

Everett engineering puts Fluke tools to the test

Application Note

Testing Functions Case Study



Dan Martin concentrates on a new machine design.

Tools: Fluke 1735 Three-Phase Power Logger, Fluke 289 True-rms Industrial Logging Multimeter, Fluke 123 Industrial ScopeMeter®, Fluke 233 Remote Display Multimeter

Operator: Everett Engineering, Inc.

Applications: Monitoring and recording a winch, testing load cells and certifying the pulling capacity of tugboats, monitoring engine prop shafts, torsion testing on gearboxes

Everett Engineering is known for its ingenuity. From building a haul-out system for barges in Alaska to maintaining wind tunnel fans, this premier Northwest machine shop designs, fabricates, machines, fits, and welds to solve problems others can't.

Dan Martin, the company's owner and president, is a machinist by trade, an inventor and innovator by experience. If you tell him "It can't be done," he'll find a way. He founded the company in 1968, starting with less than 1000 square feet (93 square meters) of space and grew by taking on the dirty jobs. Today, with 40 employees and a 30 thousand square foot (2787 square meter) facility, Everett Engineering serves a diverse group of customers in marine, aerospace, railroads, and construction.

"We're a do-anything company, making one-of-a-kind machines," says Paul Visocky, Quality Assurance Manager. "We start with a customer's needs and then create something new, or re-engineer an existing solution that is either too expensive or doesn't work the way the customer needs it to." Everett Engineering specializes in repair or design modifications, which often cost the customer much less than building something new.



Paul Visocky, Quality Assurance Manager, at the Everett Engineering facility.

One example of Everett Engineering ingenuity is a machine they built to temper rope for a rope manufacturing company. A wire rope of equivalent strength would weigh several hundred pounds per foot. The tempered rope is so light it floats on water, making it much easier to handle. EE was able to re-engineer the customer's tempering machine and create one that cost a fraction of the original, saving their customer a significant amount of money.

For two US Coast Guard vessels, EE built a machine that can be used to bore out bad engine block cylinders. Instead of the three to six months of downtime required to replace each engine or to remove and reinstall, plus the cost of new engines, Everett Engineering is able to do the necessary machining in place.

For an aircraft manufacturer, they designed and fabricated a special mechanism that facilitates the replacement of the seals on 1,000-ton presses. Built to operate on-site, the machine eliminated the need to take the presses off-line and ship each of them across the country to the original equipment manufacturer (OEM) for repairs. That alternative would have cost the company a very substantial sum of money per press, plus shipping.

In Alaska, the winter freeze does a lot of damage to barges. So Everett Engineering, at the request of the customer, designed a barge launch for one of its customers, eliminating the fuel cost to tow the barges to ice-free storage. Now instead of spending time and money every spring to repair them, the customers can just pull the barges out of the water and make any needed repairs during their regular downtime. And it lowers their carbon footprint at the same time.

Unique testing challenges for one-of-a-kind machines

Every one of Everett Engineering's innovations has to be tested. This includes stress testing, quality control testing, and verification. For that work, they use a dozen different Fluke tools from clamp meters, multimeters, and power loggers to thermometers and ScopeMeter portable oscilloscopes. Almost all of the tools require CAT IV safety ratings because of the harsh environments in which they're used—outdoors, around marine vessels in seawater, and in high-voltage machinery rooms that are greasy, noisy, and exposed to hazards like passing trains.

Paul and his team have to be able to trust each tool to perform safely and reliably, every time, despite rain, grinding dust, or accidental drops. "When I pick up a Fluke tool, I know it will work," says Paul, "and trusting we're protected from arc faults is absolutely critical. I've seen photos of other meters that were in pieces after being plugged into 4160 volts. But I've been accidentally hit with high voltage

while using a Fluke tool and all I had to do was replace one fuse."

Here are a just a few ways Everett Engineering puts Fluke tools to the test on the job.

Power quality problems discovered onboard

One day, Paul got a call from a customer in Redondo Beach, California, complaining that a winch that Everett Engineering had built for one of its tugboats continually tripped offline. The customer naturally blamed the winch. Paul flew down to see the customer, monitoring and recording the winch in service over a 24-hour period with a Fluke 1735 Three-Phase Power Logger. Paul discovered the tripping was caused not by the winch itself but by a power quality problem. There were massive fluctuations in power, with spikes of up to 400 volts and distortions of 20 to 30 %. He used the tool to document his work and help the customer solve the root problem. This discovery gave Paul an idea. He began to monitor the power quality in his own plant. He was able to find and solve a low-lagging power issue affecting his machine shop.



Everett Engineering uses a dozen different Fluke tools to cover their diverse testing workload.

Fluke digital multimeters handle the hazards in a tunnel

On another job, the Everett Engineering team installed a new door for a ventilated tunnel. The door is a horizontal slider with louvers that release pressure as traffic approaches. After installation of the door, the variable frequency drives had to be tested for unusual failures. They used a Fluke 77 digital multimeter and a Fluke 867B Graphical Multimeter with a Fluke high-voltage probe for this installation.

Paul had a lot of faith in that Fluke tool. Once, while repairing a crane with a Fluke 77, the

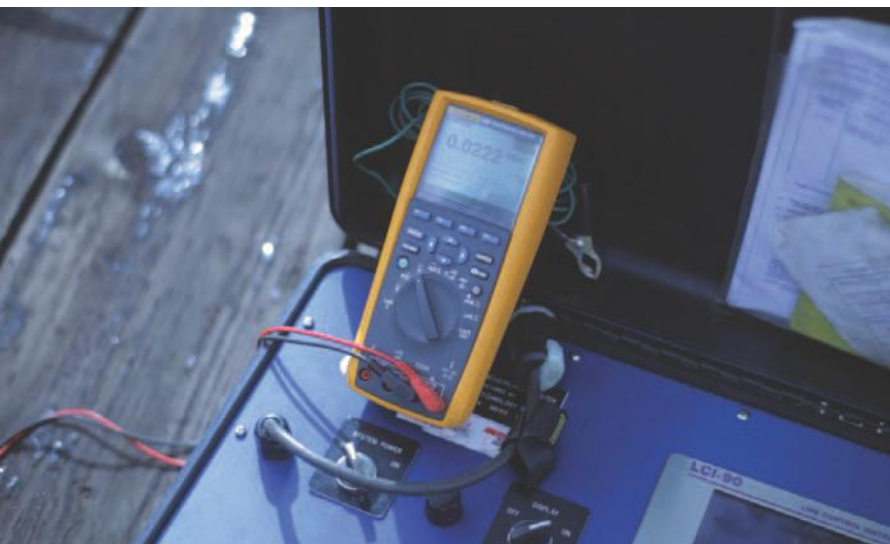
meter took a 60-foot drop onto concrete. The dial broke, but the meter still worked. "It's a very rugged meter," attests Paul.

After the Fluke 77 took that tumble, Paul replaced it with an equally rugged but more powerful Fluke 189 Logging Multimeter, safety rated 600 V CAT IV. Recently he upgraded to the Fluke 289 True-rms Industrial Logging Multimeter with Trend Capture, especially effective for tracking down elusive intermittent problems. He now uses the Fluke 289 to test load cells and certify the pulling capacity of tugboats. They also use it to monitor welded tail shafts of engine props for quality control

documentation and reporting to customers.

For torsion testing on the gearboxes of drawbridges, Paul's team turns to the Fluke 123 Industrial ScopeMeter® to balance the loading of weights and counterweights. And to assist with day-to-day maintenance troubleshooting, he's added a Fluke 233 Remote Display Multimeter. Its remote display lets one person safely perform two-person jobs.

When it comes to ingenious solutions, Everett Engineering is the "can do" company. When it comes to rugged tools they can trust, with their jobs and their lives, it's Fluke.



The Fluke 289 logs load cell data from the dock.

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