

Course Description Sheet

COURSE TITLE

Smart Trenching: Installation, Renewal, Risk

COURSE DURATION

1 Hour(s)

OVERVIEW

Trenchless technology has changed the way utilities are built and maintained underground. Open-cut methods are undesirable for the site, take longer, and cost more. Trenchless methods, on the other hand, produce less surface disruption, work better, have less of an effect on the environment, are better accurate, and make the working site safer.

This course covers three essential aspects of trenchless engineering: installation methods (Horizontal Directional Drilling, Pipe Jacking, Pipe Ramming, and Guided Boring), renewal techniques (CIPP rehabilitation, sliplining, and innovative approaches), and risk assessment (failure modes and root causes). These topics are critical for engineers to develop resilient, durable pipeline systems.

PREREQUISITES

No prior knowledge is required.

BEHAVIORAL OBJECTIVES

After successfully completing this course, you will be able to:

- Understand the principles and advantages of trenchless installation methods compared to traditional excavation
- Identify and differentiate between major trenchless installation techniques and their applications
- Evaluate trenchless renewal methods and select appropriate solutions based on project conditions
- Explain the concept of risk in pipeline systems and recognize key potential failure modes (PFMs)

COURSE OUTLINE

Chapter	Minutes
Introduction	1
Trenchless Installation	1
Horizontal Directional Drilling (HDD)	7
Pipe Jacking	2
Pipe Ramming	3
Guided Boring	3
Trenchless Renewal	1
Cured-in-Place Pipe (CIPP)	7
Sliplining (SL)	9
In-Line Replacement (ILR)	4
Spray-in-Place Pipe (SIPP)	5
Close-Fit Pipe (CFP)	5

Risk in Pipeline Systems	11
Conclusion	1
Course Total	60
+ Knowledge Checks (10% Course Total)	6
= Grand Total	66

AVAILABILITY

This course is offered online and is available 24 hours a day, 7 days a week, 365 days a year.

TRAINING METHODOLOGY & EVALUATION

This course is self-paced online training. Review exercises reinforce the content, and students are evaluated with a multiple-choice exam. Upon completion, students are prompted to submit a course evaluation.

REFERENCES

Adamtey, Simon Asinor, et al. Case Study of the Replacement of Corrugated Metal Pipe (CMP) Culverts Using Pipe Bursting. North American Society for Trenchless Technology (NASTT) No-Dig Show, 2016.

Grams, Willie. "CIPP Used to Reline Wisconsin Culvert in Winter." Trenchless Technology, 20 Mar. 2017, <https://trenchlesstechnology.com/cipp-relining-in-the-winter/>.

Mishra, Tabitha. "The Process of Pipe Ramming." Trenchlesspedia, 30 Apr. 2021, <https://trenchlesspedia.com/the-process-of-pipe-ramming/2/3448>.

Najafi, Mohammad, et al. Preparation of Construction Specifications, Contract Documents, Field Testing, Educational Materials, and Course Offerings for Trenchless Construction. University of Missouri-Columbia, Oct. 2005.

Ward, David C. The Renewal of Stormwater Systems Using Trenchless Technologies. Transportation Research Board (TRB), 2018. NCHRP Synthesis 519.

U.S. Army Corps of Engineers. Conduits, Pipes, and Culverts Associated with Dams and Levee Systems. EM 1110-2-2902, U.S. Department of the Army, 2020.