





**Dedicated to Quality and Economy in Foundation Design and Construction**

## ***WHO IS DFI?***

**AN INTERNATIONAL NETWORK OF HEAVY CONSTRUCTION PROFESSIONALS**

**A FORUM OPEN TO ALL CONSTRUCTION PROFESSIONALS**

**A TECHNOLOGICAL ASSOCIATION DEVOTED TO GATHERING, STORING AND  
DISSEMINATING PRACTICAL INFORMATION**

**AN ALLIANCE OF PROFESSIONS AND TRADES**

**A RESOURCE FOR IDENTIFYING AND LOCATING THE SPECIALISTS**

**AN INITIATOR AND PARTICIPANT IN RESEARCH**

**CONTRACTORS  
ENGINEERS  
MANUFACTURERS  
SUPPLIERS  
ACADEMICIANS  
GOVERNMENT CONSTRUCTION PERSONNEL  
YOUR CUSTOMERS and CLIENTS  
YOUR COMPETITORS**

**FOR OVER TWENTY FIVE YEARS DFI HAS GATHERED PROFESSIONALS IN THE  
DEEP FOUNDATIONS INDUSTRY, TO CREATE A PLACE FOR DISCUSSION,  
INQUIRY AND DEBATE. IN SO DOING, DFI HAS BROUGHT THE DISCIPLINES  
TOGETHER WHERE THEY HAVE LEARNED FROM EACH OTHER, CREATING A  
BETTER INFORMED, MORE COMMUNICATIVE DEEP FOUNDATIONS INDUSTRY.**

# TECHNICAL COMMITTEE MANUALS

## **Augered Cast In Place Piles Manual**

*Soft cover, 30 pgs., illustrated, 6"x9" saddle-stitched, Second Edition, 2003 Augered Cast-In-Place Pile Committee, Rudolph P. Frizzi, Chair and Editor.*

This update to the original model specification compiled in 1990 addresses current trends in ACIP Pile construction and quality control. The History and Guideline Specification and Commentary format have been updated to address the use of increased ACIP pile diameters and lengths to sustain significantly higher load carrying capacities, and the challenges associated with the use of grout and reinforcement necessary to sustain such higher loading. The order of the Guideline Specification has been arranged to more closely match the format typically utilized in project specifications. Appendices have been added to provide commentary on two quality control techniques: Automated Monitoring Equipment (AME) and Non-Destructive Testing (NDT). Lastly, an Appendix giving a glossary of frequently used ACIP pile terms and their associated definitions has been added.

## **Inspector's Guide to Augered Cast In Place Piles**

*Soft cover, 30 pgs., illustrated, 6"x9" saddle stitched, the 1993 Augered Cast In Place Pile Committee, Joel Moskowitz, Chair and Editor.*

A guide to the inspection of Augered Cast In Place Piles and a companion document to the Augered Cast In-Place Piles Manual. This manual summarizes the requirements expected of all parties concerned in the successful installation of these piles. Step by step installation procedures, construction equipment and inspection tools are discussed along with the common potential problems. Sample inspection forms are provided.

## **Drilled Shaft Inspector's Manual**

*Soft cover, 63 pgs., including 35 pgs. of illustrations, 6"x9" saddle stitched, the 1989 Caissons/Drilled Shaft Committee with The International Association of Foundation Drilling. Clyde W. Baker Jr., Chair and Editor.*

A reference of-record for drilled shaft foundation project planning, engineering, construction, and quality assurance personnel. The manual went through four drafts in its two years of preparation. It has been reviewed and is endorsed by ASFE, the Association of Engineering Firms Practicing in the Geosciences.

## **Inspector's Manual for Driven Pile Foundations**

*Soft cover, 69 pgs., illustrated, 5½"x8½" saddle-stitched, the 1997 Driven Pile Committee, James S. Graham, Chair; Garland Likins, Editor.*

A pocket-sized handbook for inspectors and others concerned with the construction of driven pile foundations. A companion piece to A Pile Inspector's Guide to Hammers. Completely rewritten and updated version of the 1979 Manual. Provides Information on soil investigation, the various pile types, pile driving by impact methods, pile tests, dynamic pile testing and analysis, static load testing, pile hammers and pile driving machinery and ancillary equipment along with some suggested inspection forms. The manual is written from the perspective of the pile inspector and presents advice as to the inspector's role and responsibilities in the pile installation and quality assurance process-

es. Invaluable in the training of inexperienced Inspectors and useful as a reference guide to the experienced inspector or crew member.

### **A Pile Inspector's Guide To Hammers**

*Soft cover, 71 pgs., illustrated, 5½"x8½" saddle stitched, the Equipment Applications Committee, Stephen K. Whitty, Jr., Chair; George G. Goble, Editor.*

An informative reference guide for inspectors and others concerned with the construction of driven pile foundations, and a companion piece to the Inspector's Manual for Pile Foundations. This reference work provides discussions on the pile hammer as a measuring tool, the transfer and utilization of hammer energy, pile driving inspection criteria, the inspector's responsibilities, and basic descriptions for the operating cycles of the various types of hammers (including newer hydraulic impact hammers) in common use. Check lists to confirm proper operation in the field and a glossary of related terms are also included.

### **Micro Pile Guide Specification**

*Soft cover, 40 pgs, illustrated, 6"x9" saddle-stitched, Deep Foundations Institute & ADSC-IAFD, Micro Pile Committee, Thomas D. Richards Jr., P.E., DFI Committee Chair; Tom Armour, ADSC Committee Chair.*

This guide to drafting a specification for Micropiles encompasses the furnishing of all designs, materials, products, accessories, tools, equipment, services, transportation, labor and supervision, and installation techniques required for testing and installing of micropiles and pile-top attachments. This guide is intended for use by Engineers for writing project specific specifications. The document was prepared by the Deep Foundations Institute (DFI) Micropile Committee from 1996 to 2001 and endorsed by the ADSC-IAFD Micropile Committee in October 2001. The Hollow Bar Supplement was developed by the joint ADSC/DFI Micropile Committee in 2002.

### **Glossary of Foundation Terms**

*Soft cover, 62 pgs., illustrated, 6"x9" saddle stitched. The 1981 Equipment Applications Committee, G. Robert Compton Jr. Chair; Alan G. MacKinnon and Hal W Hunt, Editors.*

A compilation of technical terms and field jargon commonly used in deep foundations construction work. About 1,000 terms are defined; sketches show various types of leads and accessories; rock and soil anchors are pictured and explained. This is an essential book for students of and field practitioners in deep foundations construction. It is especially valuable for all who want to understand terminology in the pile foundation field without asking.

### **Soil Nailing Design and Applications**

*Soft cover, 117 pgs., illustrated, 6"x9", Slurry Wall Committee, P.J. Nicholson, Chair*

This book was first published in 1991, and features seven papers first written by soil nail specialists for the DFI Conference in Atlanta in the fall of 1988. These papers cover the details of design, construction and performance, with particular reference to a number of case histories.

## **Driven Foundation Piling**

*Soft Cover, 121 pages, illustrated, 8½"x11", Disk optional, the Driven Pile Committee, James S. Graham P.E., Chair and Editor.*

Sizes and specifications are presented for Driven Foundation Piling: Concrete piles include Corrugated Shell, Pressure Injected Footing, Post-Tensioned Cylinder, Prestressed, and Step-Taper; Steel includes H-Pile, Monotube, Oil Well Casing, and Pipe; Timber; and Specialty Piles include Tapered pile tip (TPT), Bottom Driven Cast-In-Place, Segmental Precast, and Composite. Also included are codes and standards, English to International System (SI) Conversion Factors, List of Suppliers, and DFI Pile Driving Contractors. Available with 3½" Disk in MS Word for Windows format.

## **Driven Sheet Piling**

*Soft Cover, 183 pages, illustrated, 8½"x11", Disk optional, the 1998 Driven Pile & 1998 Sheet Piling Committees, James S. Graham P.E., DPC Chair, William C. Land, SPC Chair.*

Includes Specifications, Driving Methods and Size & Characteristic Charts for the following different types of Sheet Piling: Aluminum, Concrete, Plastic, Cold-Formed and Hot-Rolled Steel, Treated Wood, and Miscellaneous Types of Sheet Piling as well as discontinued sections. Also included is a summary of the sections categorized by Section Modulus. All measurements are listed in both English and International System (SI) Units. Available with 3½" disk in MS Word for Windows (zipped).

## **Five Language Lexicon of Foundation Terms**

*Soft Cover, 40 pgs., illustrated, 8½"x 11" Saddle Stitched, Disk Optional, George J. Tamaro, Editor.*

A companion piece to the Glossary of Foundation Terms for the international foundations professional. Approx. 800 industry terms translated into French, German, Spanish, Italian and Portuguese. Indexed in English. Lexicon available with 3½" disk in Dbase IV format for importing and custom indexing to language of choice.

# **SHORT COURSE TEXTS**

## **Dynamic Monitoring and Analysis of Pile Foundation Installations**

*Soft cover, 69 pgs., illustrated, 6"x9" saddle stitched, the 1990 Continuing Education Committee, Bengt H. Fellenius, Chair; Patrick J. Hannigan, Author.*

An official text for the DFI "Design, Analysis and Testing of Piles and Drilled Shafts" short course.

An overview of the current methods of dynamic measurement and analysis of impact driven pile during installation and restroke for assessing long term performance. Discusses wave equation analysis using the GRLWEAP computer program.

## **Guidelines for the Interpretation and Analysis of the Static Loading Test**

*Soft cover, 44 pgs., illustrated, 6"x9", The 1990 Continuing Education*

*Committee, Bengt H. Fellenius, Chair and Author:*

An official text for the DFI "Design, Analysis and Testing of Piles and Drilled Shafts" short course.

Testing arrangement, execution procedures and reporting results of the static loading test are presented. Safety considerations are outlined. Information is given on: Interpretation of failure load, factor of safety and acceptance criteria. Instrumentation of the pile, determination of "elastic" modulus, interpretation and evaluation of "telltale" data and influence of residual compression are covered.

### **Guidelines for Static Design**

*Soft cover, 45 pgs., illustrated, 6"x9" saddle-stitched, the Continuing Education Committee, Bengt H. Fellenius, Chair.:*

Design of piles and pile groups for capacity, settlement, and drag loads due to negative skin friction in total or effective design (alpha or beta method). The influence of soil set-up and residual loads is discussed, methods of settlement analysis are presented and views are presented on allowable load factors of safety. Several examples are included.

### **Guidelines for Writing Construction Specifications**

*Soft cover, 45 pgs., illustrated, 6"x9" saddle-stitched, the Continuing Education Committee, Bengt H. Fellenius, Chair.:*

Technical master construction specifications developed for Public Works Canada, Marine Division. The specs were produced with the intent of reducing the incidence of disputed claims and litigation in the piling contracts. The specs address generally applicable aspects, such as how to specify hammers and hammer performance, equipment adequacy of equipment details, obstructions, inspection, use of the Pile Driving Analyzer, and performance of static load tests, as well as aspects pertaining to the particular pile types, pipe piles, H piles, concrete piles, and others.

## **MEMBERS' CONFERENCE PREPRINTS & PROCEEDINGS**

### **Proceedings of the 28th Annual Conference on Deep Foundations, 2003, Miami Beach, FL "Deep Foundations in Compressible Soil and Soft Rock"**

*Soft cover, 425 pgs, illustrated, 8½"x 11" 2003 Meeting Committee, Edwin Hickey, Conference Chair, Matthew Meyer, Program Chair.*

32 papers of which 22 were presented at the conference in the following four sessions: Deep Foundation Systems within Florida; Drilled Shafts & Ground Improvement - State of the Practice; Augered Cast-in-Place Piles & Micropiles - Case Histories; Helical Foundations & Driven Piles - Case Histories. In addition 10 supplemental papers are included in the volume. Also includes paper by DFI Student Paper Competition winner and first runner-up.

### **Proceedings of the 27th Annual Conference on Deep Foundations,**

## **2002, San Diego, CA "The Time Factor in Design and Construction of Deep Foundations"**

*Soft cover, 276 pgs, illustrated, 8½"x 11", 2002 Meeting Committee, Thomas Weaver, Conference Chair, Kevin Crennan & Alan Pace, Program Chairs*

17 papers including: 6000 Ton Osterberg Load Test Reduces Foundation Costs for Delaware River Tramway · Case History of the Support of Excavation System at the San Diego State University (SDSU) LRT Station · Time Saving and Environmental Benefits of High Capacity, Removable Multiple Anchors · Improved Pile Economics: High Design Stresses And Remote Pile Testing · Load Testing High Capacity Drilled Shafts · Three Case Histories Comparing Impact And Vibratory Driven Pile Resistances In Marl · Recent Developments In The Law Of Deep Foundations · Classical And Finite Difference Method To Estimate Pile Capacity Compared With Pile Load Testing Results · Mitigating Early Project Delays Related to Deep Foundation Work · Lateral Load Tests on Drilled Piers in San Diego Area Residual and Formational Soils · CPT - Guided Installation of Pressure-Grouted Displacement Piles · Driven Pile Foundation Design and Construction Genentech Hall - UCSF Mission Bay Campus · Pier Testing Program at University of California Berkeley Site Featuring Conventional Static Load Tests and Rapid Load Tests using the Fundex PLT · Dynamic Lateral Response of a Full-Scale Pile Group · Large Diameter Pile Driving, Acceptance and Soil-Pile setup, New East Span San Francisco-Oakland Bay Bridge · Results of an International Pile Testing Prediction Event · The Effect of Drilling Fluid on Axial Capacity, Cape Fear River, NC

## **Proceedings of the 26th Annual Members' Conference, 2001, St. Louis, MO**

### **"Designing Deep ~ Building Deep"**

*Soft Cover, 226 pgs., illustrated, 8½"x 11", 2001 Meeting Committee, William Durbin, Conference Chair; Richard Stephenson, Program Chair*

11 Papers Including: Evolution of Piling Design and Techniques in Mudstone at Manchester Airport · Access and Riser Shafts - Detroit River Outfall #2 · Multiple Foundations Types for Bridges over the Same Coal Mine · Dynamic Load Testing of Augered Cast-in-Place Piles · Drilled and Grouted Pipe Pile Foundation for Department of Energy Spallation Neutron Source Target Building, Oak Ridge, Tennessee · Effects of Permanent and Temporary Loads on Allowable Bearing Capacity of Piles Subjected to Negative Skin Friction · Seismoacoustic Effects of Driving Large Diameter Piles · Approach Wall Foundations Olmstead Locks and Dam Project · New Outfall Bridge Structures at Bonneville Dam-Design, Construction and Lateral Testing · Minipiles and Compaction Grouting for Seismic Retrofit of Transportation Structures in the New Madrid Fault Zone · Keynote: Axial Capacity of Drilled Foundations in Soft Rocks and Intermediate Geomaterials-Presentation Notes

## **Proceedings of the 25th Annual Members' Conference and Eighth International Conference and Exposition, 2000, New York NY**

*Soft cover, 637 pgs., illustrated, 8½"x 11", New York City Organizing Committee*  
54 papers from the following 4 session subject topics: How Geology has Driven Foundation Practice Worldwide, Industry Trends and Up and Coming Innovations, Foundation Techniques in the Urban Environment, and Notable International Projects. . .

. Call DFI HQ for a complete list of titles in these proceedings.

## **Proceedings of the 24th Annual Members' Conference & Equipment Exposition, 1999, Dearborn, MI**

### **"Decades of Technology Advancing into the Future"**

*Soft Cover, 299 pgs., illustrated, 8½"x 11", The 1999 Meeting Committee, V. Dennis Millgard, Committee Chair, Richard Woods, Editor.*

20 Papers including: The Historical Evolution of Piling & Deep Foundations & Prospects for the Future · What has been Learned about Drilled Shafts from the Osterberg Load Test · Emplacement Techniques: Impervious and Pervious Wall Construction · Prediction & Calculation of Construction Vibrations · Design & Construction of Large Diameter Drilled Shafts for the Bath-Woolwich Bridge · Repair of Deep Foundations · Caisson Design & Construction Challenges on the New Tiger Stadium Project · Davison Freeway Reconstruction Utilizes Design/Build Retaining Walls · High Capacity Drilled Cast-in-Place Piles, House of Representatives Building, Lansing, Michigan · Bearing Capacity of Footings & Piles - A Delusion? · Case History: Estimating Ground Vibrations Caused by Pile Driving · Large Diameter CIDH Construction in Cohesionless Silts by the use of Rotator/Oscillator Techniques - A Case Study · Special Foundation Construction for Large Deep Excavation Pits in Berlin · Automated Installation Monitoring for Augercast and Driven Piles · Caveat Emptor or A Buyer's Guide to Pile Integrity Testing · Pile Top Hydraulic Hammer Drive - Down the Hole Chiseling - Round Steel Piling System- Designed, Load Tested, Installed, and Integrity Tested ACIP Piles at Lovers' Key Site in Southwest Florida · Elimination of Heave Forces on Lightly Loaded Piles in Swelling Clay · Design Parameter for Jacked Pile · On the Preparation of a Piling Paper

## **Proceedings of the 23rd Annual Members' Conference, 1998, Seattle**

### **"Geosystems for Future Transportation Systems"**

*Soft cover, 261 pgs., illustrated, 8½"x 11", The 1998 Meeting Committee, Jim Close, Jr., Chair, Tom Armour, Editor.*

12 Papers as follows: Case History: Use of Rock-Socketed Augered Cast-in-Place Piles · Mission Valley Viaduct Piledriving · Integrity Testing-Friend or Foe? · South 196th/200th Street Corridor and Bridge Crossing, Kent, Washington · Ground Freezing for Shoring of Excavations-A Case History · Driven Piles for New Pacific Northwest Baseball Park · Pile Test Results I-15 Corridor Reconstruction Project, Salt Lake City, Utah (Abstract Only) · Use of Micropiles and Soil Nail Piles in State of California Earthquake Retrofit Project No. 569 · Foundation Retrofit Design and Construction for the Benecia-Martinez Bridge, Martinez, California · Deep Mixing Method: A Global Perspective · Vertical Earth Reinforcement Technique-Test Wall · Micropile Foundation Retrofit Design for Richmond-San Rafael Bridge, Richmond, CA.

## **Proceedings of the 22nd Annual Members' Conference, 1997, Toronto, Canada - "Ingenuity '97"**

*Soft cover, 258 pgs., illustrated, 8½"x 11", The 1997 Meeting Committee, Gordon R. Demetrick, Chair, Nyal E. Wilson, Editor.*

17 Papers as follows: Underpinning Support Pipeline Compressor Station founded on Timber Piles · Shoring and Caissons at the Air Canada Centre/Raptors Stadium · Design

and Construction of an Earth Retaining Structure · Soil-Cement Pile Foundations for a Large Tank and Retaining Wall · Support of Excavation System - Columbia Heights Metro Station Project · Construction of Baffle Walls - Sundance Cooling Pond Expansion · Quality Assurance of Augercast Piles with Computerized Monitoring · The Utilization of Static-Load Piledriving near Structures that are Sensitive to Vibration · Innovative Technology for Deep Foundation Soil Mixing · Vibratory Driver/Extractors do more than Drive Sheet Piles · Evolution of the Design and Construction Methods for the TBM Cutterhead Retrieval · Improvement of the Cost-Effectiveness of H-Bearing Piles by using High-Strength Hystar Steels · A Comparison of Static and Statnamic Load Tests in Sand · Static and Dynamic Tests for Evaluation of the Vertical Load Bearing Capacity of Piles · "Untangling the Octopus" Bored-In Pile Construction · Ground Improvement by Cement Grouting Combines with Pipe Piles in Bridge Construction · The Waterloo Barrier - A Sealable Joint Steel Sheet Piling for Groundwater Control and Remediation

### **Proceedings of the 21st Annual Members' Conference, 1996, San Francisco**

*Soft cover, 174 pgs., illustrated, 8½"x 11", The 1996 Meeting Committee, Richard D.Short, Chair, Edward E. Rinne, Editor.*

8 Papers including: Seismic Renovation: South Carolina State House · Design & Construction of the Foundation for Underwater World at Pier 39, San Francisco · A Bracing System Subjected to Dynamic Loading · Modeling & Analysis of the San Francisco/Oakland Bay Bridge: Timber Piled & Retrofitted Foundations · Retrofitting the San Francisco Bay Bridge Approach Ramp with Tubex GI Piles · Determination of Pile Length Using electromagnetic Methods · A New Building Inflicted by the Kobe Earthquake of January 17, 1995 & the Measures Taken to Restore & Strengthen the Foundation-Building System · Micropiles for Seismic Stabilization of West Emerson Street Viaduct.

### **Proceedings of the 20th Annual Members' Conference, 1995, Charleston**

*Soft cover, 216 pgs., illustrated, 8½"x 11", The 1995 Meeting Committee, Henry Whitty, Chair, Donald C. Warrington, Editor.*

14 Papers including: Determination of Design Pile Uplift Capacities Using Dynamic Pile Methods · Dynamic Pile Testing in Soil Exhibiting Setup · Coming to Times · House and Commercial Building Foundation · 8000 Series Piling Rig · Static Load Hydraulic Pile Testing · What Causes Piles to Penetrate · I-880 Dynamic Testing Results · High-Strain Dynamic Testing of Drilled and Cast-In-Place Piles · Drilled Piers with Base Preloading by Grouting · Variable Frequency Vibrators · Sheet Pile installation Vibration Study · Design and Construction - A Case History · Soil Damping in saturated Sandy Soils for Determining Capacity of Piles by Wave Equation Analysis

### **Proceedings of the 19th Annual Members' Conference, 1994, Boston**

*Soft cover, 278 pgs., illustrated, 8½"x 11", The 1994 Meeting Committee, Edmund J. Cardoza, Chair, John R. Roma, Editor.*

16 Papers concerning The Central Artery Project, Third Harbor Tunnel Project and Approaches, and the MWRA sewage Treatment Plant: Multiple Foundation Systems · Unbraced Circular Cofferdam · Large Diameter Rock Socketed Caissons · Tied-Back

Offset Tangent Caisson Retaining Wall · Post-Tensioned Diaphragm Wall T-Panels for Large Unbraced Excavation Spans · Design and Construction of Tied-Down BMIP Boat Section · Sheetpile Wall System · Summary of Pile Adhesion and Creep Data · Use of and Design Parameters for High Capacity Foundation Element · Deer Island · Construction of Effluent Outfall Diffusers · Unique Foundation Solution · Environmental Considerations in Boston · The Hydromill.

## **Proceedings of the 18th Annual Members' Conference, 1993, Pittsburgh**

### **"Looking for Solutions to Put America Back on a Solid Foundation!"**

*Soft cover, 222 pgs., illustrated, 8½"x 11", The 1993 Meeting Committee, Bill Land, Chair, George Goble, Editor.*

Comparative Pile Tests in Alluvial Sand · The Effect of Overburden on Pile Capacity in a Calcareous Marl · Concrete Piles Driven in Coral Sand · Underpinning using Long Minipiles in Compressive Soils · A New Method of Analysis for the Statnamic Load Testing Method · A New Method for Analysis of Pile Displacement in Soil with Respect to Time · Deep Slurry Wall Construction in Hong Kong · Anchored Excavation Support Using SMW · High Capacity Soil Anchors in the Boston Clays · Some aspects of Tie-Back Design and Construction in the UK · Design Considerations for Underground Subway Stations.

## **Proceedings of the 17th Annual Members' Conference, 1992, New Orleans**

*Soft cover, 320 pgs., 8½"x 11" illustrated, The 1992 Meeting Committee, Jack Dougherty Chair, Don C. Warrington Editor.*

17 Papers including: Execution and Evaluation of High Capacity Caisson Load Tests in Glacial Deposits · Pressure Injected Fittings, Mobile Convention Centre · Structural Underpinning by Pinpiles · Roger Buillivant Cone Pile · Pile Design for Offshore Structures Subjected to Subsidence · Cement Bentonite Slurry Cut Off Wall Maxent Lagoon Levee Rehabilitation · Pile Installation Overcomes Numerous Problems at Rocket Component Manufacturing Facility · Treated Round Wood Piling Specifications · Determination of Pile Lengths Under Existing Structures · Monitoring Settlements of a Vacuum Tower. . . Call DFI HQ for a complete list of titles in these proceedings.

## **Proceedings of the 16th Annual Members' Conference, 1991, Chicago**

### **"Recognizing Solutions to Today's Problems and Defining Tomorrow's Challenges"**

*Soft cover, 351 pgs., illustrated, 8½"x 11", The 1991 Meeting Committee, John O'Malley, Chair, Jerry Parola, Editor.*

23 Papers including: Reliability of Pile Prediction Methods · Comparison of Static Pile Analyses and Load Test Results · Resolution of Prestressed Concrete Pile Splice Problems · A Case Study Supporting the Need for a Rational Method for Design and Installation of Vibratory Driven Piles · Permanent Displacement and Pile Driving Vibrations · Reducing downdrag Loads with Bitumen · Augered Pressure Grouted Piles in Complex Glacial Soils-A Case Study . . . Call DFI HQ for a complete list of titles in these proceedings.

**Proceedings of the 15th Annual Members' Conference, 1990, Seattle  
"Lessons of the 80's - Strategies of the 90's"**

*Soft cover, 290 pgs., illustrated, 8½"x 11", The 1990 Meeting Committee, David P. Nicoli, Chair, Joseph L. Frauenheim, Editor.*

20 Papers including: Installation, Design, and Quality Control of Augercast Piles · Drilled pier Foundations in Downtown Seattle · Test pile Program Carrier Pier and South Wharf Naval Station · Installation and Testing of Instrumented Tieback Anchors · Low Strain Integrity of Deep Foundations · Pin piles and Rehabilitating Structures · Mediation of Construction Disputes · Pile Load Test Results Using the New Statnamic Method · Understanding the Vibratory Pile Driver/Extractor: A field Man's Perspective · Sleeved Pile Foundations For the W. Seattle Harbor Island Swing Bridge and the Seattle Access Projects · Mt. Baker Ridge Access Pits and Seattle Bus Tunnel Jet Grouted Piles · Downtown Seattle Transit Project · The Emergence of the Soil-Cement Mixed Wall Technique and its Application in 1980's · Spin Fin Pile Technology . . . Call DFI HQ for a complete list of titles in these proceedings.

**Proceedings of the 14th Annual Members' Conference, 1989,  
Baltimore**

**"Realizing DFI's Potential - A Parallel to Baltimore's Renaissance"**

*Soft cover, 225 pgs, illustrated, 8½"x 11", DFI 1989 Meeting Committee, William J Lytle, Chair and Editor.*

15 Papers including: Steel Sheet Pile Bridge Abutments · New Load Testing Device · Development of the Osterberg Load Cell · Load Testing of Deep Foundations Using the Osterberg Load Cell · Port Orange Drilled Shaft Load Tests · Technical Aspects in Downdrag · development in Coatings to Combat negative Skin Friction · Update of AASHTO Standard Specifications for Highway Bridges · Recommended Specifications for the Design of foundations, Retaining Walls and Superstructures . . . Call DFI HQ for a complete list of titles in these proceedings.

**Proceedings of the 13th Annual Members' Conference, 1988, Atlanta  
"Deep Foundations In Urban Areas"**

*Soft cover, 235 pgs, illustrated, 8½"x 11", DFI 1988 Meeting Committee, Peter Nicholson, Chair and Editor. Out of Print*

18 papers concerning: soil nailing, US DOT foundations specifications, tieback supported walls, small diameter in situ reinforcement piles, highly structured piles to control settlement, augered cast in place piles, ground water control in urban environments, a new multi head hammer drill piling system, a new type of wave equation program, & common sense in dealing with changed conditions.

**Proceedings of the 12th Annual Members' Conference, 1987,  
Hamilton, Ontario, Canada "Advances, Innovation & Ingenuity In  
Deep Foundation Construction"**

*Soft cover, 383 pgs, illustrated, 8½"x 11", DFI 1987 Meeting Committee, Manuel A. Fine, Chair and Editor.*

17 papers including: High capacity piles in the Hamilton Bayfront · Caisson Foundation for High Speed Paper Machine · TPT Piling System · Instrumented Rock Socketed

Drilled Piers · Mini-Piling & Soil Anchors · Resonant Pile Driving · Hydraulic Impact Pile Hammers · Underwater Cable Anchors · An Unusual Permanent Shoring Job · The Spadina Pier Cofferdam · Cofferdam Failures · Tubex - Grout Injected Piles · Slurry Walls in Building Construction · Seattle Shored Excavation · Arbitration - The Tender Trap · Interlocking Caisson Walls.

## **SEMINAR & WORKSHOP PROCEEDINGS**

### **Proceedings - DFI Specialty Seminar, Soil Mixing Seminar- 2001, St. Louis, MO**

*Soft Cover, 109 pgs., illustrated, 8½"x 11", 2001 Soil Mixing Committee, Peter Nicholson, Chair; Robert Jakiel, Program Chair*

9 Papers Including: In Situ Soil Mixing Concepts Explained; Myths Dispelled; Deep Soil Mixing Utilizing Multi-Auger Equipment and Procedures; Single Axis Tooling Methods; Stabilization of Organic Soil with the Limix System; Oakland Airport Roadway Project; Deep Mixing Method An International Overview of Technology, Testing and Product; An Overview of Soil Mixing in the U.S.; Effect of Installation on Quality of Deep Mixed Soil Cement Columns

### **Proceedings - DFI Specialty Seminar, Non-Destructive Testing of Drilled Shafts Seminar- 2001, St. Louis, MO**

*Soft cover, 158 pgs, illustrated, 8½"x 11" 2001 Drilled Shaft Committee, Edmund J. Cardoza Jr., Chair.*

7 Papers Including: Deep Foundation Inspection and Integrity Testing; Non-Destructive Testing for Drilled Shafts; Cross-Hole Sonic Logging and Single-Hole Sonic Logging; Reflections on Pile Integrity Testing; The High-Strain Dynamic Load Test (Drop Weight Test); Rapid Load Test; Bi-Directional Static Load Testing.

### **Proceedings - DFI Specialty Seminar, Augered Cast-In-Place Pile Seminar- 2003, Atlanta, GA**

*Soft cover, 130 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Augered Cast-In-Place Pile Committee.*

9 Papers Including: Local Use and Design of Augered, Cast-in-Place Piles in the Southern Piedmont Province; Installation of Augered Cast-in-Place Piles; Augered Cast-in-Place Pile Inspector's Video Acknowledgements; Quality Control of Augered Cast-in-Place (ACIP) and Drilled Displacement (DD) Piles; Installation of Augerpiles in Low Headroom and Restricted Access Conditions; Construction of a Continuous Flight Auger Secant Wall: Chattahoochee Water Treatment Plant, Atlanta, Georgia; A History of the Use of ACIP Piles for Major Projects in Atlanta; Innovative Use of ACIP Piles and Geogrid to Support Kroger Superstore; Fundamental Issues of Displacement Auger Piling: The European Perspective.

### **Proceedings - DFI Specialty Seminar, Augered Cast-In-Place Piles Seminar- 2002, San Francisco, CA**

*Soft cover, 148 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Augered Cast-in-Place Piles Committee*

8 Papers Including: Installation of Augered Cast-in-Place Pile; Augered Cast-in-Place Pile Inspector's Video Acknowledgements; Quality Control of Augered Cast-in-Place and Displacement Piles; Auger Pressure Grouted Displacement Piles Installed & Tested on the Margins of the San Francisco Bay; The Colosseum at Caesars Palace, Las Vegas: A Case Study of Design Build CFA Foundations; San Bruno Jail Augered Cast-in-Place Pile Case History; Automated Instrumentation for ACIP and Drilled Displacement Piles; and Capitol Area East End Complex Blocks 171 through 174 Sacramento, California: A Case History Involving the Application of APGD and APG Piling Methods.

### **Proceedings - DFI Specialty Seminar, Augered Cast-In-Place Piles Seminar- 2001, Pittsburgh, PA**

*Soft cover, 143 pgs., illustrated, 8"x 11½", Sponsoring organization: Deep Foundations Institute, Augered Cast-in-Place Piles Committee*

8 Papers Including: Augered Cast-in-Place Piles: Regional Project Profiles · Predicting ACIP Pile Settlement Using Case Histories · Case History: Augered Cast-in-Place Piles for the Pittsburgh International Airport Midfield Terminal · Pittsburgh Steelers Stadium - Deep Foundations Case Study · Augered Cast-in-Place Pile Quality Control · Augered Cast-in-Place Pile Inspector's Video Acknowledgements · Installation of Augered Cast-in-Place Piles · Augered Cast-in-Place Concrete Piles in Flood Plains

### **Proceedings - DFI Specialty Seminar, Augered Cast-In-Place Piles Seminar- 2000, St. Louis, MO**

*Soft cover, 180 pgs., illustrated, 8"x 11½", Sponsoring organization: Deep Foundations Institute, Augered Cast-in-Place Piles Committee*

8 Papers Including: Augered Cast-In-Place Pile Inspector's Video · Installation of Augered Cast-In-Place Piles · An Evaluation of Augered Cast-In-Place Pile Design Methodologies for Compression Load in Sand · Static Load Testing-How important is it? · Dynamic Load Testing of Augered Cast-In-Place Piles · Statnamic Load Testing; Overview and Case Histories of Augered Cast-In-Place Piles · Instrumented Static Load Testing Auger-Cast-In-Place Piles May 12, 2000 St. Louis Missouri · New Technologies For Quality Control of Augered Cast-In-Place Piles

### **Proceedings - DFI Specialty Seminar, "Augered Cast-In-Place Piles Seminar- 1998, Houston, Texas."**

*1998, Soft cover, 151 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Co-Sponsor: GeoInstitute, Augered Cast-In-Place Piles Committee*

5 Papers Including: Keynote Lecture: Axial Design and Lateral Design · Installation of Augered Cast-in-Place Piles · Pile Installation Recorder Tests for ACIP/CFA Piles · Quality Control for Augered Cast-in-Place Piles in Texas and Louisiana · Jobsite Safety Inspection Checklist

### **Proceedings - DFI Specialty Seminar, "Augered Cast-In-Place Piles Seminar- 1997, Orlando, Florida."**

*1997, Soft cover, 110 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Augered Cast-In-Place Piles Committee*

8 Papers Including: An Overview of Augered, Cast-In-Place Piles in Florida. · Design of Augered CIP Piles · Installation of Augered CIP Piles · Quality Control for installation of Augered CIP Piles · Quality Control System for Augered CIP Piles · Practical experience with non-destructive testing of Aug. CIP Piles · Earth Retention using Augered CIP Piles · Contractual Pitfalls to Avoid with Augered CIP Piles

### **International Workshop on Micropiles 1997, Seattle, Washington**

*Soft cover, 463 pgs., Illustrated, 8½" x 11", 1997 Micropile Committee, Donald Bruce, Chair;*

16 papers from four sessions covering: Geotechnical Assessment & Construction; Reinforcement Design; International Standards & Programs; Applications & Implementation. Also included are introductory remarks by Dr. Donald A. Bruce, Dr. Al DiMillio, Prof. Hoshiya, Dr. Okahara and Prof. Schlosser, as well as two problem solving exercises and future needs assessment. . . .Call DFI HQ for a complete list of titles.

### **Proceedings - DFI Specialty Seminar, "I-880 Replacement Project (Cypress Freeway) Large Diameter Driven Pipe Pile Foundations Test Program & Construction."**

*1996, Soft cover, 130 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Cooperating Organization: California Department of Transportation (CALTRANS)*

6 papers concerning the design and construction of the replacement structure to the 880 Cypress Viaduct destroyed in the 1989 Loma Prieta earthquake. The replacement structure was designed using the state-of-the-art earthquake-resistant design employing large diameter driven steel pipe piles.

### **Proceedings - CalTrans Pile Load Test Results at a Deep Bay Mud Site Using Various Pile Types**

*1993, Soft cover, 500 pgs, illustrated, 8½"x 11", Sponsoring organization: Deep Foundations Institute, Cooperating Organizations: California Department of Transportation (CalTrans) and FHWA.*

CALTRANS, in association with FHWA and private business, conducted axial load tests of various pile types in deep soft soils. The tests investigated two conditions: (1) adhesion (I.e., piles installed only in deep bay mud) and (2) adhesion plus bearing in non cohesive material. The proceedings contain the results of installation and testing of the CALTRANS standard piles and proprietary piles, and CALTRANS seismic upgrade criteria and geotechnical investigation requirements.

### **Design and Construction Options for Heavy Load Bearing Foundations**

*Soft cover, 238 pgs., illus., 8½"x 11", 1988 DFI/NCSU/ASCE Joint North Carolina University Seminar Committee, Prof. Harvey E. Wahls, Chair and*

### *Editor; Out of Print*

Includes five papers on Drilled Shafts , a paper on design and installation of driven piles, two papers on load test procedures and evaluation, and two papers: "The Advantages of Arbitration," and "You Are Safer in Litigation," concerning the legal aspects of deep foundations construction.

## **INTERNATIONAL CONFERENCE PREPRINTS & PROCEEDINGS**

### **Proceedings - Ninth International Conference on Piling and Deep Foundations, 2002, Nice, France**

*Soft cover, 397 pgs., illustrated, 6 1/2"x 9 1/2", Nice Conference Organizing Committee, Alain Pecker, Chairman*

89 papers from the following 9 session subject topics: Information Technology & Monitoring; Case Histories, Part 1, Dynamics in Foundation including Earthquake Engineering, Piled-Raft, Eurocode 7 & 8 - Execution Euronorms; Case Histories, Part 2; New Trends in Design in Relation with Installation Procedure; Contractual Aspects in Foundations, Soil Risk, Benchmarking; New Trends in Design - Load Tests Results. Also included is three complementary papers as follows: "Piling the Gateway to Europe", "Recovery Efforts at the World Trade Center Bathtub", and "Construction of a Pre-founded Anchored Wall, Monitoring of Execution Based on the Eurocode 7 Observation Method, and Taking Account of the Transmission of Seismic Forces in the Retaining Structures towards the Building's Structure" . . . Call DFI HQ for a complete list of titles in these proceedings.

### **Proceedings of the 25th Annual Members' Conference and Eighth International Conference and Exposition, 2000, New York NY**

*Soft cover, 637 pgs., illustrated, 8 1/2"x 11", New York City Organizing Committee*

54 papers from the following 4 session subject topics: How Geology has Driven Foundation Practice Worldwide, Industry Trends and Up and Coming Innovations, Foundation Techniques in the Urban Environment, and Notable International Projects. . . . Call DFI HQ for a complete list of titles in these proceedings.

### **Seventh International Conference & Exhibition on Piling and Deep Foundations, 1998, Vienna, Austria**

*Soft cover, 624 pgs., illustrated, 8"x 11 1/2", Vienna Conference Paper Review Committee, Editors.*

74 papers from the following 5 session subject topics: Quality Assurance & Testing; Codes and Standards; Environmental Issues; Equipment; Case Studies. Also included is the John Mitchell Lecture titled "The Image of the Civil Engineer in Society from an Ethical and Philosophical Aspect" written and presented by Professor Heinz Brandl, Dr. Techn., Dipl-Ing., technical University Vienna . . . Call DFI HQ for a complete list of titles in these proceedings.

### **Proceedings - Sixth International Conference - & Exhibition on Piling**

## **and Deep Foundations, 1996, Bombay, India**

*Soft cover, 380 pgs., illustrated, 8"x 11½", Bombay Conference Committee, Rao Surrendra Singh, Chair, the Paper Review Committee, editors.*

66 papers from these 5 different subject topics: Innovation: Environmental Impact Due to Deep Foundation Elements; Case Histories; Quality Control and Assurance; Codes and Specifications - Flexibilities . . . Call DFI HQ for a complete list of titles in these proceedings.

## **Proceedings - Fifth International Conference & Exhibition on Piling and Deep Foundations, 1994, Bruges, Belgium**

*Soft cover, 539 pgs., illustrated, 8"x 11½", Bruges Conference Committee, Alexander Verstaeten, Chair, the Paper Review Committee, editors.*

72 papers from five conference Sessions Covering: Impacted, Drilled, Grouted and Vibrated Piles; Environmental Considerations During Deep Foundation Elements Penetration; Equipment; Quality Control and Assurance; Case Histories . . . Call DFI HQ for a complete list of titles in these proceedings.

## **Proceedings - Fourth International Conference - Piling and Deep Foundations, 1991, Stresa, Italy**

*Hard cover, 848 pgs., illustrated, 8½" x 12" 2 Volume, the '91 Stresa Conference Committee, Ambrogio Fioruzzi, Chair; The Paper Review Committee, editors.*

Two volume hardcover set containing over 100 papers from the conference sessions. The papers are categorized into the following subject areas: Recent Developments in Deep Foundations with Soil Excavation; Recent Developments in Deep Foundations without Soil Excavation; Recent Developments in Pile Design; Installation Equipment; Pile Testing. A special collection dealing with "EUROCODE 7 and Standardization" prefaces the book . . . Call DFI HQ for a complete list of titles in these proceedings.

## **Theory and Practice of Piling and Deep Foundations in China**

*Soft cover, 256 pgs., illustrated, 7"x 10", The China Deep Foundations Institute, Prof. Xu Rong Lie, President and Chief Editor. Printed in China by the China Architecture and Building Press. Limited Edition.*

A Chinese edition, written in English, for the '91 Stresa 4th International Conference preprint book. 35 papers cover the same subject topics as the above 4th International Conference Proceedings.

Case histories are included. Information about the use of stone columns, large caissons, testing and quality control procedures is given. The use of mechanically biased, vibratory pile drivers is discussed. "Theory and Practice in Deep Foundations" sums up problems and developments in piles and deep foundations in recent years in China.

## **Proceedings - Piling and Deep Foundations - 3rd International Conference, 1989, London, England**

*Hard cover, 624 pgs., illustrated, 8½" x 12" 2 Volume, the '89 London Conference Committee, Malcolm Miles, Chair; John Mitchell & John Burland, editors.*

Two volume hardcover set containing 70 papers from the conference sessions. The papers are categorized into the following subject areas: Special Foundations; Maritime

Structures; Basement Construction; Piling Problems; Rock Sockets; Driven Piles; Instrumentation and Interpretation; Pile Testing Methods; Base grouted Piles . . . Call DFI HQ for a complete list of titles in these proceedings.

## **2nd International Conference Preprint - '87 Luxembourg**

*Soft cover; 375 pgs, illustrated, 8½" x 11", the '87 Luxembourg Conference Committee, Marc Dondelinger, Chair, the Committee, Editors. Limited Edition.*

22 papers including: The History of Luxembourg · Analysis of Vibratory Driven Pile · Application of, and Experience with, an Electronically-Controlled Pile Hammer · Comparisons of Static Load Test and Dynamic Pile Testing Results · Computation of the Load/Settlement Behaviour of HP-Bearing Piles · Current Pile driving Practice in the United States · Top-Down Building Techniques in the USA . . . Call DFI HQ for a complete list of titles in these proceedings.

## **Proceedings of the International Conference, 1986, Beijing, China**

*Hard cover; 796 pgs., illustrated, 8½" x 11", two volumes The '86 Beijing Conference Committee, William F. Loftus, Chair, Publications Committee of ICDF, Editor. Printed in China. Limited Edition*

Two volume hardcover set containing 160 papers from the conference sessions. The papers are categorized into the following themes: Ground Improvement; Piles & Piers; Excavation & underground Construction; Miscellaneous Topics . . . Call DFI HQ for a complete list of titles in these proceedings.

# **JOURNALS**

## **Deep Foundations Journal Spring 1986**

*Soft cover, 84 pgs., illustrated, 6"x9" saddle stitched, Publications Committee, G. Robert Compton, Jr., Chair; Hal W. Hunt, Editor.*

6 Papers including: Dewatering Practice for Deep Basements in Hawaii · Allowable Compressive Design Stresses for Pressure-Treated Round Timber Foundation Piling · Crane Boom Loadings from Pile Driving · Case History on Pipe Pile installation · Understanding Soils reports · Long Term Behavior of Piles

## **Deep Foundations Journal Spring 1985**

*Soft cover, 65 pgs., illustrated, 6"x9" saddle stitched, Publications Committee, G. Robert Compton, Jr., Chair; Hal W. Hunt, Editor. Out of Print*

5 papers including: A review of Typical Foundations Used in the City of Cleveland · Interlocking H-Sections for Cofferdams Resist High Pressure · Differing site Conditions · A Need to Reevaluate Attitudes in Engineering and Construction · Tanana River Bulkhead Expansion, Flexibility in Construction; Key to Arctic Dock Construction.

## **Deep Foundations Journal Spring 1984**

*Soft cover, 63 pgs., illustrated, 6"x9" saddle stitched, Publications Committee, G. Robert Compton, Jr., Chair; Hal W. Hunt, Editor.*

6 papers including: History and Present Status of piles and their Installation in the US · History of Timber Piles and Preservation Techniques · Dynamically Cast-In-Place Piles · Foundations for the Sohio Corporate Headquarters · Wave Equation Analysis and Dynamic Monitoring · Effective Dewatering is more than a Pump in the Hole.

## **STANDARDS**

### **Standard Testing Method for Deflection Characteristics of Pile Driving Cushion Material**

*Soft cover, 27 pgs., Illustrated, 8½" x 11", stapled, the 1983 Equipment Applications Committee, Manuel A. Fine, Chair; David M. Rempe, Primary Author; Alan G MacKinnon, Editor.*

The method defines a standard procedure for compression testing of cushion materials used between pile hammers and a pile. The results are load deflection characteristics which provide input data for wave equation analysis of pile driving.

## **MODEL CLAUSE**

### **100 Day Document - Mandatory Discussion. Mediation and Arbitration of Construction Disputes**

*5½" x 8½", pamphlet, 4 pgs., 1987, Deep Foundations Construction Industry Roundtable.*

Seven model clauses to be included in contracts for design, engineering, construction & related agreements to invoke mandatory discussion, mediation & arbitration to settle contract disputes in a timely, reasonable & equitable fashion.

## **AUDIOVISUALS**

### **Comprehensive Pile Load Testing Program, McDuffie Island Coal Terminal, Mobile, AL**

*VHS video cassette, 37 minutes, the 1981 Special Projects Committee, Jack Dougherty, Chair; G. Robert Compton, Jr., Editor.*

A basic introduction to handling, installing and testing load bearing piles: timber, H beam, pipe, shell, Monotube and pre-cast concrete.

Details of setting up and conducting both reaction beam and dead load piles tests are covered. The program provides insight into problems confronted and the methods used in mobilizing a major pile testing program.

### **Drilled Shaft Inspector's Video**

*VHS video cassette, 32 minutes, 1990, the ADSC.*

Augments the Drilled Shaft Inspector's Manual by joint committees of DFI and ADSC. The manual is included.

Primarily targeted to geotechnical consulting firms and their inspectors, the presentation can help contractors' drilling personnel better understand the role of the drilled shaft inspector on the jobsite.

### **Augered Cast-in-Place Piles Installation Video**

*VHS video cassette, 20 minutes, the 1998 Augered Cast-in-Place Pile Committee, Tracy Brettmann, Chair; Tracy Brettmann, Editor.*

Describes the installation of augered cast-in-place piles, including the various pieces of equipment and materials used in construction. Contains animation of drilling through a layered subsurface, grouting of the pile and installation of reinforcing steel. This video is a companion to the Augered Cast-In-Place Piles Manual and is intended for contractors, owners, design engineering firms and geotechnical consultants.

### **Inspector's Guide to Augered Cast-in-Place Piles Video**

*VHS video cassette, 28 minutes, the 2000 Augered Cast-in-Place Pile Committee, Tracy Brettmann, Chair, Rudy Frizzi, Editor.*

Describes the techniques used in the inspection of augered cast-in-place piles to augment the Inspector's Guide to Augered Cast-In-Place Piles publication. This video closely follows the Inspector's Guide and is primarily intended for contractors, geotechnical consultants and their inspectors.

### **Inspector's Guide to Augered Cast-in-Place Piles CDROM Quicktime Video & Viewable Adobe PDF**

*CDRom, 2001 Augered Cast-in-Place Pile Committee*

New Release! CDROM Inspector's Guide to Augered Cast-in-Place Piles Quicktime Video & Inspector's Guide to Augered Cast-in-Place Piles in Viewable Adobe PDF. CD contains Quicktime Video, Inspector's Guide in Adobe PDF, Quicktime Install, Adobe Reader Install. Windows and Mac platforms supported. Video describes the techniques used in the inspection of augered cast-in-place piles to augment the included Inspector's Guide to Augered Cast-In-Place Piles publication. This video closely follows the Inspector's Guide and is primarily intended for contractors, geotechnical consultants and their inspectors.

## **REFERENCE**

### **2000 Desk Directory of Foundation Construction Specialists**

*Soft cover, 128 pgs*

Member Engineering Firms, Contracting Organizations, Materials, Services and Equipment Suppliers and Manufacturers listed alphabetically. Each listing identifies contact individuals, and the Services, Materials or Equipment offered by the Organization. Telephone, Fax and Internet information is also included. An index by discipline and

services is provided. The Directory is an invaluable tool for the foundations industry professional. THIS BOOK IS FREE WITH ALL PUBLICATIONS ORDERS.

# Journals

# Standards

# References

# Catalogs

# Directory

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