



When someone says to you, “This new technology is basically the ‘Holy Grail,’” you’re going to stop and listen. Who wouldn’t? That’s exactly the reaction the “masterminds” behind Turbine Stimulation Technologies (TST) have gotten in light of their new turbine-driven frac pump.

Oil well stimulation encompasses various applications, including hydraulic

able decrease in capital expenditures.

Essentially, due to the turbine engine’s lower weight, two pumps can be mounted on one truck. Weight and space efficiency are always factors in any installation, and the turbine is unparalleled in these arenas.

The applied power from the split-shaft turbine engine is the most important aspect of TST’s frac pump. The initial reason for this pump was to decrease size and weight, but testing discovered the true gem — the engine is able to perform at levels where the diesel counterpart cannot.

At high pump pressures, a diesel engine must utilize a gear reduction via a transmission to provide sufficient power to fight and overcome pressure increases. When gear reduction occurs in a diesel system, pump rate is sacrificed. Consequently, when high pump rates are needed, the gear ratio utilized in the transmission sacrifices pressure. The turbine engine covers both ends of the spectrum.

The engine can produce the needed power to obtain the desired pump rate at the maximum pressure specifications of the pump. The testing of TST’s pump proved that the hydraulic horsepower of the pump package could be easily doubled. This reduces the number of units required to provide a service by 50 percent while still maintaining power needs.

Because available units are reduced, this also reduces the time it takes to set up the equipment on a customer’s well site. This increases the operational efficiency of the company, which in turn increases the available utilization of the equipment.

“Our frac pump is about 6 feet by 16 feet — the comparable one would be more like 35 feet by 8 feet,” said Chad Touchet, TST’s president. “Basically, the pump flows better and can produce faster.”

An average treatment utilizes 15 or more tractor-trailers to transport all equipment to a well site. All of this equipment must be connected together to

create a common single system. With TST’s frac pump, six tractor-trailers could essentially be utilized to accomplish the same task.

Environmental impact

Turbine engines are more environmentally conscious than their diesel counterparts, and in an industry that is constantly striving toward more “green” operations, this is an important feature.

TST’s frac pumps are environmentally friendly units, including low emissions, less sound and the elimination or reduction of oil spills that accompany diesel engines.

It’s all in the engine

Pumping equipment used in oilfield service work has typically been driven by reciprocating engines (gasoline or diesel), electric motors and turbine engines. The turbine engines previously used were a single-shaft turbine (or free turbine) designed to run at a constant speed. This allowed for very little control, depending on the redirection of the fluid being pumped to control flow and pressure.

TST’s frac pump utilizes a split-shaft turbine to control flow and pressure.

The turbine used in TST’s frac pump offers some tremendous advantages:

- Reduction on weight: The free turbine is typically one-fifth the weight of comparable diesel engines.

- Reduction of mass: The free turbine is on average 80 percent smaller than a diesel engine.

- Reliability: Because all of the moving parts rotate, turbines are well suited to run at high horsepower and continuous RPMs for extended periods without self-destructing like piston engines. Internal lubrication is dry-

sumped and is never exposed to the combustion chambers, greatly reducing contamination and extending preventative maintenance intervals. The highest quality parts and materials are used to build these engines, meaning that the likelihood for failure is much lower than in reciprocating engines. In high performance applications, “recips” are unlikely to last more than a few hundred service hours, whereas turbines are expected to last several thousand service hours between overhaul.

The turbine frac pump incorporates a management system called Smart Pump. In conjunction with the engine’s Smart Start™ technology, this system is used to

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fracturing, frac-packing, acid/chemical stimulation, gravel packing, water fracturing and high rate water packs. These are the types of applications that TST’s turbine-driven frac pump can really make a difference in.

So how exactly is this pump the “Holy Grail”?

More horsepower, smaller footprint

TST has found the technology that major service companies have been seeking for more than 40 years. The “majors” searched for this technology, but their equipment was either an all or nothing power source.

“Others had tried this technology in the ‘70s, but the turbines weren’t compatible with the pumps,” said Ted McIntyre, one of TST’s owners.

All of the pumps currently being utilized in the well service industry are powered by diesel engines coupled by a transmission. The approximate weight of the engine, transmission and ancillary equipment associated with a similar needed package is approximately 21,000 pounds. The pump contributes an additional 14,000 pounds. That’s 35,000 pounds compared to the turbine package of approximately 18,000 pounds — a sizable increase in logistical efficiency and a siz-



Turbine Stimulation Technologies has found the technology that major service companies have been seeking for more than 40 years in its turbine-driven frac pump.

monitor and control the pump’s operation. During oilfield pumping operations it is common to have multiple units manifold together. This system allows for control of multiple units by one operator.

The turbine engine is coupled to the pump by way of a flexible coupling, which minimizes torsion shock load — another difference from what is typically used in the industry.

The people behind the power

TST is a collaboration between McIntyre, president of Marine Turbine Technologies (MTT), a leader in turbine

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innovation made famous by its motor-sports division featuring the MTT Turbine SUPERBIKE, and a team from Hub City Industries, a company that specializes in well production services such as acidizing and cementing. Both are Louisiana-based companies, deeply involved in the industrial market and

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hungry for innovation.

McIntyre started MTT in 1987 with "toys" like high performance watercraft for racing offshore. From there, the company propelled itself to the forefront of turbines, partnering with the military to power vessels.

After proving itself as a producer of the ultimate in high performance machines, MTT infiltrated the industrial marketplace by creating its fully portable fire pump system. The units are extremely versatile, as they can be used for fire suppression, irrigation, water jetting and pipeline construction. The pumps were recently used to help in the Port of New Orleans and will soon be in action in Alaska. The MTT Turbine FP4400, a compact unit that fits in the back of a pick-up truck with the pumping capacity of four fire trucks, was recently demonstrated at the Port of Greater Baton Rouge, La.

McIntyre then began pushing the envelope, in turn developing the first turbine-powered motorcycle. The MTT Turbine SUPERBIKE has successfully set two new Guinness World Records for "Most Powerful Production Motorcycle" and "Most Expensive Production Motorcycle" and has been featured in numerous TV shows and magazines.

Despite the "glamorous" side of the business, McIntyre said the company's industrial work has been its "bread and butter."



Marine Turbine Technologies' fire suppression pumps sit on this tugboat, circling an oil rig in Cozumel, Mexico, to keep the rig safe from the flame-out of natural gas.

Touchet, the fracturing expert of the bunch, met McIntyre in January 2005, and the two first discussed forming TST. In May 2005, Touchet went to work with John Egle, president of Hub City Industries, in an effort to move the company into the fracturing segment of the industry. Touchet introduced Egle to the possible venture with McIntyre.

"Fracturing is what I've been doing my whole career," Touchet said. "When I heard what Ted was trying to do with the turbines and pumps, a light went off in my head — it's technology that everybody has been looking to accomplish, but hasn't been able to. I saw a chance to make it happen."

"I was excited because it was such new technology

that was so much more advanced than anything I had seen," Egle said. "I saw so much potential in earnings because it's so far beyond what is out there. There was no doubt in Ted and Chad's minds that this was going to work."

Also part of the team is Glenn Dauterive, who works in marketing and business development for TST. He and Egle have worked together on and off for the past 18 years.

"This technology has really evolved since we have nursed it along to the point it is now," Dauterive said. "In talking to my customers — many that I've known for 25 years — that work in the types of areas where this would be employed, they're saying this could revolutionize their method of operations in fracturing.

"The fact that this frac pump minimizes the footprint, makes operations less costly and is also environmentally friendly is a big plus to customers."

Overall, TST management has more than 200 combined years of oilfield fracturing experience from companies like Halliburton, Schlumberger, BJ Services, Western and Baker Oil Tools. The company's engineering management are pioneers in many of the current fracturing technologies and frac liquid developments. In addition, field personnel have a minimum of 10 years' experience in "hard rock" fracturing.

Room to grow

Dauterive said TST's target markets are geographically driven, geared toward where the most drilling activity is located.

"Right now this is the Ft. Worth, Texas, Basin, which is the Barnett Shale gas play, and soon to be in the Arkoma Basin, which is the Fayetteville Shale gas play," he said. "The full package we offer will fit perfectly for work in these areas."

Located in the Ft.

Worth Basin, in the outlying Dallas-Ft. Worth metro area, the Barnett Shale is one of the largest natural gas plays in North America. Its hydrocarbon system is one of the 10 richest in the world, due to the massive organic matter deposited in this setting. Low-risk exploration and low-risk fracturing due to nonreactive reservoir characteristics make the area a lucrative one.

The number of rigs



The MTT Turbine FP4400 is a compact unit that fits in the back of a pick-up truck and has the pumping capacity of four fire trucks.



Turbine Stimulation Technologies is a collaboration between Ted McIntyre, pictured above, president of Marine Turbine Technologies and a team from Hub City Industries, including Chad Touchet, John Egle and Glenn Dauterive.

frac job, wanted to know how quickly TST's operations would be up and running in that area.

"There is an absolute and definite need for more frac providers," he said. "No way can the current service companies come close to accommodating the demand."

For more information, call (337) 984-3890 or e-mail ctouchet@turbineestim.com. □

The 'Holy Grail' in Oilfield Stimulation

TST's turbine-driven frac pump has many advantages:

- Size and weight enhancements.
- Increased hydraulic horsepower per unit.
- Smaller package footprint.
- Ability to perform in limited space applications.
- Pumps are available to be utilized as stacked units.
- Self generated primary or backup power.
- Smaller turbine-powered blending systems.
- Smaller turbine-powered hydration/chemical additive systems.
- Environmentally friendly units (including emissions, sound and the elimination or reduction of oil spills that accompany diesel engines).

in the Barnett Shale region increased 21 percent in 2005, demonstrating that the area has the room to grow.

Another market, one that TST has deemed "the next Barnett," is the Arkoma Basin in the northern part of Arkansas, which features the Fayetteville Shale. The Fayetteville Shale is an unconventional gas reservoir, ranging in depths from 1,500-6,500 feet. Total proved gas reserves booked in the play in 2004 totaled 7.5 bcf from a total of 20 wells, 10 of which were classified as proved undeveloped locations.

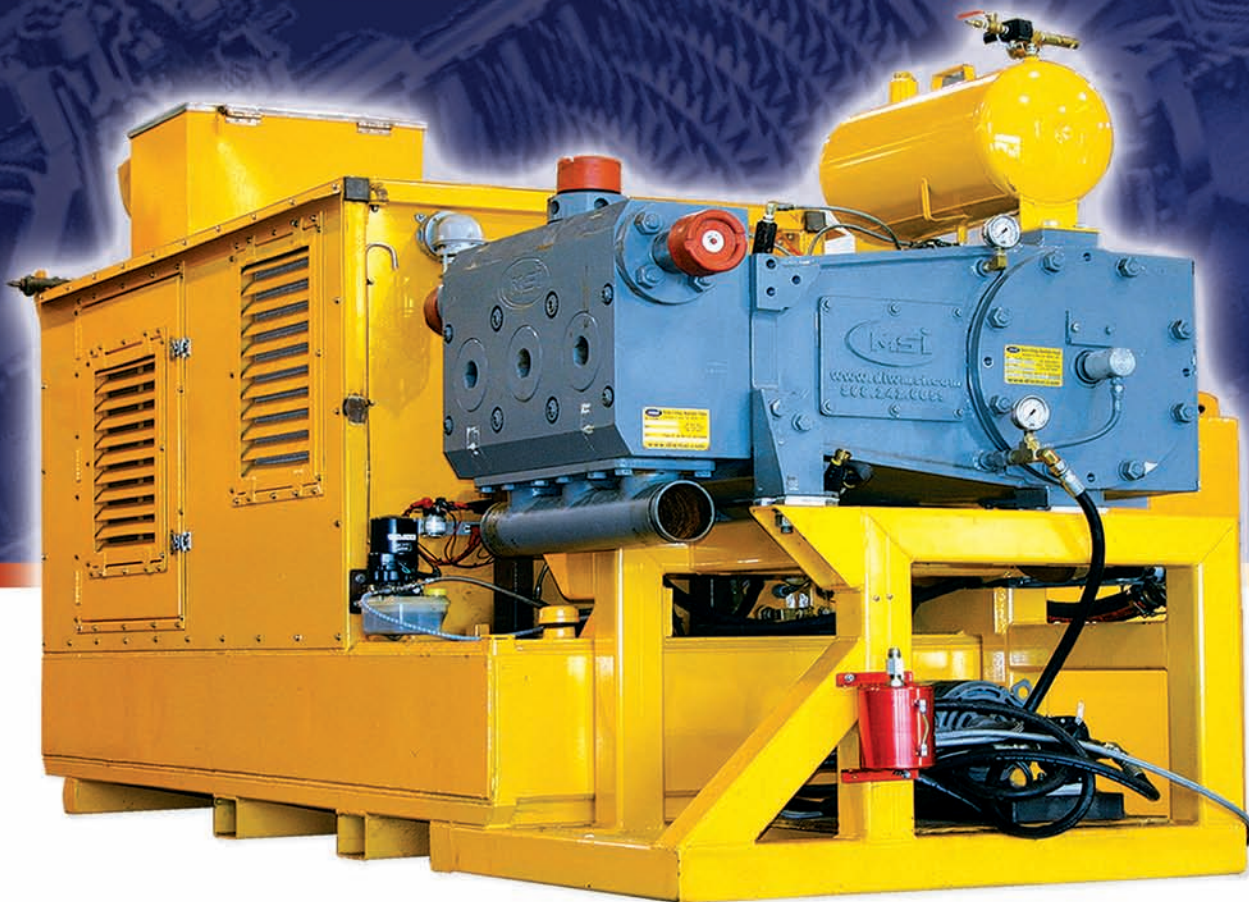
TST plans to roll out its first spread — a complete package consisting of the primary and ancillary equipment needed for fracturing — in June.

A recent conversation between Dauterive and a senior staff drilling engineer with an independent oil and gas producer based in Lafayette, La., is an indication of the ride TST is about to embark on.

The drilling engineer, who had just returned from the Ft. Worth area after witnessing his company's third

the **Jet Frac** **Revolution**

Turbine Stimulation Technologies



TST's turbine-driven frac pump is the next revolution in oilfield stimulation, packing a powerful punch with more horsepower and a smaller footprint. With improved efficiency, the need for less equipment and less emissions and sound, TST is making waves in the industry.

- Reduces size of operation by 50%
- Capital expenditure reduced by 30%
- Increases operational efficiency
- Reduces negative environmental impact
- Increases logistical efficiency



Turbine Stimulation Technologies • 337-984-3890 • www.jetfrac.com

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