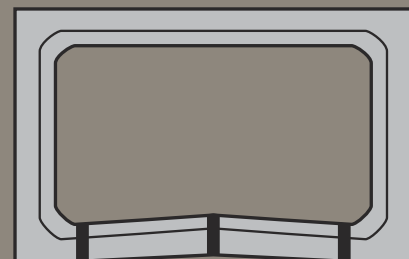
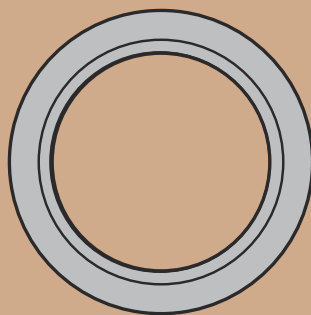
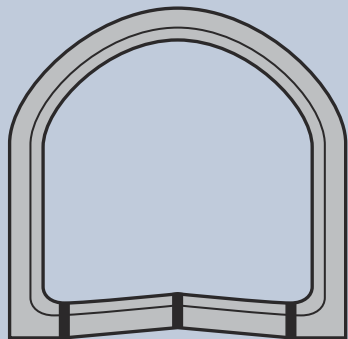


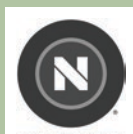
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Design of Close-Fit Liners for the Rehabilitation of Gravity Pipes

Pipeline Infrastructure
Committee

Edited by
Norman E. "Ed" Kampbell, P.E.
Jadranka Simicevic



UTILITY ENGINEERING
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Prepared by
Pipeline Infrastructure Committee of the
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American Society of Civil Engineers

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MANUALS AND REPORTS ON ENGINEERING PRACTICE

(As developed by the ASCE Technical Procedures Committee, July 1930, and revised March 1935, February 1962, and April 1982)

A manual or report in this series consists of an orderly presentation of facts on a particular subject, supplemented by an analysis of limitations and applications of these facts. It contains information useful to the average engineer in his or her everyday work, rather than findings that may be useful only occasionally or rarely. It is not in any sense a “standard,” however, nor is it so elementary or so conclusive as to provides a “rule of thumb” for nonengineers.

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In February 1962 (and revised in April 1982), the Board of Direction voted to establish a series titled “Manuals and Reports on Engineering Practice” to include the manuals published and authorized to date, future Manuals of Professional Practice, and Reports on Engineering Practice. All such manual or report material of the Society would have been refereed in a manner approved by the Board Committee on Publications and would be bound, with applicable discussion, in books similar to past manuals. Numbering would be consecutive and would be a continuation of present manual numbers. In some cases of joint committee reports, bypassing of journal publications may be authorized.

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PREFACE

This Manual of Practice is intended to be a comprehensive and useful source of information for the design of flexible, close-fit linings for the renewal and/or rehabilitation of pipes designed for gravity flow, such as sanitary sewers, culverts, and storm sewers. This manual with its adoption by ASCE supersedes the use of “Appendix X1 Design Considerations” presented in the nonmandatory section of the ASTM Standard F-1216, which has been the default design method for circular pipes with no more than 10% ovality since its first publication in 1989. The design solution prescribed herein can be used for circular and noncircular geometries such as pipe-arch shapes and egg shapes (of all the various rise-to-span ratios), for elliptical-shaped pipes (horizontal and vertical) and box-shaped pipes (rectangular and square), and for other undefined site-specific shapes.

This manual is written in such a manner as to guide the design engineer in assessing the existing soil–structure interaction system, estimating the state of the stresses in that system, and designing the wall thickness of a close-fit flexible liner that will need to be installed to efficiently carry the loads that will likely come onto it after it is installed.

The contents of this manual represent the collected background and experience of many learned professionals active throughout the world in the evaluation and rehabilitation of the existing buried pipe structures.

This manual was produced under the guidance of Norman E. “Ed” Kampbell, task group chair. The authors are

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Lynn E. Osborn
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NASSCO

NASSCO is honored to co-publish this Manual of Practice with UESI and ASCE. This effort began many years ago within NASSCO when Ed Kampbell, P.E., who had developed new design procedures for cured-in-place pipe (CIPP), suggested that NASSCO produce a CIPP design manual. After much discussion, it was agreed that ASCE would be a more appropriate organization to undertake this initiative.

Discussions with ASCE began even prior to UESI becoming ASCE's ninth institute. A work effort was started within the Pipeline Division's Trenchless Installation of Pipelines (TIPs) Committee, and after several years of writing, reviewing, and conversing, this Manual of Practice has become a reality.

NASSCO is currently collaborating with UESI and ASCE on more manuals for copublishing. Based on the success of this Manual of Practice, we see future opportunities for developing additional educational resources with UESI and ASCE and appreciate the opportunity to partner with UESI and ASCE to set standards for the assessment, maintenance, and rehabilitation of underground infrastructure.

Sheila Joy
Executive Director
NASSCO, Inc.