Third Edition

ASCE Manuals and Reports on Engineering Practice No. 108



Pipeline Design for Installation by Horizontal Directional Drilling

Task Committee on Pipeline Design for Installation by Horizontal Directional Drilling

ASCE

Edited by
Eric R. Skonberg, P.E.
Tennyson M. Muindi, P.E.

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UTILITY ENGINEERING & SURVEYING INSTITUTE

Pipeline Design for Installation by Horizontal Directional Drilling

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Task Committee on Pipeline Design for Installation by Horizontal Directional Drilling of the Trenchless Installation of Pipelines Committee of the Pipelines Division of the Utility Engineering and Surveying Institute of the American Society of Civil Engineers

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A list of available Manuals of Practice can be found at https://ascelibrary.org/page/books/s-mop.

CONTENTS

CONTRIBUTORS ..... **xi**

BLUE-RIBBON PANEL REVIEWERS ..... **xiii**

ACKNOWLEDGMENTS ..... **xv**

PREFACE ..... **xvii**

1. INTRODUCTION **1**

2. PREDESIGN SURVEYS **5**
2.1 Introduction 5
2.2 Surface Survey 5
2.3 Subsurface Investigation 8
2.3.1 Utility Research 8
2.3.2 Geotechnical Investigation 11
References 14

3. DRILLED PATH DESIGN **15**
3.1 Introduction 15
3.2 Penetration Angles 16
3.3 Depth of Cover 18
3.4 Elevations of Entry and Exit 19
3.5 Radius of Curvature 19
3.6 Directional Accuracy and Tolerances 20
3.7 Pilot Hole Intersect Method 21
3.8 Multiple-Line Installations 22
3.9 Utility Casings 23
3.10 Annular Seepage 23
References 24

4. PIPE DESIGN 25
4.1 Introduction 25
4.2 Installation Loads 25
4.2.1 Tension 26
4.2.2 Bending 28
4.2.3 External Pressure 28
4.3 Operating Loads 29
4.3.1 Internal Pressure 29
4.3.2 Bending 29
4.3.3 Thermal Expansion 30
4.3.4 External Pressure 30
4.4 Pipe Material 31
4.5 Stresses in Steel Pipe 33
4.5.1 Installation Stresses 33
4.5.2 Operating Stresses 37
4.6 Stresses in a High-Density Polyethylene Pipe and Fusible Polyvinyl Chloride Pipe 39
4.6.1 Installation Stresses 39
4.6.2 Post-installation Stresses 43
4.7 Ductile Iron Pipe Design Considerations 45
4.7.1 Installation Stresses 45
4.7.2 External Loads 46
4.8 Steel Pipe Corrosion Coating 46
4.8.1 Field Joint Coatings 46
4.8.2 Armoring Coatings 47
References 47

5. CONSTRUCTION IMPACTS 51
5.1 Introduction 51
5.2 Workspace 51
5.3 Drilling Fluid 53
5.3.1 Consumption and Characteristics 53
5.3.2 Containment and Recycling 54
5.3.3 Inadvertent Drilling Fluid Returns 54
5.3.4 Annular Seepage 57
5.3.5 Structural Failure by Piping 58
5.3.6 Drilling Fluid and Cuttings Disposal 59
5.4 Surface Casing 59
5.5 Breakover Bends 60
5.6 Noise 62
References 62

6. AS-BUILT DOCUMENTATION 63
6.1 Introduction 63
6.2 Construction Staking 63

6.3 Documentation of Actual Drilled Path End Points 63
6.4 Required Measurements prior to Commencing Drilling Operations 64
6.5 Pilot-Hole As-Built Calculations 64
6.6 Pilot-Hole Survey Data 64
6.6.1 Surface-Monitoring System 64
6.6.2 Gyroscopic Steering Tool 67
6.6.3 Walkover System 67
6.7 Pilot-Hole As-Built Error Distribution 67
6.8 Pilot-Hole As-Built Drawing 68
6.9 Post-Installation Survey 68
References 69

GLOSSARY 71

INDEX 77

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PREFACE

Horizontal directional drilling (HDD) is a surface-launched trenchless method for installing underground utilities and pipelines. Horizontal directional drilling has a storied history, existing in some form or fashion since the early 1970s. The HDD method initially gained prominence in the oil and gas industry for installing pipelines beneath waterways in remote locations, but refinements of the technology have allowed it to expand to a wide variety of markets and locations that include residential and urban areas. The tools and techniques initially used in the HDD process were an outgrowth of the oil well drilling industry but over time have evolved to become well established in their own right. These innovations were driven by the various markets for which HDD now serves.

Pipeline Design for Installation by Horizontal Directional Drilling. MOP 108, Third Edition, was prepared by the Horizontal Directional Drilling Design Guideline Task Committee as part of the broader Trenchless Installation of Pipelines (TIPS) Committee of ASCE. This manual is intended to assist engineers, contractors, and owners in understanding the HDD method, its various capabilities and limitations, and to help execute relevant trenchless projects in a safe and effective manner. The task committee acknowledges that HDD technology and its application continues to evolve and change, notwithstanding combining with other trenchless methods, to challenge contemporary understandings of HDD best practices and procedures.

Project planners shall consider the limitations of this manual, as no document can account for all project-specific constraints nor the evolution in practice borne out of the passage of time.

Contractors, owners, and engineers engaged in HDD design and construction shall possess competency in HDD practices and procedures. In the absence of such experience, contractors, owners, and engineers

should, at a minimum, seek additional guidance and/or subject matter expertise to avoid suboptimal outcomes and increased project risks.

The Horizontal Directional Drilling Design Guideline Task Committee would like to thank all contributors for their time and effort in advancing this publication to the third edition.

CHAPTER 1
INTRODUCTION

This Manual of Practice addresses the planning, design, and installation considerations for major pipeline or duct segments installed by horizontal directional drilling (HDD). Horizontal directional drilling is a trenchless installation method used to install pipes and pipelines and is accomplished using a specialized horizontal drilling rig with ancillary tools and equipment. It is separate from other installation methods such as microtunneling, auger boring, or pipe ramming, which are addressed in other Manuals of Practice.

Some of the potential benefits of utilizing HDD for a trenchless crossing include the following:

- No shafts are needed for installations. Shallow pits may be required.
- Relatively long lengths can be installed in a single installation.
- Curved alignments are possible.
- Minimum ground disturbances between entry and exit points.

Horizontal directional drilling is suitable in a variety of ground conditions and groundwater depths. Some of the limitations and risks of HDD include the following:

- Not applicable for all pipe materials.
- Some ground conditions (i.e., gravelly soils and cobbles) may present a higher risk.
- Inadvertent fluid returns could occur at unplanned locations.
- Creates a relatively large volume of fluid and spoils that require disposal.