

FLEET **Maintenance**

Best Practices for Maintenance Management



Pump-side Maintenance

**This city fleet can now download its
diagnostic information at the gas pump**

Pump ↓ ↑ Talk

What could be simpler than downloading fault codes as your drivers fill up?

Efficiency and reliability are key components in the constant challenge to keep a large, geographically-separated fleet fueled and maintained. Over the past 18 years, Bill VandenBrook, Fleet Service Superintendent for the City of Madison, Wisconsin, has proactively been searching for the most effective way to tackle this challenge, and now thinks he finally has found the answer.

Madison's fleet is as diverse as the city itself. Everything from police cruisers to Park and Rec vehicles to snow plows to garbage trucks fall under the City umbrella. As a result of this diversity, the City has faced an uphill battle in ensuring each vehicle receives the correct fuel and correct quantities at each of its fueling stations.

OUT WITH THE OLD

In 1987, the City of Madison invested in what was then a new fueling system that allowed the fleet to accurately and effectively distribute and monitor fuel to all of its vehicles.

Dubbed Tech-21, the system was based on magnetic-stripped card hardware and a software suite that downloaded vehicle information into

a central database each time the vehicle was fueled. This allowed the city to track fueling and provided an easy means to schedule preventative maintenance for each vehicle based on specific mileage.

"The fueling pump takes two cards, one assigned to the vehicle, the other assigned to the operator," explains VandenBrook. "Each time the vehicle is fueled, the operator swipes both cards and enters the current mileage on a keypad. The pump will dispense the correct fuel for the vehicle and will

limit the number of gallons the vehicle can take. The pump also encodes the current mileage back onto the magnetic card. That information then gets downloaded to our maintenance database along with how much fuel the vehicle took and who fueled it."

As simple and useful as this system sounds, its limitations have been painfully obvious to VandenBrook and his staff over the past several years.

ORPHAN TECHNOLOGY

The most challenging aspect of the



system stems from the fact the company that produced Tech-21 in 1987 has been defunct for the past 10 years, essentially making VandenBrook and his assistant responsible for the upkeep and day-to-day maintenance of the entire network.

"We've had to replace hardware at the pumps, such as touchpads and displays, ourselves for quite some time," he says. "To provide all the care and feeding of the network, in-house, by the top two guys in our shop without any kind of factory support is very difficult."

Additionally, the two-card system and the manual entering of vehicle mileage continued to be a nuisance for the fleet.

"Cards get lost, broken, warped or demagnetized constantly," VandenBrook notes. "Operators can forget mileage as soon as they step out of the vehicle, or accidentally enter the wrong information into the keypads. While these problems aren't rampant, they certainly exist and highlight the need for a more user-friendly, up-to-date system."

IN WITH THE NEW

Realizing their current platform was rapidly becoming obsolete, the City of Madison began shopping for a replacement.

"We wanted a more passive system that required no operator interface and provided better data that was more reliable," VandenBrook explains.

With that in mind, the City began hitting the trade show circuit in the mid-2000s to take in the newer, more modern systems on the market.

E.J. Ward Inc. of San Antonio, Texas, was one of the companies providing fleet fueling technology that fit the needs of the city. After a two- to three-year process of convincing City of Madison authorities of the benefits of the upgrade, E.J. Ward was awarded the contract.

"This system will solve a lot of the

problems we've faced with our older system," notes VandenBrook. "First of all, we're not tied down to using cards anymore and it completely takes the operator out of the loop."

John Featherston, Vice President of Marketing for E.J. Ward, says that ease of use, high-quality hardware, and reliable maintenance information have been the cornerstones to the development of the technology.

"We wanted to make a system that was hands-free and could deliver as much information to fleet manage-

"They stopped making these pumps over twenty years ago, but we can put our units on just about anything."

ment as possible," he says. "To do that, we needed a system that ties in directly to the vehicle's onboard computers and provides the same fueling services the fleet is accustomed to."

As a precursor to the upgrade, the City of Madison system began with an in-house hardware installation for each of the vehicles in the city fleet. City maintenance personnel installed electronic rings inside the fueling port of the vehicle. Attachments to the ring tie directly into the vehicle's Onboard Diagnostic Computer.

Following completion of the vehicle installation, E.J. Ward's technical department arrived in Madison in early May 2007 to complete installation of the hardware suite to each the city's four fueling stations.

NO DIGGING

According to Michael Price, field representative for E.J. Ward, the new hardware is wired directly into the existing fuel pumps, and draws power from the existing power supply. In the

case of Madison's Badger Road fleet fueling station, the result is a shiny new metering unit grafted onto a somewhat battered old gas pump. Despite the strange appearance of old mixed with new, there's a purpose to this type of installation.

"They stopped making these pumps over twenty years ago," Price says, "but we can put our units on just about anything. If you've got a solenoid and a pulser on it, we can control it."

"This saves the customer from having to run conduit and dig up the ground and trench everything out," he explains. "It's wired into the pump's power, and then we use radio to relay the information to the server."

"The fueling nozzle has a 'black box' that interfaces with the ring installed in the vehicle," explains VandenBrook. "Information stored in the vehicle's diagnostic computer is transmitted to the computer in the nozzle and then is uploaded to the maintenance computers via an Internet connection."

Price adds that the system can work even without a radio connection to fleet's central server. He recalls an installation for Caltrans, a northern California transit service, that involved a single isolated fuel pump that was miles from the nearest fleet facility. The reader that E.J. Ward installed on this pump stored all the vehicle information on a flash card, and a technician from the nearest maintenance facility drives out to the pump and swaps out the card every week. Once the card is back at the shop, the vehicle information is downloaded and put to use.

FILLING UP

A typical fueling process begins as the operator pulls the vehicle into the service station. While the vehicle is running throughout the day, data is constantly being uploaded to the vehicle's onboard diagnostic computer. When the vehicle is shut down and the nozzle is inserted for fueling, the ring in the

The City of Madison's new fueling system adds a 'black box' to the fuel pump nozzle (left) that reads data from a ring installed around the vehicle's fuel filler opening (center) and transmits it to a computer server. The meter (right)

fuel port downloads information from the vehicle's computer and transmits it into the 'black box' on the fuel pump.

"The ring in the fuel port authorizes the correct fuel to flow from the pump and will stop flow once the desired quantity is reached," says VandenBrook. "For us, the biggest benefit is that the operator doesn't have to fumble with magnetic cards or try to remember mileage. The operator just has to pull up to the pump and gas up the vehicle."

"Information transmitted to the pumps includes engine time, idle time, oil levels, diagnostic codes, fuel consumption, engine faults and engine mileage," notes Featherston. "The data is then directly fed into the maintenance system and if problems exist with the engine or if the vehicle comes due for any periodic maintenance; the system will alert the fleet management real-time to the condition."

According to VandenBrook, this instant access to information, transmitted to fleet headquarters via an automatic e-mail, could prove to be invaluable if a serious maintenance issue exists.

GROWING PAINS

The City of Madison is convinced technology of this sort will greatly ease their operations in the future. But the overlap of technology still has the potential to have its glitches, however small.

For instance, not all vehicles in the fleet have Onboard Diagnostic Computers compatible with the new system.

"For those vehicles that either don't have a diagnostic computer or have one that doesn't chime in with our system, we need a source to update the mileage," says VandenBrook. "In



some of these vehicles we've had to use another E.J. Ward product that, believe it or not, ties into the vehicle's radio in order to tie directly into the odometer."

Other potentially crippling bugs are being addressed such as what to do if a vehicle can't take on fuel as a result of a hardware malfunction. For instances such as this, the City has installed keypads at each of the fueling sites that will allow for a supervisor to override the system, using a personalized code, and allow users to get fuel with out tying into the network.

"We know that operators will be getting fuel from the stations in smaller quantities, such as in small cans, that obviously won't be able to interact with the system," VandenBrook notes. "For this we've got the supervisor override system that allows these transactions to take place. Plus, if any problems occur while we're transitioning to the new system, or if we have any hardware failures, we'll be able to ensure the vehicles are still getting fueled when they need."

The system will also have the option of expanding into other areas of vehicle monitoring. "The biggest costs associated with fleet maintenance are typically fuel and tires," Featherston says. "We are looking at ways to monitor tires and tire pres-

sure through our systems as well."

Whether or not the City of Madison opts to invest in that advance in technology, VandenBrook is convinced that the investment in this kind of system has been a significant step forward for his fleet.

"The biggest benefit is the ease of use for our operators," he explains. "For them it's a no-brainer. The data collection is as good as any system I've seen. It's definitely typical leading-edge technology." **FMX**



E. J. Ward, Inc.
 Contact: John K. Featherston,
 VP Marketing
 8801 Tradeway
 San Antonio, TX 78217
 Tele 800.580.WARD (9273)
 Email: sales@ejward.com
 www.ejward.com