

# What do plastic, concrete, and wastewater have in common?

## Application Note



Testing Functions  
**Case Study**

### More than you might think...

Here's a great example of why it makes sense for manufacturers to maintain a relationship with a highly skilled electrical contractor that specializes in industrial systems.

We're all familiar with the story. Manufacturers are great at making widgets, but it might not make sense for them to keep a senior-level electrician on staff if his skills are only needed for installation/commissioning and complex troubleshooting.

But then, what does a good industrial contractor look like? Take AECI (Associated Electrical Contractors, Inc.) based in Woodstock, Illinois (northwest of Chicago). This company supports all sorts of facilities; examples include companies that run precision injection molding equipment for plastic fabrication, power the heaters in concrete block molds, and keep wastewater pumping.

In each case, it's not only the output that's different—it's the risk thresholds, the operational philosophy, and the equipment and system profiles. What kinds of services does this type of electrical contractor need to supply to satisfy its customers? What's different about how it applies those services from one site to the next? What kind of senior electrician does the company provide to make the necessary decisions in the moment?

### About AECI

Started in 1989 by Vern and Carl "Butch" Schnulle, AECI continues as a family owned company today. It provides everything from new construction services and machine wiring to lighting retrofits and equipment maintenance. "We're a full-service electrical contractor," says Butch Schnulle, owner of AECI. "We do all kinds of electrical work, including installing alternative energy systems like wind turbines and solar panels." AECI covers a wide swath of Northern Illinois and employs an average of 100+ electricians and an inside support staff of field superintendents, project managers/estimators, CAD drafters, design coordinators, and administrative workers.

### Solving problems from installation to retrofitting

AECI's customers run the gamut from industrial manufacturing to municipal services to commercial facilities. About 75 percent of the firm's business is installation and ongoing service and repair. Another 15 percent is predictive maintenance, which covers thermal imaging scans, retorquing switch gear panels, and maintaining and retrofitting indoor and outdoor lighting. Emergency calls account for the remaining 10 percent of the firm's business.

**Tools:** 87V Digital Multimeter, 376 Clamp Meter, 561 Infrared and Contact Thermometer, 1735 Power Logger

**Operator:** Chipper Stohl, field service technician with Associated Electrical Contractors, Inc. in Woodstock, Illinois

**Applications:** Emergency troubleshooting and repair



In the high-power environment of a plastic injection molding plant, Chipper Stohl uses his Fluke clamp meter and iFlex™ flexible current probe to check the current draw on a newly installed 200-ton plastic mold machine.

Field service technician Chipper Stohl shares the emergency load with fellow field service tech Larry Hauschildt. Stohl has been doing electrical work since 1985, and has been with AECEI since 2005. His primary job is emergency troubleshooting and repair, although he also handles installations and preventive maintenance. “We all work as a team, so if I come up against an especially difficult emergency situation in a plant, I can call Larry and we put our heads together to quickly turn things around and minimize downtime,” says Stohl.

### Keeping wastewater moving

Any time a piece of machinery is down, response time is critical; but in the case of wastewater management, critical is an understatement. If a lift station pump goes down, that plant has a big problem. “I’ve had scenarios where an entire controller went down because of a phase failure relay, which means that pumping comes to a standstill,” says Stohl.

Stohl uses his Fluke 87V digital multimeter (DMM) more frequently than his other meters because it helps him identify very subtle indications of trouble. “I use the 87V every day,” says Stohl. “It helps me find super

small red flags like voltage differentials, a ghost reading, or a skewed reading from water soaked components. The 87V is also rated to Category III up to 1000V, which meets our safety requirements.”

In a typical scenario at the wastewater treatment plant, troubleshooting starts at the motor bucket. “I put my 87V in Ohms mode and take a motor winding resistance reading, from T1 to T2, T1 to T3, T2 to T3,” says Stohl. “When there’s a whacky reading between one of the points I know there is something awry between me and the motor.”

### Versatility and flexibility increase efficiency

In addition to emergency repairs, Stohl performs new installations. When a plastic component manufacturer decided to install new presses, AECEI ran all the feeder lines from the distribution gear to the new press locations. Before installing a new breaker for the added equipment Stohl performed an amp draw study to ensure the customer’s system could handle another 400A breaker.

The target 1600A panel board had a Square D I-Line vertical busway system that the breakers snap into. The feeder connects

from behind at the vertical midpoint. The bottom half of the line distribution gear was rated at 1000A, and the top half was rated at 645A due to the temperature rise.

“Just because you have space for that large 400A breaker doesn’t mean that you have the amp capacity to handle it,” says Stohl. “So I did an amp draw study on both the upper and lower halves of the busway to determine whether we had the ampacity to add the new breaker.”

The first challenge was to find a measurement clamp that would fit around large distribution feeders. “The i2500 connected to the Fluke 376 clamp meter shines in situations like this,” says Stohl. “The conductors were bundled very tightly together but I was able to snake the i2500 flex clamp right through a 3/8-inch gap between two conductors and get peak current and average current readings in record time.” It turned out there was enough capacity and the new breaker was installed.

### Maintaining consistent quality

Another customer—a concrete block manufacturer—relies on AECEI’s expertise to ensure consistent temperature and motor performance so that its blocks are formed properly. The concrete mixture is poured into an electrically heated mold system, which includes vibratory motors on top and bottom. Once in the mold, the mixture is compacted and subjected to a brief period of vibration to further compact the mixture.

If those motors aren’t working correctly, the blocks won’t form properly. “The press operators can hear when a vibratory motor isn’t functioning properly, so that’s when they call us,” says Stohl. “Just like with any other 480V motor, we use the 87V to do standard resistance checks starting at the supply and working our way through to identify a suspect motor that’s not vibrating enough.”

Along the way Stohl checks junction boxes to verify connections and takes direct resistance readings across T1, T2, and T3 looking for an unbalance. If a motor problem is found, the culprit is replaced and sent out for repair or replacement.

Blocks that don't form properly or don't stay together when removed from the molds indicate a heater or vibratory motor failure. There are multiple 240V heaters in each mold, each two-seriesed at 480V, so Stohl changes out the offending heaters and rewires the mold. "After the heaters are all connected we take balanced readings with the 87V across the delta of connection forms, just like the winding of a motor," says Stohl.

After confirming that the molds are electrically sound, Stohl confirms that the temperature at the mold is accurate. "The temperature controller says that the mold is operating at 125 degrees but we need to verify

that the mold is truly operating at that temperature," Stohl notes. "We put a Fluke 561 infrared contact thermometer on the shoe of the mold and if it also says 125 degrees, we have two sets of data to show the customer that it's operating at the correct temperature."

**Saving energy saves money**

AECI also helps customers improve energy efficiency with building automation and lighting retrofits. Not long ago, the firm saved a manufacturing customer the cost of an expensive service upgrade as well as monthly electricity costs by switching out HID light fixtures with more energy efficient lighting.

At the time, the factory's electrical service was maxed out and it couldn't add any more much needed equipment without an electrical service upgrade. To avoid that cost and increase

the customer's electrical capacity, AECI changed out a thousand 400-watt, high-based, HID light fixtures to a combination of fluorescent and LED lighting fixtures. That change not only solved the customer's power consumption problem; the energy savings paid for the cost of the new lights and the labor to install them, in less than a year.

"We used a Fluke 1735 power logger to record the load for 24 hours with the lights on and then with the lights off, to show what the lights were drawing before the retrofit. Then we did the same thing with the new fixtures in place," says Schnulle. "At the end we created a report showing that the retrofit cut their lighting energy consumption by more than 50 percent." As a result, the customer not only cut its lighting energy costs, but was able to add a couple pieces of equipment that it would not have been able to put in otherwise.



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**Fluke Corporation**  
PO Box 9090, Everett, WA 98206 U.S.A.

**Fluke Europe B.V.**  
PO Box 1186, 5602 BD  
Eindhoven, The Netherlands

**For more information call:**  
In the U.S.A. (800) 443-5853 or  
Fax (425) 446-5116  
In Europe/M-East/Africa +31 (0) 40 2675 200 or  
Fax +31 (0) 40 2675 222  
In Canada (800)-36-FLUKE or  
Fax (905) 890-6866  
From other countries +1 (425) 446-5500 or  
Fax +1 (425) 446-5116  
Web access: <http://www.fluke.com>

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Printed in U.S.A. 5/2013 4332287A\_EN

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