Report Date: 09 Nov 2015

Summary Report for Individual Task
052-12K-1005
Install Steel Pipe
Status: Approved

Distribution Restriction: Approved for public release; distribution is unlimited.

Destruction Notice: None

Foreign Disclosure: FD1 - This training product has been reviewed by the training developers in coordination with the Fort Leonard Wood, MO/MSCOE foreign disclosure officer. This training product can be used to instruct international military students from all approved countries without restrictions.

Condition: Given a mission to install steel pipe, a structure with rough-in service water connection, rough-in waste water connection , plans and specifications, materials takeoff list, materials estimates, all required materials, pipe fitters tool kit 2 1/2 to 4 inch, pipe-fitters tool kit 1/8 to 2 inch, engineer squad carpenters tool kit, engineer squad pioneer tool kit, special tools, goggles/safety glasses, gloves appropriate doctrine and access to the International Plumbing Code (IPC). This task should not be trained in MOPP 4.

Standard: Install pipe according to the construction prints and IPC without leaks, injury to personnel, damage to equipment or the environment.

Special Condition: In the event the application is being used for compressed air or natural gas, ensure all safety and code requirements are followed.

Safety Risk: Low

MOPP 4: Never

Task Statements

Cue: A Soldier has been given a mission to install steel pipe.

DANGER

The use of Steel Pipe in construction and installation of liquefied petroleum gas facilities shall be in accordance with the requirements of the International Building code, the International Fire Code, the International Mechanical Code, the International Fuel Gas Code and NFPA 58.

WARNING

None

CAUTION

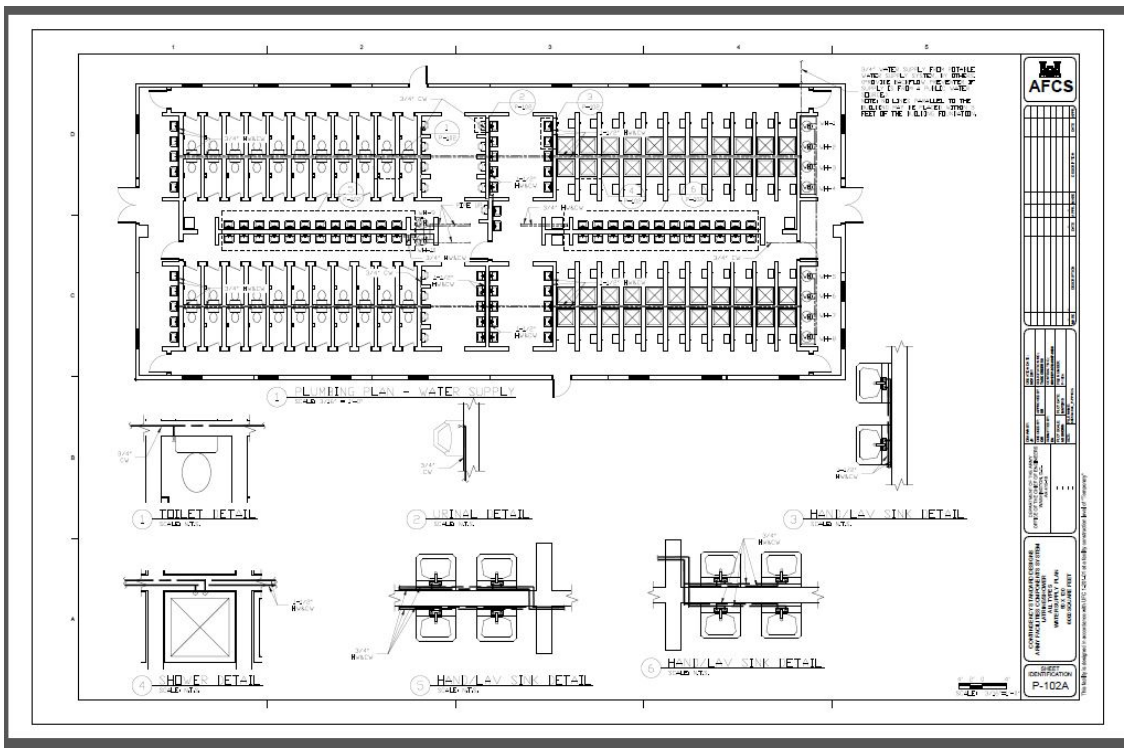
None

Remarks: None

Notes: The term "Steel" in this task is meant to reference both Galvanized Steel and Black Iron Pipe. Galvanized Steel and Black Iron Pipe is usually assembled using threaded joints. Most often Galvanized Steel Pipe is used to distribute water and Black Iron Pipe is used to distribute compressed air or natural gas.

Performance Steps

1. Review construction plans.



Typical Plumbing Plan
052-12K-1005-1

a. Identify the location of rough-in water supply connections.

b. Identify the location of rough-in waste water connections.

c. Identify routing paths.

2. Verify the materials takeoff list and the material estimates.

a. Verify the proper types of pipe required by size and rating are available.

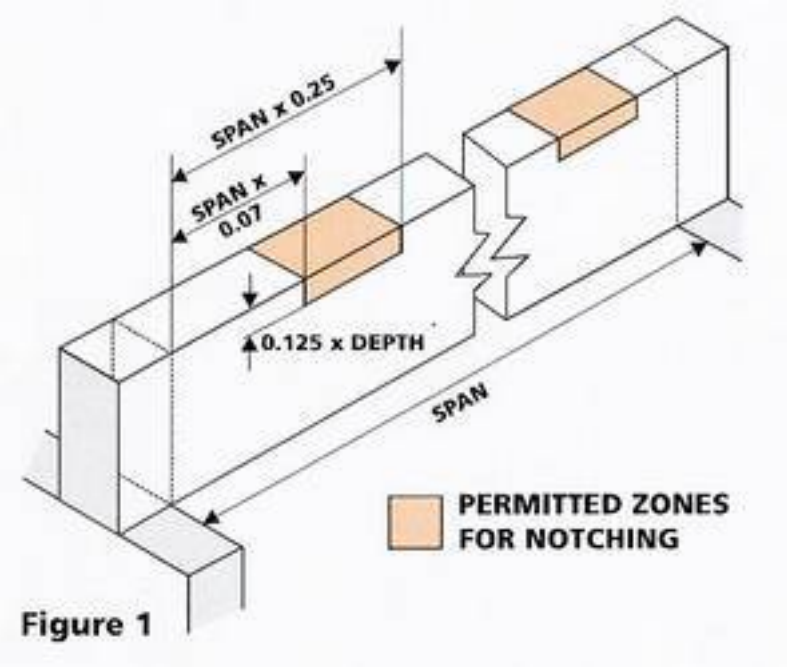
b. Verify the proper connectors and fittings are available.

c. Verify all guards, sleeves and hangers that are required are available.

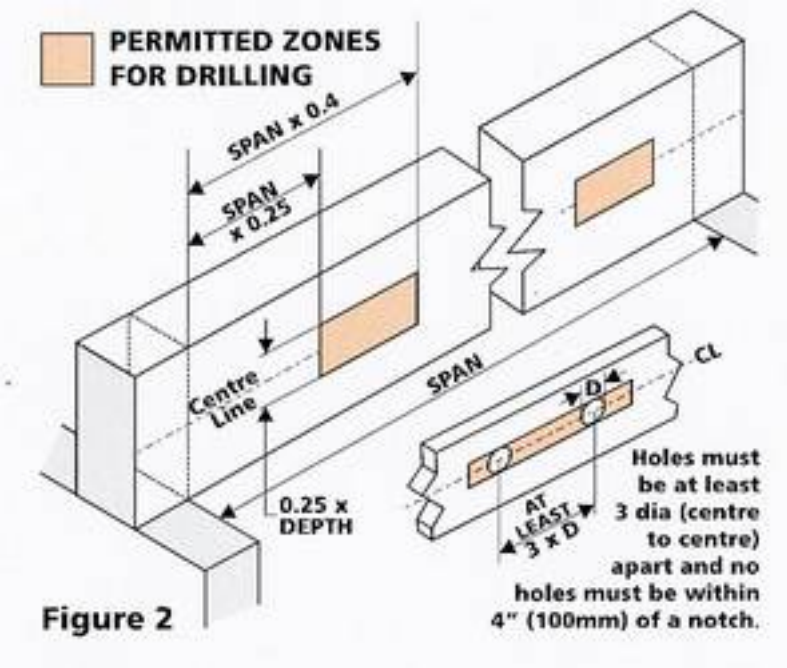
3. Mark the locations for required drilling, notching and bracing on the structure.

Note: - Steel pipe shall be supported Horizontally (H) no less than every 12 ' and Vertically (V) no less than every 15'. Stainless steel drainage systems shall be supported no less than every 10' H, and no less than every 10'. (IAW IPC)

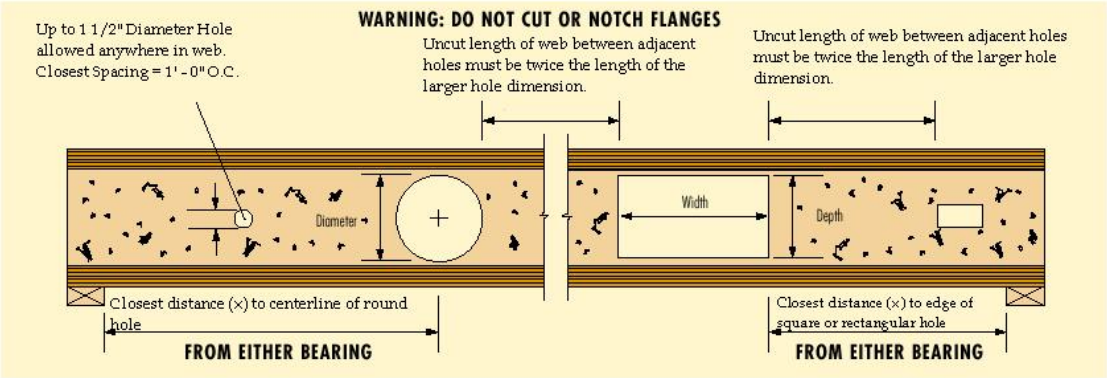
- For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.



Floor Joist Notching Guide
052-12K-1005-2



Floor Joist Drilling Guide
052-12K-1005-3



Engineered Joist Drilling Guide
052-12K-1005-4

WARNING

Do not drill through a structural member without ensuring there are no utilities on the other side. (electrical, plumbing, HVAC, gas, etc.)

CAUTION

When drilling through floors and walls ensure only enough area of the structure is removed for pipe clearance to ensure fire barrier structural integrity. This is done by selecting the drill bit that is only slightly larger than the pipe that is passing through the barrier.

4. Drill rough in routing path as required for the installation of the steel pipe.
   Note: - Ensure holes are drilled at a right angle and inline to the desired routing path.

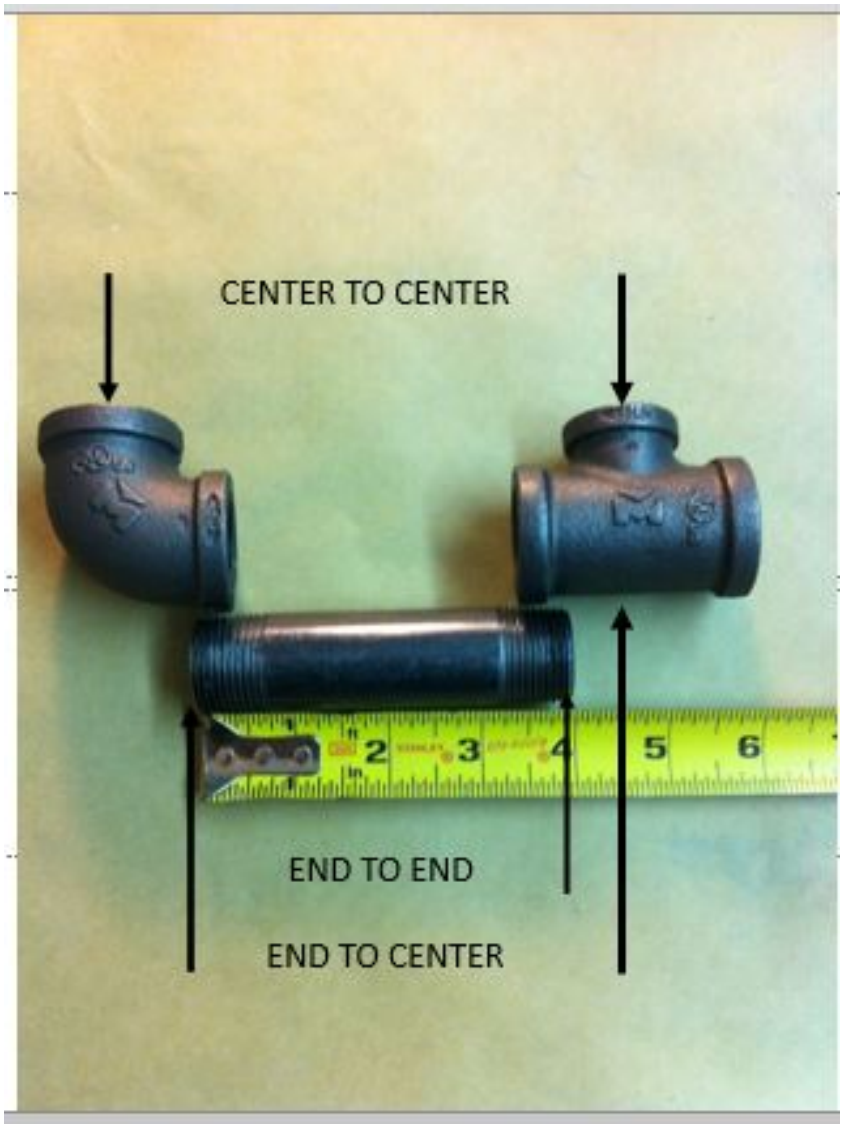
- Best practice suggest using a carpenter's level and a speed square to assist in this process.

5. Notch rough in routing path as required for the installation of the steel pipe.
   Note:
- Ensure the notches are cut at a right angle and inline to the desired routing path.

6. Install bracing as required.
   Note: - Additional bracing can be installed by carpenters however the specific types and locations should be determined by the plumbers.

7. Determine required lengths of steel pipe.
   Note: - Fittings are part of a pipe-run length. The total length measurement must include the distance (engagement) a pipe goes into a fitting and the fitting's dimensions.

- Best practice suggest using pre-cut and threaded lengths when feasible.



Measurements For Steel Pipe
052-12K-1005-5

a. Measure against the framing/actual site were the pipe will be installed, to determine the required length.

b. Transfer required measurements to the steel pipe using a suitable device such as a marker or grease pencil.

8. Cut the required lengths of steel pipe using a pipe cutter or hacksaw.

Note: - Best practice for cutting Galvanized steel or Black Iron Pipe is cut and reamed using a vise, pipe cutter, and reamer.

a. Lock the pipe in the vise spacing the cutting mark 8 inches from the end of the vise.

b. Place the cutter around the pipe, with the cutting wheel exactly on the mark.

Note: - If using a three-wheel cutter, place the cutting wheel of the movable jaw on the mark. Ensure that all three wheels are at right angles to the centerline of the pipe.

c. Close the cutter jaws lightly against the pipe by turning the handle clockwise.

d. Turn the handle one-quarter turn clockwise when the cutting wheel and rollers make contact with the pipe.

e. Apply cutting oil, and rotate the cutter completely around the pipe, making a one-quarter turn on the handle for each complete revolution around the pipe. Continue this action until the pipe is cut.

f. Push the reamer into the pipe. Turn the reamer clockwise in short, even strokes, while keeping steady pressure against the pipe until the inside burrs are removed.

g. Remove the outside burrs with a file.

9. Thread the pipe.

Note: There are many types of pipe-threading sets in use. A common set is one with a ratchet, nonadjustable stock with solid dies, and individual guides. The die and guide must be the same size to fit the pipe being threaded.When using a threading set, always refer to the manufacturer's, or accompanying instructions in addition to using the following procedures.

a. Lock the pipe securely in the vise, leaving enough pipe projecting for threading.

b. Slide the diestock over the end of the pipe, with the guide on the inside. Push the die against the pipe using one hand.

c. Make three or four short, slow, clockwise strokes until the dies are firmly started on the pipe. Apply a generous amount of oil.

d. Give the stock a complete clockwise turn, then a one-quarter turn counterclockwise. This will clear cut metal from the die and burrs from the new threads. Continue this procedure until 1/2 to 1/4 inch extends from the diestock.

e. Turn the diestock counterclockwise until the die is free of the cut threads.

f. Wipe away excess oil using a heavy rag and a wire brush to remove any chips.

10. Place the cut steel pipe into the correct routing path in accordance with the plans.

Note: - When practical, preassemble fittings and joints according to the construction prints prior to mounting/emplacement.

- Pipe-joint compound or Teflon tape shall be applied on the male threads only. (IAW IPC)

- Joints between copper or copper-alloy tubing and galvanized steel pipe shall be made with a brass fitting or dielectric fitting or a dielectric union. The copper tubing shall be soldered to the fitting in an approved manner, and the fitting shall be screwed to the threaded pipe.

11. Connect steel pipe and fittings.

Note: - The fittings for galvanized steel/iron pipe are classified as ordinary (standard) or drainage (recessed). Ordinary fittings are used for water service and venting. They range in sizes from 3/8 inch to 6 inches. Drainage fittings are used in waste systems. They have threads at a slight angle so that horizontal drainage pipe will slope about 1/4 inch per foot. They range in sizes from 1 1/4 to 12 inches.

a. Apply pipe-joint compound or Teflon tape to the pipe threads.

Note:

- Pipe-joint compound or tape shall be applied on the male threads only IAW IPC.

b. Screw the fitting on by hand, and tighten it using a vise or two pipe wrenches.

c. Wipe away excess pipe-joint compound.

12. Test the system after all required connections have been made.

Note: - Inspecting for leaks is important. A leaky joint wastes water and causes costly damage to the building. In new construction, test the entire system for leaks before the floor and partitions are closed up. When performing this test, use the water pressure from the main that feeds the system. While the system is under pressure, inspect each joint for moisture. If a leak is detected in a joint, tighten the joint or replace it by cutting the pipe and connecting a new section with a union. When working with copper soldered joints or plastic solvent-cement joints, drain the pipe and then connect the joint. Copper compression joints can be tightened or replaced.

(Asterisks indicates a leader performance step.)

Evaluation Guidance: Score the Soldier GO if all performance measures are passed (P).Score the Soldier NO GO if any performance measure is failed (F). If the Soldier scores NO GO, show the Soldier what was done wrong and how to do it correctly.

Evaluation Preparation: Provide the Soldier with the items listed in the conditions. Brief Soldier: Tell the Soldier that he will be required to complete the performance measures according to the standards set forth in the task.

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Reviewed construction plans.			
2. Verified the materials takeoff list and the material estimates.			
3. Marked the locations for required drilling, notching and bracing on the structure.			
4. Drilled rough in routing path as required for the installation of the steel pipe.			
5. Notched rough in routing path as required for the installation of the steel pipe.			
6. Installed bracing as required.			
7. Determined required lengths of steel pipe.			
8. Cut the required lengths of steel pipe using a pipe cutter or hacksaw.			
9. Threaded the pipe.			
10. Placed the cut steel pipe into the correct routing path in accordance with the plans.			
11. Connected steel pipe and fittings.			
12. Tested the system after all required connections have been made.			

Supporting Reference(s):

Step Number	Reference ID	Reference Name	Required	Primary
	TM 3-34.70	Plumbing, Pipe Fitting, and Sewerage	Yes	Yes

Environment: Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so, you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects. Refer to FM 3-34.5 Environmental Considerations and GTA 05-08-002 ENVIRONMENTAL-RELATED RISK ASSESSMENT. Environmental protection is not just the law but the right thing to do. It is a continual process and starts with deliberate planning. Always be alert to ways to protect our environment during training and missions. In doing so you will contribute to the sustainment of our training resources while protecting people and the environment from harmful effects.

Safety: In a training environment, leaders must perform a risk assessment in accordance with ATP 5-19, Risk Management. Leaders will complete the current Deliberate Risk Assessment Worksheet in accordance with the TRADOC Safety Officer during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection, FM 3-11.5, Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination. Everyone is responsible for safety. A thorough risk assessment must be completed prior to every mission or operation.

Prerequisite Individual Tasks : None

Supporting Individual Tasks :

Task Number	Title	Proponent	Status
052-12K-1061	Maintain Plumbing Tools	052 - Engineer (Individual)	Approved
052-248-1021	Identify Plumbing Materials	052 - Engineer (Individual)	Approved
052-248-1040	Interpret Plumbing Prints and Drawings	052 - Engineer (Individual)	Approved

Supported Individual Tasks : None

Supported Collective Tasks : None