

## Chapter 12

# Horizontal Directional Drilling

### Introduction

The Horizontal Directional Drilling (HDD) industry has experienced so much growth in the past two decades that HDD has become commonplace as a method of installation. One source reported that the number of units in use increased by more than a hundred-fold in the decade following 1984. This growth has been driven by the benefits offered to utility owners (such as the elimination of traffic disruption and minimal surface damage) and by the ingenuity of contractors in developing this technology. To date, HDD pipe engineering has focused on installation techniques, and rightfully so. In many cases, the pipe experiences its maximum lifetime loads during the pullback operation.

The purpose of this chapter is to acquaint the reader with some of the important considerations in selecting the proper PE pipe. Proper selection of pipe involves consideration not only of installation design factors such as pullback force limits and collapse resistance, but also of the long-term performance of the pipe once installed in the bore-hole. The information herein is not all-inclusive; there may be parameters not discussed that will have significant bearing on the proper engineering of an application and the pipe selection. For specific projects, the reader is advised to consult with a qualified engineer to evaluate the project and prepare a specification including recommendations for design and installation and for pipe selection. The reader may find additional design and installation information in ASTM F1962, "Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of PE Pipe or Conduit Under Obstacles, Including River Crossings," and in the ASCE Manual of Practice 108, "Pipeline Design for Installation by Directional Drilling."

# Horizontal Directional Drilling Plastics Pipe Institute

**Lawrence A. Smith**



## **Horizontal Directional Drilling Plastics Pipe Institute:**

**Horizontal Directional Drilling (HDD) : Utility and Pipeline Applications** David Willoughby, 2005-06-03 This is a complete sourcebook of information on Horizontal Directional Drilling the installation of pipelines and utilities beneath obstacles such as water and roadways HDD is a fast growing technology in the trenchless industry Provides technical information on the design permitting construction bid documents specifications and construction of HDD applications Numerous HDD calculations with examples *Construction Equipment Management* John E. Schaufelberger, Giovanni C. Migliaccio, 2019-03-27 This revised and updated edition of Construction Equipment Management fills a gap on this subject by integrating both conceptual and hands on quantitative knowledge on construction equipment into a process that facilitates student learning The first six chapters summarize interdisciplinary concepts that are necessary to ground students learning on construction equipment management including both engineering and economics Each of the next 16 chapters covers a different type of construction equipment and associated methods of use The final chapter introduces the more advanced concept of operation analysis This allows the book to be used on numerous courses at different levels to prepare graduates to apply skills on construction equipment when planning for a new project estimating its costs and monitoring field operations Organized around the major categories of construction equipment including both commercial and heavy civil examples case studies and exercises this textbook will help students develop independence in applying concepts to hands on scenarios A companion website provides an instructor manual solutions additional examples lecture slides figures and diagrams

*Customer Acceptance of Water Main Structural Reliability* Nimmi Damodaran, 2005 This book reports on an evaluation approach for utilities to use to assess customer perceptions attitudes and expectations for water system reliability their tolerance to service disruptions and construction impacts and their willingness to pay for expected levels of service Strategies discussed include methods for assessing customers perceptions and expectations costs of infrastructure strategies how to incorporate external costs and a plan to communicate with customers *Flexible Pipelines and Power Cables* Yong Bai, Shuai Yuan, Kaïen Jiang, 2024-05-15 FLEXIBLE PIPELINES AND POWER CABLES Pipelines are an important part of the world's energy infrastructure and without them oil and gas the most commonly used sources for energy today would not be available to much of the world's countries New theories and designs are constantly being researched and developed by scientists and engineers to continue improving this technology and making it safer and more economical The technology processes materials and theories surrounding pipeline construction application and troubleshooting are constantly changing and this groundbreaking series Advances in Pipes and Pipelines has been created to meet the needs of engineers and scientists to keep them up to date and informed of all of these advances This latest volume in the series focuses on flexible pipelines and power cables offering the engineer the most thorough coverage of the state of the art available The authors of this work have written numerous books and papers on these subjects and are some of the most influential authors on flexible

pipes in the world contributing much of the literature on this subject to the industry This new volume is a presentation of some of the most cutting edge technological advances in technical publishing This is the most comprehensive and in depth series on pipelines covering not just the various materials and their aspects that make them different but every process that goes into their installation operation and design This is the future of pipelines and it is an important breakthrough A must have for the veteran engineer and student alike this volume is an important new advancement in the energy industry a strong link in the chain of the world s energy production

*Decision Support System for Distribution System Piping Renewal* Arun K. Deb,2002

*Trenchless Technology: Planning, Equipment, and Methods* Mohammad Najafi,2013-01-18 The complete guide to trenchless technology project management planning costs and methodsWritten by an expert in the field of pipeline system engineering this book describes how to plan schedule and implement efficient cost effective trenchless technology piping projects Filled with detailed illustrations and real world examples Trenchless Technology Planning Equipment and Methods explains how to accurately compare the costs of trenchless projects considering geotechnical and rock mass impacts drilling fluids and locating and tracking equipment This detailed reference provides important information on how to estimate the cost of labor and equipment and schedule trenchless piping projects A wide range of trenchless technology methods suitable for various ground and project conditions are discussed in this practical resource Coverage includes Cost comparison of trenchless technology methods Planning for trenchless technology projects Project delivery methods Geotechnical considerations Rock mass properties impacts on trenchless project feasibility Tracking locating and planning tools for horizontal directional drilling Drilling and lubricating fluids Planning and construction requirements for horizontal direction drilling Horizontal auger boring Pipe ramming Microtunneling methods Pilot tube or pilot tube microtunneling method Pipe box jacking and utility tunneling Cured in place pipe Sliplining Lateral renewal Localized repair Planning and construction requirements for pipe bursting Panel linings Spray in place pipe

**Underground Infrastructure Research** M. Knight,N. Thomson,2020-08-26 A collection of papers from the international symposium Underground Infrastructure Research Municipal Industrial and Environmental Applications 2001 It explores materials for buried pipelines pipeline construction techniques and condition assessment methods and more

**Plastic Piping Handbook** David Willoughby,2001-08-22 All the answers guide to plastic piping Written by expert David Willoughby a 20 year veteran in the field Plastic Piping Handbook is a one of a kind comprehensive guide to the durable economical piping solution used today in 90 percent of low pressure liquid and natural gas installations You get the facts you need on a full range of vital topics from pipe selection to pipeline purging and drying to leak detection This incomparable resource features codes and specs for gas and water transmission inspection and testing procedures and provides you with plenty of charts data sheets and tables You ll find at your fingertips hundreds of pages of clear practical guidance to help you Design systems for municipal industrial commercial residential and field use Follow step by step procedures for aboveground and buried pipe design Choose and

apply pipes control valves and regulators Adhere to codes and standards Install inspect and test pipelines More **Federal Register** ,2008 **Kazısız Teknolojiler ve Malzemeler** Fevzi Yılmaz,2009-01-01 KAZISIZ TEKNOLOJLER VE MALZEMELER Kitab indekiler Temizlik Kaz s z Teknoloji Literat r ve Vaka al malar At k Su Rehabilitasyon Teknolojileri ve Kullan lan Malzemeler Borular Sonu lar Ek 1 At ksu Boru Hatlar n n inde Astar Olu turma Y ntemi Olan CIPP Tekni i ile Rehabilit Edilmesi Teknik arnamesi rne i Ek 2 At ksu Boru Hatlar n n PVC Astar Boru Kullan larak Katla ve ekil Ver Y ntemi ile Rehabilit Edilmesi Teknik arnamesi rne i Ek 3 At ksu ve Ya mursuyu Hatlar nda Temizlik ve G r nt leme ine Ait zel Teknik arnamesi rne i **Trenchless Technology : Pipeline and Utility Design, Construction, and Renewal** Mohammad Najafi,2004-12-27 Trenchless technology allows for the installation or renewal of underground utility systems with minimum disruption of the surface As water and wastewater systems age or must be redesigned in order to comply with environmental regulations the demand for this technology has dramatically increased This is a detailed reference covering construction details design guidelines environmental concerns and the latest advances in equipment methods and materials Design and analysis procedures Design equations Risk assessment Soil compatibility and more **Options for Leak and Break Detection and Repair for Drinking Water Systems** Lawrence A. Smith,2000 Three researchers with the Battelle research company and another with the US Environmental Protection Agency explore new technologies and management concept to reduce leakage and improve long term performance in water distribution networks They focuses on leakage caused by structural hydraulic or Applied Plastics Engineering Handbook Myer Kutz,2016-09-15 Applied Plastics Engineering Handbook Processing Materials and Applications Second Edition covers both the polymer basics that are helpful to bring readers quickly up to speed if they are not familiar with a particular area of plastics processing and the recent developments that enable practitioners to discover which options best fit their requirements New chapters added specifically cover polyamides polyimides and polyesters Hot topics such as 3 D printing and smart plastics are also included giving plastics engineers the information they need to take these embryonic technologies and deploy them in their own work With the increasing demands for lightness and fuel economy in the automotive industry not least due to CAF standards plastics will soon be used even further in vehicles A new chapter has been added to cover the technology trends in this area and the book has been substantially updated to reflect advancements in technology regulations and the commercialization of plastics in various areas Recycling of plastics has been thoroughly revised to reflect ongoing developments in sustainability of plastics Extrusion processing is constantly progressing as have the elastomeric materials fillers and additives which are available Throughout the book the focus is on the engineering aspects of producing and using plastics The properties of plastics are explained along with techniques for testing measuring enhancing and analyzing them Practical introductions to both core topics and new developments make this work equally valuable for newly qualified plastics engineers seeking the practical rules of thumb they don t teach you in school and experienced practitioners evaluating new technologies or getting

up to speed in a new field Presents an authoritative source of practical advice for engineers providing guidance from experts that will lead to cost savings and process improvements Ideal introduction for both new engineers and experienced practitioners entering a new field or evaluating a new technology Updated to include the latest technology including 3D Printing smart polymers and thorough coverage of biopolymers and biodegradable plastics      **Pipeline Crossings** Task Committee on Pipeline Crossings,1996-01-01 Pipeline Crossings Manuals and Reports on Engineering Practice 89 was prepared by the Task Committee on Pipeline Crossings Pipeline Crossings Technical Committee Pipeline Division of the American Society of Civil Engineers The purpose of this manual is to present common approaches for the design of crossing installations through the use of examples of standard practice as they exist in industry today While the emphasis is on the pipeline crossing techniques of highways railroads and waterways they can also be applied to cable and conduit crossings The manual is divided into four major sections First general concepts are presented including crossing environments permits and a description of the various types of crossings The second section discusses the design issues while the different construction methods are explored in detail in the next section Finally the fourth section features a glossary of terms and a bibliography of resource materials For new engineers this manual may supplement what they were taught in school about pipeline design and construction For more experienced engineers it will hopefully provide useful options and guidelines from current practice      **Applied Plastics Engineering** Mr. Rohit Manglik,2024-01-30 EduGorilla Publication is a trusted name in the education sector committed to empowering learners with high quality study materials and resources Specializing in competitive exams and academic support EduGorilla provides comprehensive and well structured content tailored to meet the needs of students across various streams and levels      *Trenchless Installation of Conduits Beneath Roadways* Tom Iseley,1997 This synthesis will be of interest to geologists geotechnical construction and maintenance engineers other state department of transportation DOT personnel involved with the planning design and permit issuance for conduits beneath roadways local transportation agencies utility contractors and consultants and trenchless construction equipment manufacturers It describes the current state of the practice for the use of trenchless technology for installing conduits beneath roadways Trenchless construction is a process of installing rehabilitating or replacing underground utility systems without open cut excavation The synthesis is focused on trenchless technology for new installations This report of the Transportation Research Board describes the trenchless installation technologies methods materials and equipment currently employed by state DOTs and other agencies to install conduits beneath roadways The synthesis presents data obtained from a review of the literature and a survey of transportation agencies For each technology identified information is provided to describe the range of applications basis for technique selection site specific design factors to be considered relative costs common environmental issues and example specifications In addition information on emerging technologies and research needs is presented      **The Smart Guide to Geothermal** Donal Blaise Lloyd,2011 Covers residential geothermal heating

and cooling including various system options and installation configurations costs and payback issues performance standards and contractors Also examines how energy efficient non polluting geothermal heat pumps work and how to integrate solar energy

*Directional Drilling for Coalbed Degasification* C. D. Messelt, David C. Oyler, David M. Hopstock, David M. Soboroff, George N. Aul, Glenn R. Palmer, John L. Ellenberger, John M. Gomes, Joseph M. Singer, Leroy H. Wullstein, N. A. Gokcen, Richard G. Sandberg, S. Ralph Austin, Stuart J. Hussey, Terry L. Marchewka, Timothy J. Driscoll, United States. Bureau of Mines, Yael Miron, B. S. Covino, Donald A. Stanley, George M. Martinez, H. B. Salisbury, H. Heystek, Ivan L. Nichols, Jerry D. Troyer, Joseph Cervik, Robert F. Drouillard, Ronald Phillip Tye, Terry L. Hebble, Thomas C. Ruhe, W. Richard McDonald, William P. Diamond, Andrew A. Cochran, Danton L. Paulson, Don C. Seidel, E. K. Landis, George M. Potter, Morton Min Wong, Murray Rosen, P. W. Jeran, Richard William Watson, 1979

**The 2012 Feasibility Study for Canaveral Harbor, Brevard County, Florida** United States. Office of the Assistant Secretary of the Army (Civil Works), 2013

**2023 Florida Underground Utility Contractor Exam Prep** Upstryve Inc, Get one step closer to becoming a Florida Underground Utility Contractor with a book designed by 1 Exam Prep to help you conquer the required Florida Underground Utility Contractor Trade Knowledge computer based examination Test Taking Techniques Book Overviews Highlight and Tab Instructions Hundreds of Test Questions Math Review Test Scope Approved References Underground utility and excavation contractor means a contractor whose services are limited to the construction installation and repair on public or private property whether accomplished through open excavations or through other means including but not limited to directional drilling auger boring jacking and boring trenchless technologies wet and dry taps grouting and slip lining of main sanitary sewer collection systems main water distribution systems storm sewer collection systems and the continuation of utility lines from the main systems to a point of termination up to and including the meter location for the individual occupancy sewer collection systems at property line on residential or single occupancy commercial properties or on multioccupancy properties at manhole or wye lateral extended to an invert elevation as engineered to accommodate future building sewers water distribution systems or storm sewer collection systems at storm sewer structures However an underground utility and excavation contractor may install empty underground conduits in rights of way easements platted rights of way in new site development and sleeves for parking lot crossings no smaller than 2 inches in diameter if each conduit system installed is designed by a licensed professional engineer or an authorized employee of a municipality county or public utility and the installation of such conduit does not include installation of any conductor wiring or connection to an energized electrical system An underground utility and excavation contractor may not install piping that is an integral part of a fire protection system as defined in s 633 102 beginning at the point where the piping is used exclusively for such system

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