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The MARITIME EXECUTIVE

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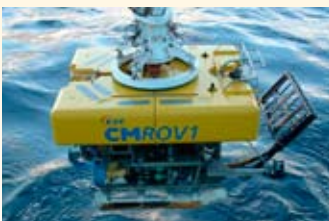
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Calico Coatings: SLICK, FAST AND CLEAN

The biggest name in coatings

(that you never heard of) is vying to help solve the engine problems of the workboat industry as it races to comply with new emissions standards. Calico Coatings and its founder, Tracy Trotter, aim to bring the very same technology that race car teams depend on every day to a market that might not be ready for the good news. But as the IMO, EPA and U.S. Coast Guard hail the adoption of new emissions standards for large diesel ships, the maritime industry may not necessarily have to be dragged kicking and screaming into Calico's way of thinking. The reasons why may surprise you.



The New Normal for Marine Operators

The stricter emissions standards for most large marine vessels are not coming – they are here. Churning in the sloppy wake of that reality, today's marine operators are rightfully concerned about meeting and/or exceeding those standards. Most of them are concentrating on what comes out of the stack; however, this may be the least of their problems. Calico Coatings, with its ceramic internal engine coatings solution, thinks it has all the answers. They just can't prove it – at least not yet.

Racing Roots – Real Results

Tracy Trotter's first passion is automotive racing. Calico's founder says enthusiastically, "We're racers. We pretty much started Calico so we could afford to go racing. That's our first love – anything with an engine, pretty much." Started in 1997, Calico along the way picked up some industrial customers. Trotter freely admits, "You can make a good living at racing, but the industrial applications are where the action is, as far as the big numbers."

Tracy Trotter has always been around coatings. As a kid, he kept a car at A.J. Foyt's shop in Houston. Eventually, and through that relationship, Trotter went to work for an industrial coatings company. After that, he left and moved to North Carolina to get closer to a racing industry that generates more than \$6 billion in revenues annually in the Tar Heel State alone. After helping another coating company get started, he decided to open his own shop.

The racing business is a secretive profession, where one-hundredth of a second can mean the difference between first and fourth place in the big races. For that reason alone, Trotter was reluctant to provide the names of his business customers. He did offer, "I can't think of any major NASCAR race car team that does not run with our coated parts, every Sunday. Every car running has something coated – whether that be the engine or drive train – with Calico coatings." In fact, says Trotter, the demands on racing

engines are such that anyone who would try to compete at a NASCAR track today without internal engine coatings would be doomed to failure.

Industrial Clients: Understanding Needs, Providing Solutions

Calico Coatings is a well-known brand within the insular world of motor racing. Less obvious, but no less successful, is its penetration into markets such as the military, oil and gas, recycling and others.

Trotter himself is no stranger to the oil industry, having worked previously with mechanical seals for

pumps. He adds, "This won't be the first time I've run into the oilfield crowd. I grew up in Texas near those plants along the Gulf Coast. I've been inside all of them."

A common use for Calico Coatings products is found in the engines in industrial landfills. There, methane is tapped from landfills for a multitude of uses. The gas is extremely dirty and the coatings keep the piston heads clean, reduce carbon build-up and extend piston life. Now Calico is working on developing skirt and ring coatings as well. Trotter's right-hand man, Gary Huffman, says, "We marry up the coatings side of the equation to the needs of the customer – and we'll do just that in terms of the marine industry. We've already moved beyond reducing carbon build-up – now we are also focusing on the life of the piston."

Proven Track Record

A skeptical marine industry will demand data before jumping aboard the coatings bandwagon, especially since a mistake in the new "Tier 2 engine" game could prove to be expensive. Coatings have been around racing since the 1960s, but Tracy Trotter freely admits that people didn't start having much success with them until the late 1970s. Today, Calico Coatings boasts of increasing the efficiency of racing engines by as much as three percent.

Fuel economy came to racing late in the game. But to today's NASCAR gamer, three percent in fuel savings is an extra two laps. "You are also referring to horsepower," Trotter added. "Think about it this way: If you have a three percent advantage over the rest of the field at Talladega or Daytona, you'll lap the field. In fact, everyone at the highest levels of racing uses coatings. If you didn't use coatings, you probably wouldn't finish the race." Beyond this, the basic engine package used in NASCAR is similar to that used in the workboat industry – 1950s' technology. The car engines weren't designed to have more than 250 HP – now they're getting 950 HP, close to 970. So only with technology – better materials and coatings – have they been able to achieve those efficiencies.

life of certain parts since a big part of the money in the marine power game comes from the sale of replacement parts. Time will tell if the use of coatings will impact this metric.

Negating the Loss of Lubrication: Calico's Been There, Done That

Today, achieving a "greener" marine footprint also means the removal of sulfur from marine fuels. The practice also removes a critical lubricant for engine parts, especially valve seals and related components. Arguably, then, what marine operators

should be more concerned about is the premature failure of critical engine parts. One way to combat this is to use expensive additives. But that option also involves ensuring that the additives are added correctly, on time and in proper proportions – a growing headache on thousands of ships.

It turns out that Tracy Trotter has already "been there, done that." He explains, "In racing, we have already gone through a similar evolution. About three years ago racing engines went from leaded gasoline to unleaded gasoline. So racing teams had to use coatings to make the engines survive because of the loss of lubrication associated with the absence of lead in the fuel. This change was anticipated for at least ten years, during which time the proper coatings were developed to combat the problem."

The typical racing engine, in the absence of leaded fuels, will not last 200 miles without coatings. The marine industry, with the loss of sulfur in marine diesels, is about to go through the same process. The widespread use of internal engine coatings may, however, obviate the need for additives.

A Low-Cost Insurance Policy

The obvious wish list for every marine operator should include reduced emissions, increased horsepower, higher revolutions, lower oil temperature, cooler running engines, and less friction and wear. How to get there cost-effectively is less clear. Burning cleaner and running longer on less fuel are worthy goals. But NASCAR hasn't, at least for very long, been too concerned with either of them. More important to NASCAR teams is the issue of engine wear-and-tear.

Engine bearings are just one of many parts that can fail, both on the track and at sea. Tracy Trotter explains, "We have a NASCAR customer who used to throw away his engine bearings after one race. Today that same customer, using our coatings, might run those same engines for three races. In fact, when he finally does replace the bearings, they are still good, but they don't fit in the bore house anymore."

Teaming Up: NREC Test-Drives Calico Coatings

The Calico/NREC Power Systems partnership is a curious one. After meeting at the Workboat Show last year, NREC (National Railway Equipment Co.) – one of the largest after-market suppliers of locomotive and marine engines – admitted it was having issues with engine bearings. And although NREC knew very little about Calico, they invited them to their facility in Houma where it was agreed that testing of Calico's coatings would begin by "base lining" an engine on a dynamometer. After determining performance in a normal mode, the engine would be run and tested again with coatings on specific parts. That testing is ongoing as this edition of MarEx went to press.

NREC spokesperson Richard Fournet told MarEx in October, "We look at new products every day. Our product quality has to be higher than the original equipment manufacturer (OEM). So for us, we are always looking to improve our product for the customer." In the world of industrial engine rebuilding, that also means offering an equivalent or slightly better warranty than the OEM provider at a significantly better price. Typically, NREC can rebuild a marine engine for about half what a new one would cost. With Calico's coating solutions, it saw the possibility of doubling the service life of critical components while eliminating the need for expensive fuel additives.

Gary Huffman tempers some of the excitement by saying, "I don't think there's any doubt we're going to have some success in the marine markets with NREC and wherever we go after that. The only question is how much success are we going to have? The coatings will prove themselves out. We understand combustible engines and how they work. Once we understand what the needs of the marine industry really are, we'll develop an appropriate coatings solution."

Breaking into the marine engine business won't be easy. OEMs aren't necessarily going to be thrilled at the use of coatings that might increase the

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ENGINE BUILDERS – ALTHOUGH NOT YET IN MARINE APPLICATIONS – USE CALICO’S CT-1 COATED ENGINE BEARINGS TO SAVE TIME AND COSTS DURING REBUILDS BY NOT HAVING TO CHANGE AND REFIT NEW ENGINE BEARINGS.

Coatings are also important for other reasons. In racing, the person working on the engine day after day is highly skilled on that one engine. But on a typical marine platform, engineers rotate frequently so that different people – with a wide range of competence and experience levels – will be working on the same engine. Lubrication and coatings become even more important in such uneven industrial environments.

In racing, coatings are also considered “insurance” policies. Coatings give that little cushion in case of loss of oil pressure or overheating. At the end of the day, the bearings are the cheap parts – and coatings can and do prevent the damage that can occur and lead to a much more expensive repair. The workboat world runs 24/7, 365 days per year. So this has always been incredibly important. Now there may be a better way to approach the problem.

Efficiency = More Complete Burn

Discounting the importance of engine parts life and the loss of lubrication

caused by today’s low sulfur marine diesel fuels, the two biggest concerns for marine operators are better fuel economy and reduced stack emissions. Short of running at reduced speeds at a time when bunker prices are literally eating the profit out of the bottom line, owners are searching for a better way to create fuel economy.

Tracy Trotter can demonstrate that internal coatings can and do generate a three percent improvement in efficiency in a racing engine. What could those coatings do for a mass-produced marine engine with much greater tolerance in bearing clearance and other qualities? Trotter doesn’t yet know. But three percent in terms of fuel efficiency on a daily basis is a huge number for today’s offshore workboat operator. If a 180-foot supply vessel burns about 90 gallons of diesel fuel per hour and that operator is spending \$5,000 per day on fuel, then a three percent savings in this line item could easily amount to as much as \$50,000 annually. The cleaner (more complete) burn is an added incentive.

Emissions from stock car engines have rarely been an issue over the years.

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That's because the typical stock car engine runs so lean that it is far cleaner than the average street car. Tracy Trotter admits, "We won't know until we get real-world data on it after sticking one of these engines with coated parts into the ship. But in every other area we've used these coatings, we've seen measurable gains. Coatings promote better combustion in the chamber. Fuel is burned more efficiently and puts less carbon out the exhaust. The more efficient burn also serves to increase horsepower and lower the environmental footprint." In the world of marine cargo, that translates into more cargo per mile and less environmental impact per ton of cargo.

**The Calico Hat Trick:
Less Wear-and-Tear, Better Fuel Economy
and Reduced Emissions**

Calico has yet to install a single coated part into a working marine engine. But owners facing the challenge of regulations that mandate significant reductions in NOx, PM, and SOx levels have bigger problems to solve. Along with the installation of more expensive engine technologies to meet future environmental standards, owners must also achieve better fuel economy while burning more expensive "green" fuels that also potentially increase wear-and-tear on engine parts because of reduced lubrication properties.

For its part, Calico Coatings promises an economically priced solution. Amortizing the initial cost of coatings over the increased life of various engine parts will, they say, provide measurable savings down the road. Calico's CT-1 dry film lubricant used on engine bearings, valve springs, oil

pump gears, timing and transmission gears is 0.0002" to 0.0004" thick and – according to Calico – generally does not need extra clearances. Tighter piston-to-wall clearance will result in faster sealing and longer ring life.

Calico recommends coatings for engine bearings, pistons, oil pumps, combustion chambers, exhaust ports and valves, transmissions and shifters, rear ends, wheel bearings and many other parts. Engine builders – although not yet in marine applications – use Calico's CT-1 coated engine bearings to save time and costs during rebuilds by not having to change and refit new engine bearings. Calico also reports that its customers have seen reduced damage in engines from heat and lubrication-related failures.

Ramping Up to Meet a New Challenge

Calico will have to gear up to meet any new industrial demands from the marine sector. But the company that started out serving the tightly focused racing industry has expanded before and now boasts more than 10,000 square feet of production space, up five-fold from just 10 years ago. And while there's no guarantee that anything will come of its efforts to expand into the marine sector, Tracy Trotter will tell you, "For many years, racing engine manufacturers would tell their customers not to coat their engine parts. Today, they compete against us in the coatings game." Far away from the racing oval, a much larger market awaits on the water. The guys who know next-to-nothing about the workboat industry and everything about internal combustion engines may just be poised to change how that industry powers, protects and operates its engines.

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