such opinions represent only the personal opinions of the particular individuals giving them. These individuals do not speak on behalf of AWS, nor do these oral opinions constitute official or unofficial opinions or interpretations of AWS. In addition, oral opinions are informal and should not be used as a substitute for an official interpretation.

This standard is subject to revision at any time by the AWS D1 Committee on Structural Welding. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are required and will be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D1 Committee on Structural Welding and the author of the comments will be informed of the Committee’s response to the comments. Guests are invited to attend all meetings of the AWS D1 Committee on Structural Welding to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.
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Foreword

This foreword is not part of AWS D1.7/D1.7M:2010, *Guide for Strengthening and Repairing Existing Structures*, but is included for informational purposes only.

This guide has been developed to assist in the task of strengthening and repairing existing structures. The guide includes information to assist both Engineers and Contractors in order to provide general direction and guidance on weld repairs, weld strengthening, and other procedures to correct challenging issues faced while dealing with existing structures.

**Informative Annexes.** These annexes are not part of this guide but are provided to clarify the guide’s recommendations by showing examples, providing information, or suggesting alternative good practices.

**Errata.** It is the Structural Welding Committee’s Policy that all errata should be made available to users of the code. Therefore, any significant errata will be published in the Society News Section of the *Welding Journal* and posted on the AWS web site at: http://www.aws.org/technical/d1/.

**Suggestions.** Your comments for improving AWS D1.7/D1.7M:2010, *Guide for Strengthening and Repairing Existing Structures* are welcome. Submit comments to the Managing Director, Technical Services Division, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126; telephone (305) 443-9353; fax (305) 443-5951; e-mail info@aws.org; or via the AWS web site <http://www.aws.org>.
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Guide for Strengthening and Repairing Existing Structures


1.1 Scope. This document contains basic information pertinent to the welded strengthening and repair of existing steel structures. The information contained in this guide is intended for both Engineers and Contractors with the purpose of providing direction and guidance to perform weld repairs, weld strengthening, and other weld procedures to correct problematic issues with existing structures. This guide contains background information that will be useful to the Engineer who is obligated under AWS D1.1/D1.1M:2008 Clause 8 to provide a comprehensive plan to address projects that involve strengthening and repairing of steel structures. The approach to the strengthening and repairing of these materials is to be developed using the information provided herein.

This guide is intended to apply to the strengthening and repair of existing structures made of the following materials:

1. Steel with a minimum specified yield strength of 100 ksi [690 MPa] or less
2. Cast iron
3. Wrought iron

Strengthening or repairing an existing structure includes modifications to meet new serviceability or load requirements as well as corrections made to repair conditions unsuitable for future use specified by the Engineer. The Engineer should prepare a contract for the work including, but not limited to, design, workmanship, inspection, acceptance criteria, and documentation. Except as modified in this clause, provisions of this guide should apply to the strengthening and repair of existing structures, including heat straightening of distorted members.

1.2 Limitations. This guide is intended to assist in the evaluation of existing structural elements and the development of appropriate procedures for repairing those elements. It does not provide exhaustive coverage of any specific topic.

This guide is intended to apply to the strengthening and repair of existing buildings and other structural systems. It is not intended to apply to:

1. Structures made of steels less than 1/8 in [3 mm] thick
2. Pressure vessels and pressure piping
3. Structures made of materials other than those listed under the scope
4. Seismic upgrades
5. New construction

Whereas this guide is not intended to apply the application outside the scope, the principles contained in this guide may be applied to other materials and applications. The Engineer is advised to use caution and engineering judgment for application outside the scope of this guide.

More importantly, it is critical to state here that this document does not provide detailed specific procedures and direction to correct any specific strengthening or repair operation regardless of how common or standard the procedure may be. Instead, information supplied herein as well as that material referenced in Annex A is intended to provide users with an overall approach to weld modifications as they pertain to: strengthening and repair; technical resources to develop