Northeast GAS ASSOCIATION
NYSEARCH

Technology Brief

Ergonomic Needle Bar

Description: A new ergonomic tool for leak detection surveys that is designed to reduce operator work related injuries.

Status: Pre-commercial units were built and delivered to utility members. A commercial manufacturer is being sought.

BENEFITS

As part of a collaborative effort with Rochester Institute of Technology's Center of Integrated Manufacturing Studies (CIMS), NYSEARCH has designed, built and tested a new tool that will help reduce injuries to gas utility operators. Initially an RG&E concept, the goal was to replace the existing needle bar tool (also referred to as plunger-bar, slap-stick or pogo-bar) with a new ergonomically designed tool to reduce back and shoulder injuries when making barholes during routine leak surveys.

It has been estimated that utilities make hundreds of thousands barholes annually that result in injuries to utility operators. Many of these injuries can result in lost time and medical expenses that can cost companies thousand of dollars annually.

BACKGROUND

Utility companies use the needle bar device to probe holes in the ground to check for possible gas leaks. In order to detect and measure subsurface natural gas, a gas detection probe needs a bar-hole. This hole is generally created by using a needle bar. The needle bar is manually driven into the ground to a depth of 30 inches. It is typical for employees to place a maximum of fifteen to twenty-five holes at each site.

The current needle bar poses a number of ergonomic hazards, specifically, a high prevalence of back and upper extremity injuries. The original tool, though light in weight, requires high levels of grip force to prevent hands from sliding up the shaft when the user penetrates the needle bar into the ground. Furthermore, as the needle bar is pushed, the technician must bend over to fully drive the bar. This posture not only puts considerable strain on the back but also the force required to drive the bar places significant strain on the hands, arms, and shoulders.

In 2004, the RG&E project was turned over to NYSEARCH to optimize the prototype design, evaluate ergonomic benefits and begin the commercialization process.

TECHNICAL APPROACH

The prototype tool was quickly developed into a final design with six available beta tools for utility field tests. The new design makes use of an innovative weighted sliding

shaft that allows the operator to go through the entire barhole process without bending over. Ergonomic tests performed on utility operators have shown a dramatic improvement over the old tool. Tests indicate that forces generated on a person's back are reduced by almost 2.5 times with the new tool.

In early January 2006, ten member companies received a special training program to field test the tools over a three month period. Feedback from utility survey technicians indicated that the tool was a big improvement over the old version and would help reduce injuries in the long run.

Since the new tool weighs twice as much as existing tools, operators need to understand that the additional weight is required to drive the bar into the ground to achieve the desired ergonomic benefit.

Utility experts agree that with the proper training and implementation program the bar's weight should not be a concern.

PROJECT STATUS

RIT and NYSEARCH have completed a value engineering process to simplify the tool's design for ease of manufacturing. This was accomplished by reducing the number of parts, thereby reducing the cost of production. In addition, the RIT needle bar originally designed for 10 KV shock resistance has been increased to 13 KV. RIT provided performance and durability testing at their test facility.

A limited number of tools were manufactured by a local Rochester machine shop for NYSEARCH member companies. NYSEARCH is planning to work with gas industry tool distributors to market the ErgoBar for general utility use in the near future.

SPECIFICATIONS

- Weight – 22 lbs
- Tool Length with bar – 70 in.
- Bar length – 43 in. (rod 30 in.)
- Electric resistance to 13KV
- Material- tempered aluminum & steel
- Est. cost per unit - $350 to $400
- Bar types – straight and tapered

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