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**SUCCESSFUL PRACTICES**

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### **"Using Video Inspection Tool before Entering Potentially Dangerous manholes"**

**Successful Practice Challenge:** When field crews approach a manhole where a fault or other potentially dangerous condition might be present, they don their personal protective equipment, hope for the best, and enter the confined space. Even if dispatch says the circuit is shut down and grounded, the location could still represent a serious risk. If it is in service, then there is always potential for an impending fault. Without some kind of visual inspection tool, there is no way of evaluating the situation underground without putting a crew member at risk. No company wants to have one of its people injured or killed in the line of duty. Finding some kind of visual inspection system that is reliable, easy to set up, and simple to use would help avoid those potentially dangerous situations.

**Successful Practice Solution:** Find and evaluate video inspection systems that field crews can use productively. "That's exactly what we did," says Chris Gibbs, Underground Manager for Commonwealth Edison in Chicago, "our senior methods specialist, Kevin Kinnerk, researched available equipment and engaged our field force for evaluation."

Gibbs has 190 Underground employees covering the Chicago area's 22,000 manholes. "We inspect 7,000 annually as part of our safety program. We inspect another 1,000 because we have been called out to perform work in them." ComEd lost an employee to a manhole flash fire and their incident investigation resulted in a number of recommendations. Video inspection was one of them.

ComEd now has ten video inspection units available to its crews. From above the manhole, they can insert the video camera down into the confined space to evaluate conditions before anyone enters. The camera systems are made by Zistos Corporation specifically for this application and are based on rugged, reliable search and security products proven in urban search and rescue and law enforcement applications. The cameras are available at each office and a crew can call for one and receive it within thirty minutes.

The Zistos displays are tripod-mounted and have recording capability with a separate digital video recorder (DVR). Some other utility users of the system have opted for either a wired or wireless solution that allows them to transmit video to a laptop near the site. This allows another pair of eyes away from the worksite to view the situation. The camera has a self illuminated 10-to-1 zoom feature which "lets us see within an inch of the cable abnormality." By being able to pan across various cables, ducts, racks, and hangers, the crew can even determine the line number in order to get the proper line out of service. Gibbs reports that it takes a little while to orient yourself to what you are seeing in the manhole, as the controls and the view is not what we are accustomed to looking at. With training and increased use, crews are getting much more comfortable with this important tool. There are a wide variety of accessories, such as thermal cameras, to check temperatures. A rise in temperature can signal an impending fault. The cameras have been very reliable and can even be immersed in water.

"We are probably at a four on a scale of ten in our effective utilization," explains Gibbs. "There is still some attitude in the field that 'hey I'm only going to go down there for ten minutes; it's not

worth waiting for the camera. But we are working with our field personnel and our supervisors to encourage their use whenever a crew feels there is a potentially dangerous situation.”

Other safety precautions implemented as a result of ongoing study include:

- \* Enhanced manhole inspections: ComEd inspects each time a crew is called to that manhole. They look to make sure joints aren't falling off the rack and that all cable supporting equipment is in place. This means looking at brackets and channels, insulators, hangers, etc. They use a form to write it down and track it in a database. This change helps overcome the old mindset of 'ignore anything in the manhole that you aren't working on'.
- \* Starting to use suppression blankets: ComEd's sister company, PECO, has invested thousands of dollars in suppression blankets and is in the process of mandating their usage in their Underground Department. ComEd is currently reviewing the process and will be moving forward with it in the very near future.
- \* Doubling Personal Protective Equipment, including fire retardant clothing.

“No matter how much we do to prevent incidents,” says Gibbs, “there will always be some risk. We had a recent incident where the splicing crew was OK after a cable failure. Luckily, it failed outside the joint and the crew was already coming out of the manhole. We determined that tomography would not have seen this fault and that by the time it happened the suppression blanket would have been removed. Even with the camera, we might not have been able to locate this particular problem. It is one of the reasons this is a highly technical and dangerous job which is only fully understood when employees come into the Underground Department. There is just some inherent danger. I breathe a little easier knowing that the Zistos cameras are available and that we have taken other steps to significantly reduce the risk to our people.”

MEA thanks [Chris Gibbs](#), Underground Manager for Commonwealth Edison, for providing this Successful Practice.

MEA also thanks Zistos for providing additional background information. Go to <http://www.zistos.com/industrial.htm> for more information on their equipment. Zistos can also be reached at (631) 434-1370 . There is a short video at the site and [http://www.zistos.com/images/Utility\\_Inspection.pdf](http://www.zistos.com/images/Utility_Inspection.pdf) is a brochure of what most utilities are purchasing. In addition to ComEd, ConEd (New York), Duquesne Light (Pittsburg); Baltimore Gas & Electric, LA Power and Water, and Entergy (Louisiana) are also using the Zistos video system.

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