ATLB-2170: GAS PIPELINE WORKER II

Cuyahoga Community College

Viewing: ATLB-2170 : Gas Pipeline Worker II

Board of Trustees:
2017-06-29

Academic Term:
Spring 2019

Subject Code
ATLB - AIT-Construct/Hazard Material

Course Number:
2170

Title:
Gas Pipeline Worker II

Catalog Description:
Advanced course covering general skills required for gas pipe line installations including site clearing, split fence installation and tensioning. Also discussed and explained are specialty operations, including waterway installations, pipe preparation and placement and safe tool and equipment use.

Credit Hour(s):
4

Lecture Hour(s):
4

Requisites

Prerequisite and Corequisite
Departmental approval: admission to Laborer's apprenticeship program.

Outcomes

Course Outcome(s):
Discuss the general skills, safety and warehouse set-up for operations relative to gas pipeline work.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Define the terms related to gas pipeline work.
2. Discuss the safety procedures that need to be followed while working on gas pipeline installations.
3. List the safety concerns that are associated with gas pipeline work.
4. Identify the set up and operation of the field warehouse.
5. Discuss the importance of establishing suitable staging locations for material handling and worker safety.

Course Outcome(s):
Explain how existing underground utilities are located and discuss site clearing and fencing operations.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
1. Discuss potholing operations used to locate underground piping.
2. List the various equipment that is used to expose utilities including buried gas, electric, and water systems.

3. Discuss the safety procedures followed in site clearing and potholing operations.
4. Identify the procedures followed when clearing sites for gas pipelines, including interpretation of Right of Way (ROW) stakes and proper tree falling techniques.

Course Outcome(s):

Discuss various specialty operations that are employed when working around waterways and existing services and identify procedures used to restore the ROW to its original state.

Objective(s):

1. Discuss the techniques employed for waterway gas pipeline installations including dredging procedures, floating operations, and aerial crossings.
2. Discuss methods used for installations of gas pipeline travelling under railroads and roadways.
3. Discuss ROW restoration operations, including fence repair and landscaping.
4. Install line markers to identify new gas pipeline locations.

Course Outcome(s):

Demonstrate the ability to safely operate chainsaws to establish clear right of way for gas pipeline transmissions.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Apply the related OSHA standards relative to safe chainsaw operation.
2. Calculate the proper oil-gasoline ratio required for safe chainsaw operation.
3. Identify and apply manufacturer standards for safe saw start up procedures including equipment inspection.
4. Differentiate between “felling” and bucking clearing tasks.
5. Safely operate the chainsaw to establish clear path right of way for gas pipeline installation.
6. Establish clear path escape route for emergency evacuations.

Course Outcome(s):

Identify the different types of split gap fencing used for pipe line and right of way security and discuss fence installation technique including temporary marker identification, post and bracing lay out procedures and excavation techniques.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. List the different types of fencing materials used and explain the purpose of each.
2. Interpret the temporary markers found on pipeline installation work sites and explain the various methods used for identifying utilities.
3. Discuss the techniques used in the installation of split gap fences.
4. Describe the method used for posthole excavation.
5. Discuss the importance of maintaining respect for landowners’ property during installations.

Course Outcome(s):

Demonstrate the ability to safely install split gap fences including tensioning techniques and post excavation placement.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Explain the methods used for post bracing.
2. List the different hand and power tools and equipment used.
3. Apply lay out procedures for establishing brace and line posts.
4. Select the applicable post excavation equipment and safely perform required operations.
5. Backfill and properly maintain post position and ground stability.
6. Properly install the bracing using posts, wire and correct configuration.
7. Establish split gap fence installing latching posts, wire loops, and stays.
8. Operate tensioning equipment safely to stretch and tension slip gap fence wire.

9. Detach and trim wire from center post.

Course Outcome(s):

Identify crew and tasks required for connecting pipe along right of way.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. List the various crews working on mainline operations and discuss the respective duties of each.
2. Identify the various welding tasks performed by the construction tender during gas pipeline installations.
3. Perform pipe aligning operations, including skid building, needed to position the pipe for welding.
4. Set up equipment used for sand blasting operations and demonstrate the ability to prepare gas pipe for protective coatings.
5. Identify the different coatings used for pipe joints and pipe repair.
6. Discuss the procedures employed to prepare the trenches for gas line placement.
7. Apply rigging procedures as prescribed by the Occupational Safety and Health Administration (OSHA) to lower and tie-in gas pipe.
8. List and discuss the tasks performed by the construction tender during backfill operations.

Methods of Evaluation:

1. Tests
2. Quizzes
3. Classroom participation

Course Content Outline:

1. General skills, safety and warehouse
    a. Terminology
        i. Right of way (ROW)
        ii. Markers
        iii. Potholing
        iv. Skids
        v. Hydrovac
        vi. Holiday detector (Jeep)
        vii. Fence gap
        viii. Swamper
    b. General skills
        i. Safety
            1. Personal Protective Equipment (PPE)
            2. Power line work
            3. Trench safety
            4. Biological hazards
            5. Environmental hazards
            6. Power tool safety
        ii. Rigging
        iii. ROW identification
    c. Warehouse
        i. Purpose
            1. Personnel
            2. Meetings
            3. Tool and material storage
        ii. Trailer
            1. Type
            2. Location
        iii. Staging
            1. Loading and unloading
            2. Placement
2. Utility location, clearing and fencing

a. Locating utilities
    i. Potholing
        1. Probing
        2. Excavation
        3. Hydrovac
        4. Color coding
    ii. Scoping
b. Site clearing
    i. Safety
        1. Chain saw operation
        2. Equipment handling
        3. PPE
    ii. Procedures
        1. ROW stakes
        2. Tree falling techniques
        3. Tool operation
c. Fencing
    i. Gaps
    ii. Corner braces
    iii. Existing fencing
d. Erosion control
    i. Silt fence
    ii. Jute matting
    iii. Hay bale

3. Specialty operations
    a. Types
        i. Waterways
            1. Rivers
            2. Ponds
            3. Lakes
        ii. Existing service
            1. Roads
            2. Railroads
            3. Existing pipelines
    b. Procedures
        i. Horizontal boring
        ii. Directional drill
        iii. Aerial crossings
        iv. Floating
        v. Dredging
    c. Restoration
        i. Fence repair
        ii. Landscaping
    d. Markings
        i. Pipe line markings
        ii. Inspections
4. Chain saw
    a. Relative OSHA Standards
        i. PPE
        ii. Hearing
        iii. Fuel Handling
        iv. Foot Protection
    b. Oil/Gasoline Chain Saw
        i. Manufacturers Specification
        ii. Calculation
            1. Gallon to ounce conversion
            2. Ounces divided required ratio
            3. Oil/gas
        iii. Oil

1. Standard
2. Two cycle
    a. Void of detergents
    b. Mixing of compatibility
    c. Light weight

c. Start- up Procedure
    i. Manufacturer specification
    ii. Engage chain brake
    iii. Choking
        1. Fuel injection into combustion chamber
        2. Reduce air intake

d. Felling and Bucking
    i. Felling
        1. Notch cutting
        2. Back cut
        3. Path of retreat
        4. Worker warnings
    ii. Bucking
        1. Tension/compression check
        2. Limb removal
        3. Chainsaw engagement
        4. Slope cutting awareness

e. Right of Way
    i. Boundaries
    ii. Stakes and markers
    iii. Overhead interference
    iv. Debris control
    v. Material stockpile

f. Escape path
    i. Small tree/brush clearing
    ii. Stable footing
    iii. Purpose
        1. Emergency
        2. Tree kick-back avoidance

5. Split Gap Fencing
    a. Types
        i. Barbed wire
        ii. Woven wire
        iii. Metal gate
    b. Materials
        i. Post
        ii. Fasteners
        iii. Wire stays
        iv. High tensile wire
    c. Temporary markers
        i. Types
            1. Stakes
            2. Pin flags
            3. Paint marks
            4. Whiskers
        ii. Color coding
            1. Blue-potable water
            2. Yellow-gas
            3. Orange-telecommunications
            4. Green-sewer
            5. Red-electrical
            6. Purple-reclaimed water
                a. Irrigation
                b. Slurry lines

7. White-proposed excavation
8. Pink-temporary survey mark

d. Installation techniques
   i. Layout
   ii. Leveling and plumbing
   iii. Tensioning
e. Post hole excavation
   i. Manual
   ii. Mechanized
f. Landowner's property
   i. Maintaining right of way
   ii. Trespassing avoidance
   iii. Boundary awareness
g. Post bracing
   i. L brace
   ii. H brace
   iii. Wire tensioning
   iv. Horizontal posting

6. Main line operations
   a. Crews
      i. Grade
      ii. Ditch
      iii. Skid
      iv. Welding
      v. Coating
      vi. Pipe lowering
      vii. Backfill
      viii. Restoration
   b. Welding tasks
      i. Pipe support
      ii. Alignment
      iii. Grinding
   c. Pipe alignment
      i. Purpose
      ii. Equipment
      iii. Procedure
   d. Coatings
      i. Types
      ii. Application
         1. Sand blasting
         2. Mixing
   e. Trench preparation
   f. Pipe installation
   g. Backfilling
7. Crew tasks and operation
   a. Crew assignment title
      i. Set-up
      ii. Welding
      iii. Coatings
      iv. Pipe lowering
      v. Back fill
   b. Welding tasks
      i. Skid handling
      ii. Rigging
      iii. Padding
   c. Aligning operation
      i. Rigging
      ii. Skid building
      iii. Line up clamp

d. Gas pipe preparation
    i. Set-up
        1. Hose and fitting inspection
        2. P.P.E.
        3. Blasting agents
    ii. Sand blasting
        1. Purpose
            a. Remove surface contaminants
            b. Coatings adhesion
        2. Equipment
            a. Air compressor
            b. Blasting pot
            c. Blast hose
            d. Air supply hose
            e. Nozzle
            f. Dead man switch
e. Coatings
    i. Two part epoxy
    ii. Fusion bond epoxy
    iii. Shrine wrap
    iv. Heat stick
    v. Cold tape
    vi. Hot tape
    vii. Coal tar
    viii. Wax
    ix. Mastic
    x. Plastic
    xi. Enamel
f. Trench preparation
    i. Pad
        1. Sand
        2. Expander foam
        3. Rock free soil
        4. Rock shield
    ii. De watering
    iii. Trench breaker
g. OSHA Standard
    i. Sling capacities
    ii. Stable lifting
    iii. Overhead
h. Backfill tasks
    i. Backfill inspection
        1. Rock
        2. Debris
    ii. Signaling
    iii. Visual pipe inspection
    iv. Debris removal

Resources

Proctor, Thomas E., Toenjes, Leonard P. *Printreading for Residential Construction.* current. Orland Park, IL;American Technical Publishers, 2010.

Herubin, Charles. *Principles of Surveying.* third. Reston, VA; Reston Publishing Co, 1982.

Resources Other

1. www.marcellus-shale.us/**gas-pipelines**.htm
2. www.lylesutility.com/6-steel-natural-**gas-pipeline-installation**

3. www.spectraenergy.com/Operations/US...**Gas**...US/...**Process**.../**Pipeline**-**Construction**/
4. LIUNA “Gas Pipeline Worker” video series
5. “Excavation Safety” PowerPoint
6. “Safety Around Moving Equipment” video

“Denso Liquid Coatings Application Guide”
Version 109.1
9747 Whithorn Drive,
Houston, Texas, 77095

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