DAILY SCHEDULE AND DESCRIPTION OF CLASSES

Subject to slight modifications.

MONDAY – ENGINEERS' TRACK

1 Welcome and Introductions ... 30 min .... Simicevic

Overview of week ahead. Introduction of instructors.

2 History & Capabilities of Auger Boring ... 60 min .... Iseley

Classroom presentation and discussion on the history of Auger Boring starting in the 1930's in the coal mining industry as a means to increase productivity. Auger Boring provides an economical means to cross under surface obstructions. The industry mainly serves the utility industry. Utility demands in high density traffic and politically and environmentally sensitive areas have provided opportunities for both contractors and manufacturers to modify this simple equipment. Today's equipment and techniques enhance the range of ground conditions that can be economically bored and to enhance the precision of the equipment to better serve gradeline sensitive utility requirements. The past 10 plus years has seen accelerating equipment advances and new contractor skills developed to economically address the ever expanding utility and pipeline market needs.

3-E ASCE MOP 106 ... 60 min .... Marquis

The MOP 106 is presented to emphasize the usefulness of this manual to owners and engineers. The objectives and responsibilities of owners and engineers in auger boring projects are clarified:
The Owner has the need and gets the benefit from an Auger Boring crossing The Owner is responsible for bringing an Auger Boring project that is constructible and properly funded to the table. The Owner/ Engineer typically specifies the use of Auger Boring thus the Owner/Engineer is responsible for the decision that the Auger Boring technique can be used to successfully complete a crossing. An Owner may retain specialists such as permitting specialist, engineers and construction managers to define conditions associated with a crossing along with budgeting, design and schedule.

4-E Defining Project ... 75 min .....Marquis/Strater

Project stakeholders define the project: Owner, Regulators, Engineer(s), Permitter, Property Owners, Impacted Public, and Contractor. This session will emphasize and discuss the communication and coordination between stakeholders including scope schedule and specifications. It includes discussions on the specification process and meaning of specifications as a communication tool. Perspective: Merge and manage expectations of all stakeholders necessary to deliver a successful project. The session will discuss how owner/engineer will:

1. Define the project and associated stakeholders.
2. Determine stakeholder conditions for success including need for project insurance such as bonding or specific policy coverages.
3. Acquire adequate space for construction and final alignment, including construction access, work space, staging area, etc.
4. Acquire project database: Utilities, Property Ownership, Subsurface Data
5. Design the project construction sequence and conditions and permanent features based on the Owner's project objective, and stakeholder conditions. Local sensitive features where Engineer designs the jacking pits or contractor design pits with given criteria.
6. Define the budget, schedule and associated design risks with associated source of funding based on project conditions and data base.
7. Communicate (Specifications and Plans) adequate information to Contractor to develop cost and schedule based on material acquisition, production rates, ancillary work such as work shafts and site preparation, reviews, funding needs based on project payment schedule from Owner, and quality control parameters to measure compliance with project conditions and design assumptions.
8. Prior to construction, verification that Contractor understands the Specifications and Plans through the submittal process.
9. During construction compliance verification of design assumptions and project conditions with quality assurance data including subsurface conditions. Acknowledge variances from design assumptions and fairly assess cost and schedule.
10. Define Substantial Completion, punch list, demobilization including site restoration

11. Require accurate final as-built information to adequately protect the construction from future construction damage.
12. Records turn over

5-E Subsurface Conditions ... 60 min .....Marquis/Strater

Importance of subsurface conditions on planning, design and construction of auger boring projects will be discussed.

Discussions on what engineer needs to know about subsurface conditions and consider when designing the auger boring project. The session will include:

1. Desktop study - Identify issues
2. Desktop study utilities – Identify issues
3. How to survey site for dimensioning and elevation to have accurate base including property lines.
4. Explorations to verify and establish design parameters of subsurface conditions.
5. Explorations to verify critical utilities that can impact design alignment.
6. Laboratory study to establish design parameters.
7. Engineering to determine ground reaction to excavation of tunnel and pits.
8. Develop soil loading diagram for contractor pit design.
9. Develop design constraints to comply with permit conditions and to address security of adjacent properties owned by others.
10. Review short term and long term loads on pipe.

6-E Dewatering ... 30 min..... ..... Sunhachawi

Dewatering involves controlling groundwater by pumping, to locally lower groundwater levels in the vicinity of the construction site. Importance of dewatering in planning and design and construction of auger boring projects will be explained.

Discussions on what engineer needs to know about groundwater conditions and consider when designing dewatering for the auger boring project. The session will discuss how to:

1. Determine if dewatering is needed for stability. If so, what to specify so it can be priced.
2. Establish design parameters for contractor design.
3. Establish payment.
4. Establish performance requirements to prevent collateral damage.
5. Discharge water permit conditions

7-E Permitting ... 30 min ....Marquis

The session will discuss what engineer needs to know about permitting of Auger Boring Projects. It will explain:

1. Construction permits needed for meeting long lead times.
2. How not to lose control of a project to regulators by coordinating with the regulator to develop the permit requirement tailored to the project
3. Construction procedure for permit filing. Do not offer unnecessary construction constraints as it is easier to work the permit than allocating resources to install contingency measure during construction.
4. Permitting for material disposal and cost.
5. Establish threshold values for actions and negotiate actions and responses with stakeholders.
6. Storm water.

8-E Lubrication ... 60 min ..... Canon/Anderson

Construction fluids in all phases of auger boring project – planning, design and construction – will be explained.

The session will discuss what engineer needs to know about lubrication in Auger Boring Projects. It will explain:

1. Is lubrication required – Yes/No. If needed, then how to specify that it will be used.
2. Ground chemistry so fluid supplier can properly design a mix.
3. How to design to assess fluid impact to job.
4. Disallowed fluids by specs.

9-E Fluids to Manage Subsurface Conditions... 30 min …… ..... Canon/Anderson

The session will discuss what engineer needs to know about drilling fluids. It will explain:

1. What properties are needed and why.
2. How to assess impact for reasonable return.Lio
3. How to communicate assumed properties for returns.

11-E Jobsite Preparation ... 45 min..... Marquis/Strater

The session will discuss what engineer needs to know about jobsite preparation. It will explain how to:

1. Acquire and define site limits.
2. Access restrictions.
3. Work hour restrictions.
4. Permit conditions for stakeholder access.
5. Soil loads onto pipe and pit supports

MONDAY – CONTRACTORS' TRACK

1 Welcome and Introductions ... 30 min .... Simicevic

Overview of week ahead. Introduction of instructors.

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Classroom presentation and discussion on the history of Auger Boring starting in the 1930's in the coal mining industry as a means to increase productivity. Auger Boring provides an economical means to cross under surface obstructions. The industry mainly serves the utility industry. Utility demands in high density traffic and politically and environmentally sensitive areas have provided opportunities for both contractors and manufacturers to modify this simple equipment. Today's equipment and techniques enhance the range of ground conditions that can be economically bored and to enhance the precision of the equipment to better serve gradeline sensitive utility requirements. The past 10 plus years has seen accelerating equipment advances and new contractor skills developed to economically address the ever expanding utility and pipeline market needs.

3-C ASCE MOP 106 ... 60 min .... Dorwart

The ASCE has updated the Manual of Practice (MOP) 106 for auger boring. This manual provides present industry practices for the design and construction of auger bores. These practices are guidelines to be considered not a proscriptive standard. These guidelines have been developed by engineers and contractors over the years and now has been updated to include recent advances in equipment and design/construction practices. The objectives and responsibilities of both engineers and contractors in auger boring projects are clarified. The basic concepts of Engineer and Contractor responsibilities are discussed. The Engineer has a responsibility to bring a constructible project to the table within industry standard practices as modified by the project Documents. The Contractor has a responsibility for providing equipment and applying industry standard practices to the safe and successful completion of the crossing through conditions defined in contract documents. This session is structured for interaction between participants and instructor on key topics discussed in MOP 106 representing the life of a project.

4-C Defining Project ... 75 min .... Dorwart

There are or should be reasons behind development of a set of project documents issued for bid and construction. Project stakeholders define the project: Owner, Regulators, Engineer(s), Permiters, Property Owners, and Impacted Public. Stakeholders define project conditions like work space, tolerances, regulatory conditions, and other contractual conditions with which the Contractor must comply. These requirements need to be clearly communicated in the contract documents. It is typically the Engineers responsibility to understand the science behind the specified construction method. In particular, the Engineer must understand the interaction between the given ground and the range of equipment capabilities when using the specified construction method. It is then the Engineer's responsibility to define the ground conditions and any special conditions that will impact the construction schedule and cost in the Project Document Special Conditions. Items that may impact cost or schedule along with allowable methods need to be specified so the Contractor can develop a list of equipment, materials, and procedures to properly plan, schedule, and cost the project in the bid. Risks should be defined and if considered a Contractor responsibility, either specified or accounted for in a line item with allowance or unit price. Failure in this communication process often leads down a path for claims which typically does not add value to a project. This session will emphasize and explain the communication between stakeholders that result in project specifications. It includes discussions on the specification process and meaning of specifications as a communication tool.

Perspective: Contractors do not take risks they price risks. Project documents are used to communicate project conditions. The session will explain how the Project Documents impact equipment and materials selection and application of industry standard means and methods to construct the specified project under the given conditions based on interpretation of construction specifications and plans.

PLANNING YOUR BID

1. Determine technical complexity of job including tie-ins at ends and interfacing with adjacent contract work.
2. Determine a construction work plan with schedule, work tasks, labor needs, working in defined limits, expected end of work conditions, and production rates.
3. Select appropriate equipment to meet given subsurface and project conditions and assess working range of conditions where equipment will properly function.
4. Materials procurement, lead time, and cost.
5. Site access and disposal of cuttings and if water or ground conditioning required and associated means and methods and cost.
6. Define risks for adherence to project conditions and develop project cost and contingency cost for risk mitigation.
7. Shaft design and cost.
8. Fit equipment to site and staging locations and servicing of equipment for the job
9. Availability and who will be project lead
10. Site restoration method and cost
11. Survey and as-built
12. Determine project cost, cash flow, bonding, and schedule for bid with a fair profit.

CONSTRUCTION – Do what you said you would do. Notify of changes from work plan.

1. Provide (Submittals): Demonstrate qualifications and compliance with specifications in the work plan approach for adherence to project contract conditions. This submittal should be assessed and verified by the stakeholders. This is the critical opportunity to match Stakeholder and Contractor expectations for the project. This includes defining the anticipated conditions based on contract document data as this can provide a basis for changed conditions and defining the limits like steering of what should be expected excluding luck.
2. Records
3. Closure

5-C Subsurface Conditions ... 120 min .... Dorwart

A discussion on reasonable expectations regarding the interaction of equipment to given subsurface conditions. A contractor needs define subsurface conditions based on contract documents and develop appropriate means and methods for performing the auger boring project:

1. Manmade features and what to expect: utility locations, manmade ground anomalies impacting construction.
2. Determine ground reaction to various tools and select mitigation options. Always have an option!
3. Planning a production rate: work cycle, penetration rate, critical path production.
4. Determine need for ground modification at entry and exit or at excavation face.
5. Steering: what the ground will let you do.

6-C Dewatering — 30 min .... Sunhachawi

Groundwater has a significant impact on how subsurface materials react to the excavation process. Dewatering modifies the properties of subsurface conditions to improve excavation standup time by enhancing stability. Dewatering controls groundwater by pumping which locally lowers groundwater levels in the vicinity of the construction site. Discussions will focus on what the contractor needs to know about implementing dewatering for an auger boring project. The session will discuss:

1. Types of typical dewatering systems: sump, deep wells, suction wells, ejector wells, depressurization wells.
2. Where is dewatering practical (what soil groups)
3. What permits are needed.
4. How to obtain permits and schedule impacts.
5. Who obtains permits.
6. Cost of dewatering.
7. Equipment footprint, Dischange requirements at the site, and Schedule of dewatering measures basically how long do you need to wait before excavation after turning on the pumps.

7-C Permitting ... 60 min .... Dorwart

The session will discuss what contractor needs to know about permitting of Auger Boring Projects. It will explain:

1. Special loading DOT permits.
2. DOT compliance.
3. Bridge loading.
4. Disposal of soil and water.
5. Compliance reporting.
6. Managing action thresholds and regulatory thresholds and project impacts.
7. Street opening and usage/restoration.
8. Storm water.

10-C Jobsite Preparation ... 60 min .... Dorwart

The session will explain what contractor needs to know about jobsite preparation.

It will explain:

1. Pit design, components
    a. Thrust block
    b. Entry and exit from soil/rock through pits for control of conditions.
    c. Construction of pit and alignment system
2. Mobilization with Material ordering and handling
3. Servicing the equipment and rentals
4. Access routing for M&D and daily supply and access frequency
5. Staging the equipment one site or secondary site

TUESDAY – ENGINEERS' TRACK

12-E Basic AB Construction (Non-Steerable) ... 120 min..... .....Strater

The session will explain what engineer needs to know about basic auger boring construction:
1. Work cycle requirements
2. Options and limitations of various excavation tools.
3. Groundwater impact on shaft, thrust block, bore stability.

13-E Simple Steering AB Construction (1 or 2 axes) ... 30 min..... Marquis, Fuerst

Simple steering with 1 or 2 axes in auger boring for left/right control as well as vertical grade control will be presented.

The session will explain what both engineer and contractor need to know about basic steering capabilities in auger boring construction. It will explain:
1. Locating the face.
2. No steering precision and accuracy.
3. Uniaxial steering.
4. Biaxial Steering.
5. Guided steering.

14-E Various Types of Cutter Heads – 60 min .....Marquis, Fuerst

The session will explain what engineer needs to know about cutter heads. It will explain how to:
1. Predict how the ground reacts to the total excavation.
2. Predict how the ground reacts to the cutter.
3. Specify minimum requirements and reasons and set measurable performance limits.

15-E Grouting Basics ... 60 min..... .....Strater

There are two types of grouting in Auger Boring projects: one performed for soil alteration and the other for filling up annulus between the installed pipe and borehole wall. The session will explain what engineer needs to know about grouting. It will explain:
1. Overcut.
2. Settlement.
3. Ground stability.
4. Can the annulus be realistically grouted or are you wasting Owner money?
5. Performance specifications for managing ground fracturing and leakage.
6. Impacts to adjacent utilities and required clearances.

16-E Pipe Options ... 60 min .....Marquis

Steel pipe is most commonly used in Auger Boring projects and installed as a casing. Other pipe types can be used as well. The session will explain what engineer needs to know about pipe to be used in the auger boring project. It will explain:
1. Failure modes.
2. Long term design loading and corrosion.
3. Minimum wall for long term loadings.
4. Temporary or permanent installation.
5. Grout carrier to casing or not.
6. Grout properties for performance.
7. Pipe loading Axial, ground and traffic, surcharge, longitudinal.

17-E Construction Management ... 45 min .....Marquis

During Auger Boring project, the construction management team represents the owner's interests by monitoring the work for compliance with the contract. Specifications usually require the contractor to submit construction work plans with details of the proposed means and methods; these submittals are relied upon by the construction management personnel as they observe and document the work. The intent of the construction work plans is to verify that the construction meets specifications and to evaluate potential claims.

The session will explain what engineer needs to know about construction management in the auger boring project. It will explain:

1. Direction of Contractor.
2. Compliance with contract.
3. Recognition of changes and associated management of issue.
4. Claim path.

18 Case Histories — 60 min.....Liotti et al

TBA

TUESDAY – CONTRACTORS' TRACK

8-C Lubrication ... 60 min ..... Canon/Anderson

Lubrication can significantly reduce friction related force in sand and from stickey clay. The session will discuss the benefits of lubrication in Auger Boring Projects. It will explain how to:

1. Find supplier.
2. Prepare the mix.
3. Train on using the lubrication.
4. Mechanics of installing evenly along pipe outside.
5. Technical training to use fluids.
6. MSDS and preparation for spill.

9-C Fluids to manage subsurface conditions ... 120 min..... Canon/Dorwart

The session will discuss what contractor needs to know about excavation face control fluids. It will explain:

1. How to identify supplier/products and why products
   a. Sand. Clay.
   b. Flowing ground
   c. Fluid ground support.
2. How to prepare drilling fluids.
3. Hands on experience on testing properties for compliance.

10-C Fluids LAB ... 3.75 hours ..... Canon/Dorwart

Practical session on fluid properties and hands-on practice in the lab.

12-C Basic AB Construction (non-steerable) ... 30 min ....

Managing the Work Cycle:

1. Anticipated precision and accuracy
2. Equipment setup
3. Shift and weekend shutdown/restarting.
4. Monitor Rotational stability of thrust block and associated remediation.
5. As-Built
6. Troubleshooting.

13-C Simple Steering AB Construction (1 or 2 axes) ... 30 min ..... Dorwart, Gasmovic

Simple steering with 1 or 2 axes in auger boring for left/right control as well as vertical grade control will be presented. The session will explain what both engineer and contractor need to know about basic steering capabilities in auger boring construction. It will explain:

6. Anticipated precision and accuracy
7. Steering options: Uniaxial, Biaxial, Guided
8. Locating the face.
9. As-Built
10. Troubleshooting

14-C Various Types of Cutter Heads ... 30 min ..... Fuerst, Dorwart

The session will explain what contractor needs to know about cutter heads. It will explain:

1. Subsurface conditions, cutter options, and cutter material range and how different cutters excavate.
2. Ground reaction to excavation.
3. Recognition of expected cuttings from different cutters in different ground.
4. Recognition of impending problem.
5. Troubleshooting.

15-C Grouting Basics ... 30 min ..... Dorwart

Grouting is used to modify existing subsurface conditions, repair or mitigate issues resulting from over-excavation, and annulus filling between carrier pipe(s) and casing. It is a specialty service with many options. Typically you want to hire a specialist to design and do the work. This should be setup and included in the bid.

The session will explain what contractor needs to know about grouting for communication to a specialty grouting contractor including:

1. Knowing the purpose of why grout
2. Grout types, properties, and limitations
3. Equipment
4. Examples:
    a. Stabilizing entry and exit portals.
    b. Settlement mitigation
    c. Annular fill methods and planning.
    d. Management of grouting – Pressure, volume, schedule management.

18 Case Histories ... 60 min .....Liotti et al

TBA

WEDNESDAY – ENGINEERS' TRACK

20-E SAFETY – PART 1 ... 60 min .....Marquis, Strudwick

Setup Your Project for Safety by Planning During Engineering

- The Engineer's responsibility to bring a constructible project to the table includes planning for safety of the contractor and surrounding public. This responsibility is more than just following the traffic codes.
- ASCE Ethics Cannon 1 – HOLD SAFETY PARAMONT
  "Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties."
- Plan for safety to give the contractor a chance. Up front engineering includes planning for a constructible project. This means you need to:
  - Visit the site and assess existing conditions.
  - Provide sufficient space for the construction. (Equipment laydown at design entry and exit, work room around equipment, access to supply equipment, safety buffer/barrier room and locations, etc) You must understand the equipment basics and operation to properly assess space requirements for a successful project.
  - Provide actual location of all utilities within 25 feet of construction in verified X,Y, Z format. Contractor must still verify.
  - Provide traffic control
  - Provide site access for supplying construction
  - Noise/Vibration control
  - Access to abutters through construction zone
  - Assess special environmental conditions and actions like hazardous materials and specify required actions and costs
- Communication to Contractor by plans and specification for safety so it may be properly budgeted and implemented. Specify for safety by understanding field facts and conditions.
  - The prebid site visit from Engineer's perspective.
  - The preconstruction meeting from the engineers perspective.
- Plan and address special conditions up front. Protection of public from construction. Tunneling under roads without some form of support can lead to collapse for many reasons. What is the contingency or action required. Basically, if special shoring is required to protect the public either specify the shoring or specify what will not be allowed and why as you will need justification to reject.
- The purpose of submittals is to verify the effectiveness of plan and spec communications. You need to assess if the contractor means and methods meet the project assumptions and intent. Safety is a consideration in this review process.

See description of the following classes in the CONTRACTORS' TRACK:

21 Safety PART 2 ... 60 min

22 Introduction to Practical Sessions – 2 hours 15 min

PRACTICAL SESSION– DAY 1 : PS1 & PS2

24-E Test – 45 min

25-E Wrap-Up – 15 min

26-E Issuing of Certificates – 60 min

WEDNESDAY – CONTRACTORS' TRACK

16-C1 Pipe Options ... 60 min .....Hasen, Gonterman, Boschert

Steel/Permalok, Clay Pipe in Auger Boring

Auger boring is typically used to install a pipe for a purpose. The product pipe(s) is typically called the carrier pipe. With the auger boring method, a casing is typically required on every job these days where the slick bore method is frowned on as a technique. Sometimes a casing can become a carrier. The selection of casing and carrier is typically done by the specifying engineer for the owner. The contractor has the job of handling and coupling the pipe in an appropriate method to handle the casing or carrier loadings and purpose. The session will explain what contractor needs to know about casing and carrier pipe materials as they relate to an auger boring project. This session discusses pipe carrier and casing options and properties for handling and installation in an auger bore project.

Discussions will be segmented on each material with regard to the following topics:

1. Pipe material, cost, availability across the U.S., how it ships.
2. Pipe handling.
3. Design for axial and eccentricity of loading.
4. Coupling of the pipe to the equipment.
5. Installation of carrier pipe in the casing for gradeline and grouting installations
6. Installation troubleshooting.

21 Safety PART 2 — 60 min … ..... Strudwick

Implementation of Specified and Conditional Safety on a Job Site.

Safety starts with the PreBid and is priced in the bid. The contract is the vehicle to implement and cost. Contractor to verify and assess for themselves based on their work plan and their extensive field experience. This session describes the approach to a project for safety by an experienced contractor starting with the PreBid.

- Why proactive safety planning is necessary and critical to the success of the entire operation and installation.
- Making sure there is a credible emergency preparedness plan in place to expedite a proper emergency response if and when it is necessary.
- Listing the "Crises Team Members" their contact information and role in emergency action when and if necessary.
- Identifying a "Public Information officer" to handle press relations in case there is an "Unfortunate and or unexpected" incident involving personal injury or property damage.
- Preplanning emergency response with the local fire fighters. Establishing routes and access to the "Auger bore pit" and or job site to facilitate timely response.
- Making sure that prior to mobilization of any "Auger Boring Operation" everyone involved is a competent and qualified professional. All site specific training is completed and contingency plans are in place where everyone involved is ready and capable of handling an emergency with confidence!!

22 Introduction to Practical Sessions – 2 hr 15 min …….. Fisher, Fuerst, Canon, Gonterman, others

- Outline activities during Day 1 and Day 2
- Cover SAFETY during practical sessions:
  - Site Safety contractor and engineer:
    - Who owns the site – The Contractor all others access by contract AND permission to enter and requirements if you enter
    - Site Entry by Other than contractor forces – Sign Safety Book and Briefing
    - Site OSHA and Contractor required PPE
  - Work Site Hazard Analyses – Contractor should do and Engineers be aware (OSHA guidelines)
  - AM Safety and planning meeting "Tool Box Talk"
    - Site safety plan basics (It must be on site full time!): Emergency numbers/nearest emergency response/etc.
    - Take a four-second "reset". Take four seconds before starting some new familiar task. This act of refocusing has been shown to reduce the probability of an injury incident by more than 90% versus not taking the four seconds.
    - Resources: www.osha.net/toolbox-talks
    - Document with attendance sheet for ALL that enter site: Example attached
    - Example Topics:

1. Site behavior safety
2. Confined space
3. Electrical hazards
4. Ergonomics - back
5. Fatigue
6. Fire
7. What to do if emergency occurs
8. Lock out and Tag out
9. Ladders
10. PPE
11. Seasonal/Holidays/Weather
12. Slip Trip Fall
13. Small Tools
14. Reading MSDS sheets

  - Discussion and Questions

- Site tool box safety talk – introduction to lite etiquette and rules of access along with pointing out barriers and all equipment and safety rules for accessing the work zone for the school session.
- Pit Planning and setup for work. How to plan the work for the work space provided and how to layout the equipment to minimize spoils handling, moving of equipment around the site, supplying the machine. Explain the work cycle for the machine and boring operation including single time tasks like when to maintain the machine, refueling and ability to get fuel truck to machine without obstructing the layout, winter work warmup and shutdown. Who should be the first on and last off the site each day. Who is the responsible person on the site. Traffic buffer if needed – for now lets say that the soil box is the traffic zone not to be accessed by anyone.
- Equipment selection for site soils in prep for tooling at site – What soils are we mining for this session and why do we have the equipment that you see on the site. Basically describe the site geotech data and what is expected of the machine to soil interaction. Say looser soil at this site would be expected to possibly ravel at entry and form a sinkhole thus include inside safety barrier, start far enough from a critical object like a road to provide a learning curve trial space before crossing critical structure.
- This pit layout and why. Utilities notifications and locations.
- Equipment and space requirement in layout for each piece of equipment and why work space around equipment is needed for safety and servicing without needing to watch your back.
- Site specific setup and equipment operation in a pit and the planned work cycle for the working session. Who will do what and when and where do things go. What paperwork is needed during the work cycle

PRACTICAL SESSION – DAY 1 …….. Fisher, Fuerst, Canon, Gonterman, other manufacturers

PS-1 120 min – HANDS-ON Permalok Installation – 1st Casing

- Insert first piece of Permalok into the machine
- Augering with individual operators.

PS-2 90 min – HANDS-ON Permalok Installation – 2nd Casing

- Tool box on continuation of work and machine issues like torque and torque plates and what it can do and changing auger position to handle issues and different soil in box as construction continues.
- Stalk on next piece of Permalok.
- Continue with augering in the next pipe with individual operators.

PS-4 90 min – HANDS-ON Finish Bore

- Continue with fully inserting the Permalok
- Discuss work cycle for other pipe types and why.
- Discuss work cycle and operations of the day and Q/A session

THURSDAY – CONTRACTORS' TRACK and 5-DAY ENGINEERS' TRACK

16-C2 Pipe Options ... 60 min ..... Carpenter, LeBlanc

Ductile Iron Pipe, Fiberglass and Polymer Concrete Pipe in Auger Boring

Auger boring is typically used to install a pipe for a purpose. The product pipe(s) is typically called the carrier pipe. With the auger boring method, a casing is typically required on every job these days where the slick bore method is frowned on as a technique. Sometimes a casing can become a carrier. The selection of casing and carrier is typically done by the specifying engineer for the owner. The contractor has the job of handling and coupling the pipe in an appropriate method to handle the casing or carrier loadings and purpose. The session will explain what contractor needs to know about casing and carrier pipe materials as they relate to an auger boring project. This session discusses pipe carrier and casing options and properties for handling and installation in an auger bore project.

Discussions will be segmented on each material with regard to the following topics:

7. Pipe material, cost, availability across the U.S., how it ships.
8. Pipe handling.
9. Design for axial and eccentricity of loading.
10. Coupling of the pipe to the equipment.
11. Installation of carrier pipe in the casing for gradeline and grouting installations
12. Installation troubleshooting.

23 Safety PART 3 ... 120 min ... . Strudwick

Contractors Safety, Part 1 – 30 min

- Site assessments: Location evaluation, rural vs metropolitan, traffic, Signs and barricades, access and egress, neighborhood schools, businesses, hospitals. Existing utilities, underground and overhead conflicts, local one call requirements. Emergency response, site specific emergency action plan.
- Internal work zone conflicts, noise, vibration and illumination, hours of active excavation. Perimeter security (fencing, guard rail, warning signs). Storage and location of equipment, fuel, conex, pressurized cylinders (oxygen / acetylene) and chemicals.
- Personal Protective equipment and First Aid supplies. Designated and trained first responders.
- Shoring options based on size of casing, sloping and benching, boxes, plates, shields, slide rail systems.

Contractors Safety, Part 2 – 30 min

- Location of welding machines, GFCI considerations as well as grounding. DC voltage vs AC voltage exposures / ground water. Fire extinguishers, size and location. PPE and ventilation of toxic fumes, SDS information on welding rods used. Eye protection for personnel exposed to ark flash during welding operations during the day time or especially at night.

Contractors Safety, Part 3 – 30 min

- Review respiratory exposures to sawing or cutting concrete and fiberglass pipe. Proper respiratory protection to eliminate exposure to silica and fiberglass particles.
- Rigging issues related to large diameter pipe and struck by hazards associated to pipe handling in and out of the pit.

Contractors Safety, Part 4 – 30 min

- PPE related to exposures to the lubrication fluids used, SDS information onsite. Waterproof foot wear, nonskid soles, steel toes. Access and egress to the pit and placement of ladders or ramps. Eyewash stations readily available. Respiratory equipment as necessary based on Manufacturers recommendations.

PRACTICAL SESSION – DAY 2 …….. Fisher, Fuerst, Canon and Gonterman, other manufacturers

PS-5 90 min – Relocate AB Machine.

- Tool box on what will happen today
- Site planning of looking and documenting anticipated fatal flaws in site conditions and fixing them so your equipment is more versatile and works better.
- Team to develop a practical layout of a new pit setup by all to relocate the equipment to the other side and setup for work. Setup for the steel pipe
- Breakdown machine from previous day and relocate to other side of pit.

PS-6 90 min – Cutter Heads Setting-up

- Discussions on how to setup for different pipes and critical issues like rigidity of equipment and pipe connections to machine. Setup for the steel pipe piece.
- Discussions and demonstration of setting up different types of cutter heads on the machine to expand capabilities and what different heads are available and how to make them work.

PS-7 60 min – Steering System Setting-up

- Discuss setup of a steering head and how to operate
- Setup of steering system and steering head and get practice grade readings as best practical for what we have to work with.
- How to steer

PS-8 120 min – Review of Critical Elements

- Do and don’ts of auger boring
- How to slipline and setup a bulkhead for grouting
- Resources available from suppliers and manufacturers that are available to assist a contractor in bid, setup, and the work.
- Summary of Field Operations and Questions

FRIDAY – CONTRACTORS' TRACK & 5-DAY ENGINEERS' TRACK

17-C Construction Management ... 30 min — ..... Dorwart

The session will explain what contractor needs to know about construction records for an auger boring project. It is not a comprehensive discussion on contracting. However, it will discuss why paperwork associated with field work is critical to protecting individual and contractor billing and claim rights. Knowing why the management of specific paperwork is important helps promote getting the paperwork completed in a timely and meaningful manner. It will discuss:

1. Purpose of construction records
    a. Payroll tracking
    b. Billing for cash flow
    c. Job performance tracking for the company (Make or Lose money)
    d. Data base for developing better future bids for various subsurface conditions
    e. Equipment work cycle performance for future bids
    f. Changes from project bid assumptions
    g. Claim support
    h. Safety requirements for insurance and bonding
    i. DOT audit requirements
    j. Mechanics lean protection
    k. Notices for protection of rights to a claim
2. Content of records
3. Storage of records

19 Student Case Histories, Lessons Learnt ... 2.5 hours ..... All

- Students talk about their projects and compare with what they learned during the week

24 Test ... 45 min

25 Wrap Up ... 15 min

26 Issuing of Certificates ... 30 min