



Fuel Accountability for Towboats Enters 21st Century

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By David Murray

Companies that make a new generation of fuel accountability systems are hoping that the price may be right for barge and towing operators to take a closer look at them.

With diesel pushing \$4.00 a gallon in some markets at this writing, “Now is the time to look at these systems,” said Keith Darling, senior vice president of boat operations at Memco Barge Line of Chesterfield, Mo. Memco’s 56-boat fleet has not yet adopted a fuel accountability system, but Darling said one of their boats recently began trying one out.

Marine Cruise Control

Measuring fuel consumption is not new. Since the early 1980s, various systems have tried different technologies to meter fuel usage. But the suite of technologies we have today had not yet matured.

Charlie Lewis, director of vessel project management at American Commercial Lines LLC, says boats in one of their divisions have used an older fuel measurement system for 10 years. But this system has produced only “mixed results.” It saves fuel by adjusting engine speed to reduce drag in the propeller wash, maximizing thrust by giving the propeller the best bite. Lewis estimates fuel savings at only 3 percent. ACL is examining newer systems to increase fuel savings.

Unlike older systems, the new systems can integrate information from multiple data sources, whether analog or digital. Users can add meters or other input devices to fuel tanks, engines, generators, drive shafts, and other sources. The aggregated data from these sources, along with time and distance information from GPS tracking, is processed using proprietary algorithms in a “black box” toughened for the marine environment, and displayed on a bank of pilothouse screens. The pilot can use the data to adjust the throttle manually, or let an automatic setting control the throttle for optimum fuel usage.

“It’s like cruise control for your boat,” said Anthony George, owner of Nautical Control Solutions LP of Houston, a company spun off from Control Dynamics International. NCS developed FuelTrax, a fuel accountability system patented in 2006 and billed as the first complete system developed for the inland tug and barge industry.

Growing Choices

FuelTrax’s competitors are close behind.

Micad Marine spent six years developing its patented fuel accountability system, according to Micad Marine owner Ron Steinberg. Flow Technology is a newer player; its Fusion system has been available since late 2007.



Both companies have so far focused more on blue-water than brown-water operators. Blue-water operators typically have to absorb fuel costs directly instead of passing them through to customers. But the brown-water fleet is increasingly engaging these companies' attention.

Flow Technology's oil and gas market manager Paul Mason said feedback from tug and barge companies directly affected key design features of Fusion.

"We went to a lot of trouble to speak with operators, and a lot of the design features of Fusion reflect their feedback. A particular focus was the fuel meters. Operators were concerned about putting anything in the fuel lines that might choke off fuel supply, so we designed a 'fail-open' system where the meters can never block fuel even in failure mode," said Mason.

NCS worked closely with Kirby Marine and Teco Transport, among others. According to Steinberg, Micad Marine worked with 15 companies, both inland and blue-water, in the U.S., Canada and Europe.

All three companies have a background of developing flow-monitoring tools for the oil and gas industries.

Long Development

Between 2000 and 2002, Kirby Marine was introducing four-stroke engines into its fleet of towboats. Even back then, Kirby's canal boat maintenance manager Paul Soper says he was more interested in true fuel accountability than just fuel savings. That meant knowing where the fuel was going and what behavior contributed to the burn rate.

"The engine manufacturers had numbers in their specs," said Soper, "but they depended on all kinds of assumptions. We were basically taking their word for everything. And we were still measuring fuel consumption by putting a stick down a tank. That's like measuring river depth with a lead line! We were using 19th-century technology in the 21st century."

Kirby tried other systems before settling on a working relationship with Nautical Control Solutions. In its latest quarterly report, Kirby noted, "A major driver with respect to the 25 percent increase in marine transportation revenues was the recovery of higher diesel fuel costs."

Frying wires

The biggest challenge, said Soper, was finding a way to transmit engine data to the wheelhouse while blocking out engine noise. "There was a lot of heartache involved" in developing the system that became FuelTrax. George agreed: "The marine environment is terrible for electronics. We fried a lot of systems before we figured out how to transmit data. Ethernet cable didn't work. Fiber-optic cable finally killed the ghost signals we were picking up from engine noises and vibrations."



Beyond Fuel Savings

Fuel accountability systems can be about much more than just saving fuel. They can alert captains to fuel tank imbalances, which can affect some vessels' stability, and other potential hazards. Harbor tugs use these systems to bill customers the same day with precise fuel amounts, instead of an estimated surcharge. Steinberg said his system is useful for predictive maintenance – using data to shorten downtime and adjust engines and other components before they cause problems.

Along with the onboard monitoring system, some systems, like NCS's and Flow Technology's, offer the option of satellites to relay information to secure web sites where onshore office managers can monitor fleet data. Baseline measurements are established during a test cruise, which can be as brief as two hours. The longer the systems are in use, the more useful the accumulated data can become; Micad's system archives data for 10 years. Marine engine makers are beginning to explore mining data from these monitoring systems to provide feedback on their engines' performance.

Both Micad's and NCS's systems use Windows-based software. Flow Technology's fusion converts saved data to Excel spreadsheets, which Mason says most managers are already familiar with. Micad Marine limits its video displays to numbers and line graphs, so that they can be instantly understood in all languages – an important consideration for offshore companies with diverse crews. Micad says little or no training is needed to understand its displays.

A Monitored Future

Emissions control can be another important reason to consider these systems. They are “plug-in,” meaning they can be retrofitted to older engines.

Little hard data yet exists on whether these types of systems can help reduce emissions enough to warrant some kind of “green” certification. But George says it's an area his company is looking into. The kind of data provided by these systems will be increasingly required by the next generation of Tier III electronic engines.

“Engines have gone about as far as they can go in saving fuel and reducing emissions through physical improvements,” says Kirby's Paul Soper. “The next gains will have to come from control systems and exhaust cleaning.”

Towboats have always been greener and more fuel-efficient than trucks and rail cars when measured by ton-mile of cargo carried. But a future is coming where all forms of transport will be measured by how clean and efficient they are by the gallon.

Soper sums it up: “The fully monitored boat is the boat of the future.”