The Tellus Approach to Tool Design

A three step process

Determine the Process
- Leak location & Repair
- Service cut-off
- Corrosion control
- Service renewal
- Service installation
- Camera inspection
- Test station install
- Main tie-over

Develop a Procedure

Design the Tooling to fulfill the requirements of the Procedure
Process or Procedure

The difference between a “Process” and a “Procedure”

**PROCESS**

“What” is the task to be performed.
- Service Retirement (service cut-off)
- Service Renewal (service insertion)
- Leak Repair
- Corrosion Control

**PROCEDURE**

“How” the process is to be completed.
- It is a sequence of steps utilized to complete the procedure.
- Flow charts are used to describe the sequence of steps
Process Considerations
A meeting with the gas system operator to determine system parameters

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>&quot;What&quot; process</td>
<td>The process that is to be performed on the distribution system</td>
</tr>
<tr>
<td></td>
<td>Service retirement, Service renewal, Leak repair, Anode installation etc.</td>
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<tr>
<td>System material</td>
<td>What is material makeup of the mains, services &amp; service tees</td>
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<td>Cast iron, Steel, HDPE plastic, Malleable iron, Red thread etc.</td>
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<tr>
<td>System hardware</td>
<td>What hardware is on system or to be added to the system</td>
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<td>Fitting manufacturer, Fitting size, Attachment to main, Service configuration</td>
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<tr>
<td>Location accuracy</td>
<td>What plant location information is available</td>
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<td>Accuracy of drawings, location devices available, who will be responsible for locations</td>
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<td>System pressure</td>
<td>What is the operating system pressure</td>
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<td>Low pressure, Medium pressure, High pressure</td>
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<td>Blowing gas</td>
<td>Will it be &quot;No-blow&quot; or a Blowing gas process</td>
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<td>Does system operator expect a &quot;No-blow&quot; procedure</td>
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</table>
Each process is unique to the service connection configuration

A steel to plastic service

A saddle on a steel main
A “Procedure” consists of a step-by-step set of instructions, a flow chart and list of tools. Each procedure will vary based upon the system hardware.

**Service Retirement Procedure; Medium Pressure Gas Systems (Steel)**

(for services attached to the main with a “U” bolt saddle)

**Preparation:**

1. Core and excavate an 18” diameter hole to a depth that allows 3” to 4” of clearance below the gas main. Also be sure to expose enough of the service line to permit cutting of the service run with the pneumatic reciprocating saw.
2. Clean the service tee plug and top surface of service tee using an extension sandblasting nozzle. Remove all caked-on soil and rust scale to insure that the tee plug removal socket will fit onto the square pad of the plug and that the band on the top of the tee is sufficiently clean to seal on the pressure chamber.

**The Process:**

3. Select the appropriate size main clamp fixture, service tee adapter and pressure chamber for the service to be retired. Assemble the service tee adapter to the pressure chamber and snug coupling tight enough to establish a gas tight seal using the two pressure chamber wrenches.
4. The assembled pressure chamber, service tee adapter and main clamp platform assembly can now be lowered into the excavated keyhole and positioned over the service tee. The service tee adapter must slide freely in the two slots of the main clamp platform. After the service tee adapter is positioned on the service tee and the service tee adapter drops in place over the service tee, the main clamps can be tightened onto the main. With the pressure chamber and main clamp assembly firmly clamped in place the service tee adapter can be sealed on the service tee by advancing...
A well written “procedure” must address all events that can cause the procedure to fail.

All operating procedures include the list of tooling that will be used to perform that procedure as it is written.
A standard service renewal flow chart

When the procedure progresses without any problems it would be a series of events with no deviations or decisions.
When events do not progress as planned

The reality is that tee plugs break, saddles are not positioned directly over the hole in the main and holes in the main have been torched.
What do you need to know to buy tools

Keyhole & No-blow tools are unique and specialized devices

- The gas mechanic usually has a good understanding of the process at hand but it is unfair to expect him to have the ability to identify the keyhole or no-blow tools necessary to perform any specific procedure. Tellus procedure descriptions clearly explain each procedure and provides a tooling list and description.
A description of the procedure & tooling

The complete procedure and hardware are described

- A general description of the tooling with tool names and part numbers

Keyhole Technology

Service Retirement (up to 100PSIG)
For mechanical saddles on a steel main

This procedure is designed for the retirement or abandonment of saddle mounted steel services that have been attached to steel gas mains operating at pressures ranging from 15 to 100 PSIG. In most installations the service is mounted using a mechanical "h" bolt saddle similar to those manufactured by Mueller Co. and Peerless Industries. It should be noted that this is a "No More" procedure that is designed to be performed in an 18" diameter cured "Keyhole" Condition.

At the time most of these services were installed there were no community wide methods to place a bolt on the steel gas main. The most frequent method utilized was to drill a bolt in the main using a dill bit fixture that cut a hole with a shell cutter, resulting in a perfectly round hole that is always a uniform size and centered squarely under the threaded hole in the saddle. The removal community then used a method to replace the main with a welding method. When this method was utilized it was virtually impossible to make a perfectly round hole in the main or to accurately locate the bolt hole under the threaded recess in the saddle.

This Teflon procedure has been designed to address either of these types of installations by providing a procedure inside the operating pressure chamber that allows the operator the ability to inspect the opening in the main then carry out the procedure that is appropriate for the existing installation. Either procedure is always complimented by plugging the main and then assembling a new saddle bolt cap to permanently seal the area where the saddle was removed from the main.

Service Retirement (up to 100PSIG)
For mechanical saddles on steel mains

Tooling Description and Features

The keyhole tooling utilizes or inserts a gas service from a pressured steel main in a hard upon the use of a pressure chamber to perform many of the steps in this "no more" procedure. The procedure requires that the keyhole tooling be inserted inside the pressure chamber to open the access to the saddle. This plant more accurately in a keyhole for the installation of a steel plug or plugged with an expansion plug for those mains with a locked hole. After the main has been plugged the pressure chamber is removed and the main is reconditioned to the Standard method of welding with a stubborn state of filling.

In those areas where the locked hole in the main is not far enough to close the pipe it is impossible for the gas customer to install the plug into the main, or have established a conventional excavation method to cut the saddle over the plugged hole using the keyhole tooling.

If in the event of the gas mechanical states that he would prefer to abort the "Keyhole" procedure and perform the procedure using conventional excavation methods, he can replace the plug himself or at a later date.

Tellus tooling are designed to be used by utility personnel. These tools are designed to assist in the development of the underground gas distribution industry.

TEFLON tooling are designed to be used by utility personnel. These tools are designed to assist in the development of the underground gas distribution industry.

TECHNICAL SUPPORT

We work with your operating crews and equipment to ensure that the procedure is performed as designed. Our experienced personnel can address the details of the keyhole procedure in unique situations.

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STATE OF THE ART TECHNOLOGY

This process is performed in a controlled and effectively engaged in R&D and product development where, once again, in combination with industry insight, suppliers are producing a tool that is suitable for the existing conditions.

The latest developments will be carried out as new procedures and tooling are developed.

For more information on any of our products or services please visit our website:
www.tellusengineering.com
Professional grade keyhole & no-blow tools for gas operations professionals

Durable pneumatic tools designed specifically for keyhole operations & no-blow pressure chambers that are safe and functional
Standard drives give the user the ability to utilize “off the shelf” tools

Standard locking square drives from 1/8” to ¾”

• Standard ¼” hex drives for tools that must be positioned or attached to the main or service and released in the excavation.
Specialty tools
Tooling specifically designed for keyhole work

- Keyhole ratchet
  - A long handle wrench that locks in one direction & releases in the opposite direction

- Pressure chambers
  - Designed to precisely machine gas fittings while under full operating pressure

- Pneumatic scaler tool
  - Can be positioned at any angle around a bell joint to remove pipe scale
Specialty processes (service retirement and service renewal of saddle mounted cast steel service tees on medium pressure steel mains)

A No-blow keyhole procedure

- A special threaded plug is installed into the steel main.
Tellus also manufactures technologically advanced vacuum excavation systems

Equipped with a filtration system that never requires cleaning

- Above deck designs that can be fitted to a Non CDL chassis (under 26,000 lbs.)
- Four wheel drive configurations that are mounted on a 19,500 lbs. chassis
- Under-deck designs with short wheel bases that can maneuver in tight spaces
Available processes

- Leak location & repair
- Service retirement (service cut-offs)
- Corrosion control
- Service renewals
- Anode installation
- Service installation
- Camera launch & inspection
- Underground plant location
- Meter replacement & relocation
- Tracer wire repair
- Test station installation
- Gas evacuation: emergency leaks
- Tie-overs on main replacements
Partner with Tellus professionals to bring the latest keyhole & no-blow technology to your organization

Tellus Underground Technology, Inc. offers comprehensive keyhole training and implementation programs to gas LDC’s and their contractors. Contact us at 570-234-0325 or on the web at: www.tellusunderground.com
Corrosion protection for keyhole procedures

Corrosion primer is heated to 120 degrees F then pumped into the bottom of the mold until both vent tubes begin to fill. The inlet and vent tubes are then capped and dropped into the excavation.

TWO PIECE MOLD (THREE PIECE MOLDS WILL BE NECESSARY FOR SERVICE TEES)

PROTOTYPE ENCLOSURE TO ACCOMMODATE A TWO BOLT BAND CLAMP