Q&A

with

Dennis Doherty
P.E., F.ASCE

FOUNDING CHAIR OF NASTT-NE CHAPTER INDUCTED INTO NASTT HALL OF FAME

Dennis Doherty, P.E., F.ASCE, is a versatile senior principal engineer with Kleinfelder having proven experience and national recognition as a leader in trenchless technology. Dennis has more than 40 years of industry experience—the last 30 of which have been focused on design, construction, and management of underground infrastructure. Described as applying a "think outside the box" approach to his projects, he has successfully delivered significant projects involving environmentally sensitive sites, congested urban areas, river/body-of-water crossings, and sites with challenging terrains.

A NASTT member since 1992, Dennis has been a champion of bringing trenchless technology to the next generation. His efforts raising money for NASTT's Education Fund and sponsoring NASTT student chapters provided resources for student scholarships and attendance at the NASTT No-Dig Show and regional conferences. He is helping UMass Lowell develop a first-of-its-kind, graduate-level certificate in trenchless technology, which will count toward a Master's degree in civil engineering. Dennis also helped found the NASTT-NE Regional Chapter in 2016, and is the Founding Chair of this organization.

Dennis believes in continuous lifelong learning and self-improvement in a holistic approach to life. His approach to solving engineering problems is based on risk-based engineering principles. In his spare time, Dennis enjoys his dogs Rylee and Daisy, his wife Debra, his immediate and extended family, and his grandchildren. His hobbies include cooking, gardening, long rides with Debra, New England sports, drum corps, and hanging out with the dogs.

In a wide-ranging interview, Dennis describes his early exposure to trenchless technology, details milestone projects in his illustrious career, and shares his ideas on fostering the next generation of trenchless technologists:

What first inspired you to become interested in construction & engineering field, particularly underground construction?

I liked playing in the mud when I was a kid; I would use toy trucks, dozers, etc. to construct sites. Later, I took up designing things on paper. I knew I wanted to be an engineer, and in 1974, I entered Lowell Technological Institute (now UMass Lowell) where I received an excellent education that prepared me well for the real world. While at Lowell I became Managing Editor of the student newspaper, The Connector. This experience taught me a lot about communicating properly with people to get a message out. I also competed at a world class level in Drum Corps International (DCI). I was with the 27th Lancers Drum & Bugle Corps. We were always in the mix for the world championship. This experience taught me how to work with large groups of people for a common goal, how to persevere, work hard towards a goal, and leadership skills.

I started out working for a small construction company, but shortly after, I moved into structural engineering. I worked on nuclear power plants designing piping and pipe support systems. This work required living near the power plant you were assigned to. My wife, Debra, we first met when we were 11 /12 years old, dated throughout high school, went our separate ways in college and somehow found each other again. We have now been married 38 years, with 4 children and 2 grandchildren. When our kids got of school age, we decided to settle down back in New England so the kids would not have to jump from school to school and they could be near relatives. I took a job with a small civil engineering firm, but within a year, I moved to Bryant Associates in Boston.

"I LIKED PLAYING IN THE MUD WHEN I WAS A KID... LATER, I TOOK UP DESIGNING THINGS ON PAPER."

A Connector staff meeting

"I WOULD LIKE TO SEE NASTT AND THE INDUSTRY IN GENERAL DEVELOP DEGREED ENGINEERS IN TRENCHLESS TECHNOLOGY."

Competing in DCI

Outline your experience of first being introduced to trenchless technology methods and applications.

It was at Bryant Associates where I was first exposed to trenchless. In 1988/1989, I worked on the South Boston interceptor rehab project using a Gunite lining to rehabilitate the sewer. In 1990/1991, I was assigned to solve the problem in the Back Bay section of Boston where the existing old sewer system was drawing down groundwater to the numerous buildings on wood piles. When the tips of the piles are exposed to air above the groundwater table, they rot and buildings settle. The area was highly urbanized and historic. A detailed study was conducted that reviewed and compared numerous trenchless methods that were applicable to solving the problems. The project eventually included microtunneling, pipe bursting, CIPP lining, and Gunite lining. The project eventually won both Trenchless Project of the Year awards for New Installation and Rehabilitation – it's quite an accomplishment to win both awards in the same year! I have since been involved with five other New Installation Trenchless Projects of the Year and several runner ups and honorable mention projects.

After Bryant Associates, I worked for Metcalf & Eddy (now part of AECOM) where I collaborated with John Hair on my first HDD project. I was also involved with 36,000 feet of large diameter slip lining of the Big Creek Interceptor in Cleveland. There is a case study of the project in Dr. Mo Najafi's Trenchless Technology book "Pipeline and Utility Design, Construction, and Renewal" (WEF Press 2004), Section 14.10. I moved on to Jacobs Engineering where I was exposed to trenchless work, all over the world. Even got to test fire rockets at NASA's Stennis Space Center to study the massive fire deluge system and how best to rehabilitate the piping system.

But the project I am most proud of is the East Boston Branch Sewer for the Massachusetts Water Resources Authority (MWRA). Having grown up in the town of Winthrop right next door to East Boston, I knew the area well. An old combined sewer system in East Boston was a large contributor of sewage overflows into Boston's Inner Harbor. I became involved with this project while at Bryant. In fact, East Boston is modeled after St. James. Being involved from concept to end of construction, the project

was another Trenchless Technology Project of the Year. But the most important part was seeing marine life like seals and whales returning to Winthrop Harbor that was my playground growing up.

I also spent 10 years at Haley & Aldrich before moving over to Kleinfelder at the beginning of the Covid pandemic. At Haley & Aldrich, we worked on many high voltage power transmission projects using trenchless methods, including last year's Trenchless Project of the year, The Rappahannock River crossing acting as owners' rep during the preliminary design.

How did you first get involved with NASTT? What are some of the goals and initiatives you would like to see NASTT pursue?

I attended my first No Dig show in Washington, DC in 1992 and was amazed at the combinations of technologies that can be used to maintain and install needed underground horizontal infrastructure. These new tools allowed me to be creative in identifying and solving our underground horizontal infrastructure challenges. Outside of the past two years (due to the COVID pandemic), I have only missed two No Dig events since 1992. I became involved with the standardization of methods and contributed to many manuals of practice. The two documents I am most proud of are the ASCE

Past presidents dinner with the Northeast Regional Chapter and the former Northeast Trenchless Association

Overboarding pipe from fixed platforms for twin 17,000-foot HDD crossing of York River Power transmission project

Standard Design and Construction Guidelines for Microtunneling, where I was a principal author responsible for sections on planning and being Chair of the Blue-Ribbon Review Committee for the NASTT HDD Good Practices Manual, 4th edition.

With respect to goals and initiatives, I would like to see NASTT and the industry in general develop degreed engineers in trenchless technology. There is currently no degree in trenchless engineering, yet the wealth of knowledge required to successfully plan, design, and construct a trenchless project is highly specialized. This book of knowledge is no different than the book of knowledge for project managers, electrical engineers, geotechnical engineers, and so forth. It is specialized and should be recognized as such. The book of knowledge required to be a successful trenchless engineer is now well established; the issue is finding faculty to teach the various topics. I put together an eight-course curriculum for UMass Lowell to allow students to receive a Certificate in Trenchless Engineering where the credits also apply toward a master's degree in engineering. Four classes are required, with two classes focused on either new installation or rehabilitation, and two common courses – one on all methods and one on risk

HDD in historical downtown Atlanta

management for trenchless projects. We plan on starting small by offering a single hybrid online/in person class. I also would like to develop the Center for Excellence in Trenchless Technology and Underground Engineering (CETTUE) at UMass Lowell. I need a hobby for when I retire.

MWRA and East Boston Branch Sewer team accepting TT Project of the Year

What are your thoughts on the current state of the trenchless industry? What areas do you see evolving in STEM education and post-secondary academics?

We should start getting students interested and involved in high school, and even offer classes at vocational schools in the skills needed to be on an active trenchless construction site. The small rig manufacturers have done a good job developing training for operating small rigs. But I think the industry needs to step up and engage the high school and vocational school students. For those more interested in the engineering aspects of trenchless, I strongly believe that a degreed trenchless engineer will bring significantly more value to the industry than just trying to plug and play engineers that are not fully interested in a career in trenchless.

Is the trenchless industry generally doing a good job of attracting young professionals? What do you think can be done to better engage students and young professionals in the trenchless industry?

The Northeast Regional Chapter for NASTT goal is to have at least one higher education institute in each of the seven states in our region. We had plans to start a chapter at Quinnipiac University when COVID hit, causing many on-campus activities to cease. However, now that life has adjusted to COVID and students are re-engaging with campus activities, we need to renew our efforts and goals. I think it is critical that the industry engage and attract young engineers into this industry because the growth will not stop. Our recent regional conference at the US Military Academy at West Point has resulted in a strong interest by the West Point Department of Civil Engineering; they have requested a detailed presentation on all things trenchless. The conference this fall will be in Portland, Maine – a short drive for students at the University of Maine, University of New Hampshire, and UMass Lowell. The intent is to invite interested students and faculty from each institute.

Biggest challenges facing the trenchless industry today? Has acceptance and understanding of trenchless technology improved?

The biggest challenge facing the trenchless industry is limited resources to design and construct a successful trenchless project. Too many people are drawing lines on a piece of paper and calling it designed, when in fact they do not understand the intricacies

"I AM A BIG PROPONENT OF USING RISK-BASED ENGINEERING PRACTICES FOR TRENCHLESS PROJECTS."

With students from UMass Lowell Student Chapter checking out microtunnel project in Springfield, MA

of a trenchless design and often try to pass off the risk to the contractor. Conversely, many contractors could increase their knowledge and not take shortcuts in best practices. I am a big proponent of using risk-based engineering practices for trenchless projects. Understanding cause and effect of the various trenchless methods is a big step in managing risk associated with trenchless projects. The use of risk management methods for trenchless is growing, particularly in the private energy market and with public regulatory agencies. For example, the Pennsylvania Department of Environmental Protection (PADEP) is adapting some of my writings on the risk management topic to their developing standards for HDD projects. Additionally, a major energy company has developed a four-tier system for identifying and managing risk of trenchless projects based on alignment complexities. These initiatives will only require engineers and contractors to step up their game if they want to win work consistently.

Maintaining 2-way traffic in tight urban setting for microtunneling on East Boston Branch Sewer

Northeast Regional Chapter Board of Directors meeting

What do you personally enjoy most about working in the trenchless technology field?

With over 30 years in the industry, there are too many to list; if I tried, this article would be a 1,000-page book. However, the many relationships I've built over the years are certainly a career highlight worth mentioning. Bill Gray and Tom Iseley got me hooked on the industry, and I can call about half of the people in the Hall of Fame a friend, as I have worked and collaborated with them. When I got news of my induction, one of the first people I called was my friend Frank Cannon. I also spoke with my co inductee Mike Willmets. Paul Nicholas, my other co inductee, taught me about microtunneling way back in the days of St. James Ave. I have worked with many engineers, many on the NASTT Board of Directors. Perhaps the most influential person though, was my good friend Ron Halderman (RIP). We collaborated on projects together for 20 years, including last year's Trenchless Project of the Year. I am forever grateful for the knowledge he openly shared with me.

How do you foresee trenchless applications developing in the next decade?

I foresee the use of passive sonar in identifying the geology being microtunneled or drilled (HDD) with the use of virtual/augmented reality to "see" the ground you are going through. This is already being developed at the academic level. Although it may be possible to use AI for design and construction, such as Georgia Tech's Ant Colony Optimization theories, it still needs development.

Any further reflections as you become an honored member of the NASTT Hall of Fame?

I am not sure why I deserve this honor, considering I was only doing what I love to do. Strangely, when I checked with some of my friends in the Hall of Fame, they felt the same way, so I guess I am in good company. When you realize there are only 31 people in a billion-dollar industry with this honor, it requires some retrospect and reflection. These are all pioneers in this industry, but I do not consider myself a pioneer. I am in awe of this honor and realize the industry bestowing this honor on me will memorialize me; that is humbling. Not bad for a guy doing what he loves to play in the mud and develop processes to achieve a specific project goal!