

DRILLER APPROVED

Schramm & T455i Get Stamp of Approval from Seasoned Drillers

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Eichelbergers Inc, Mechanicsburg, PA*

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EICHELBERGERS EVALUATES HIGH TECHNOLOGY DRILL RIG

When Eichelbergers Inc. had an opportunity to evaluate Schramm's new-model T455i rotary top head drill, the company took it. Eichelbergers is one of the leading water-well drilling contractors in the Mid-Atlantic States, employing 125 people and owning/operating 25 drill-rigs. New technology and innovations are always welcomed by Eichelbergers. To illustrate how focused the company is on new equipment technology, Jerry Rice, President and CEO for Eichelbergers, says he is always interested in continually adding new equipment technologies for it is congruent with his philosophy of diversifying the company's activities. In fact, responding to new technologies is one of the reasons the company continues to be on the cutting edge of earth-related services that include water-well drilling, geothermal drilling, water-well and ground monitoring, earth-sample coring and a host of various remediation services.

The company serves Pennsylvania and neighboring states with some of its services but water-well drilling projects are primarily confined to within a 50-mile radius of its corporate headquarters in Mechanicsburg, Pennsylvania. Of the 25 drill-rigs in the fleet, 16 are the air rotary type. Seven of these rotary drill-rigs are Schramm models T555, T450W and T450WS. According to Rice, the Schramm product is gradually replacing other make drill-rigs in the fleet because of the outstanding product reliability and the services offered by Schramm.

New Model Cutting-Edge Schramm Drill-Rig

According to Rice, the company seized the opportunity to try out the new-model T455i drill rig because for the first time, a drill manufacturer is offering a drill rig with a computer-controlled drilling system. Gone are the plethora of hydraulic manual-control levers, gone is much of the guess-work associated with the drilling process, which made it challenging and difficult to train new would-be operators. With this new technology, there is a more efficient and precise drilling procedure resulting in higher production rates. "We wanted to evaluate this unique technology offered on a drill-rig for ourselves. So far, we are quite impressed with the technology and it could be the way things will be done with all future drilling," says Ted Gayman, Executive Vice President.

Actually, Schramm has made available for the past year a prototype T455i drill-rig to various water-well drilling contractors where the drill-rig was used on actual water-well drilling projects. Each contractor used it day-in day-out for at least 6 weeks each. One contractor, Buehler Drilling, used it for three and one-half months with outstanding success. As is Eichelbergers Inc., the other contractors are some of the leading water-well drilling companies in the respective areas they serve. "We wanted the contractors to push the drill-rig to the limit because we wanted to find where the bugs, if any, might be. After a year of hard drilling use, we found none of any significance," explains Brian Brookover, an engineer for Schramm and a major contributor to the drill-rig's control system.

What It Is All About

The news-worthy feature about the T455i drill-rig is its control system designated the **i-Control**® center. This new control center eliminates all the hydraulic actuated levers that have traditionally enabled the operator to control the drilling process but was an arduous learning effort for inexperienced operators. The entire multitude of levers is replaced with two joysticks.

Major Components, Major Differences

The **i-Control** system is not a traditional hydraulic-actuated control system but a system that electronically actuates the hydraulic components. Further, the **i-Control** system includes both PLC (Programmable Logic Controllers) and the HMI (Human-Machine interface) concept.

•**Stage-I** Once the total wanted weight to be placed on the drill-bit face and its rotational-torque-limit capacity is pre-programmed by the operator, the five-stage drilling procedure can commence. The **i-Control** system captures and logs these operator values-inputs and continuously and automatically reconciles the optimum hold-down pressure to be put on the drill-bit face. The system automatically determines and includes the string weight before determining the final hydraulic down pressure.

The benefit to this action is, all the guesswork for the operator in trying to place the optimum weight on the drill-bit face is eliminated.

•**Stage-II** As the bit is advanced down the hole to make contact with the ground (usually rock) face, the force (weight) placed on the drill-bit is automatically reduced until it makes contact with the ground face to be drilled. As the air pressure increases by this action the weight on the drill-bit face also increases.

The benefit to this action is in eliminating the crowding of the down-the-hole hammer and consequently, the common fracturing of the drill-bit's carbide buttons is avoided.

•**Stage-III** As the drilling advances, the penetration rate is recorded in real-time and displayed on the **i-Control** Monitor. Automatically and constantly the drill-bit rotation speed is regulated to achieve an optimal drilling advancement rate in ratio with the drill-bit's rotation speed.

The benefit to this action is optimizing drilling productivity and efficiency.

•**Stage-IV** As the drilling proceeds, the **i-Control** system continually captures both the air-line pressure and the drill-bit's rotational torque. At any time the drill-bit encounters a heading that is partially or fully void, it is automatically detected by a drop in the air-line pressure and the drilling status returns to Stage-II. Likewise, if the drill-bit rotational torque is 60 percent of the torque-limiter setting, the total weight on the drill-bit is accordingly reduced and total weight resumes only once the drill-heading conditions have returned to normal.

The benefit to these actions ensures longer drill-bit life with no carbide button bits fracturing.

•**Stage-V** With one round of drilling advancement accomplished, The *i-Control* system retracts the drill string a short distance and pauses until the borehole air-pressure stabilizes. Once stable, the string assembly (connected to the rotation gearbox) is farther retracted to the position where the holding fork can be indexed into the drill pipe slot as this puts the whole drilling process on temporary hold. It is at this point (with Stage-V completed) where the operator can intervene at will and command the drill to carry out other tasks or to start another drilling round that includes the five stages.

The benefit to this action is it increases the life of the drill-bit's torque-spline section and reduces possible drill-bit shanking caused by it extending ahead of the down-the-hole hammer. It also eliminates the operator having to manually bring the string to the correct position for indexing it with the holding fork.

More

The drill-rig's cooling fan speed is continuously regulated to a minimum speed that is just adequate to hold operating temperatures of the engine, compressor and hydraulic oil system within preset values. This not only reduces fuel consumption but considerably lowers the operating noise created by the drill-rig.

Any activities associated with tripping pipe are done in steps automatically as far as rotation gearbox travel positions and lazy-susan pipe position indexing. One of the benefits of the trip-mode is the operator is no longer obligated to look high at the rotation gearbox as it being is positioned to receive the next drill rod from the carousel. Simply, the operator actuates each step from the *i-Control* center panel, while all positioning and indexing are carried out automatically.

There are some other unique features to be found with the *i-Control* center. They include a comprehensive on-board diagnostics system for monitoring the electrical and hydraulic systems as well as all functions of the engine, fan and vital in-operation drilling data.

The attributes of the T455i and its *i-Control* Center have been well demonstrated to Eichelbergers. The plus that resonated greatest with one of Eichelbergers operators, Troy Toland, was how easy it was for him to learn how to operate it. Troy operated the drill-rig on some of the water-well projects. Another operator who spent time operating the rig was Kevin Weigle, assistant field superintendent of operations and maintenance. He is also a master drill operator.

The ease of learning how to operate and be proficient with the T455i drill-rig has been of the utmost importance with the other contractors and their operators. This enables to add more drill operators more quickly than is possible with the old drill control technology. To illustrate how quickly one can learn, Toland has been an assistant drill operator for the past five years, working with conventionally-controlled drill-rigs. To his surprise, he found himself operating the new drill-rig after two days of supervised practice. He says, "I was amazed how much easier this drill is to operate than the old-model drills that have over a dozen levers. This has just two joysticks to control the drill for most operations and I was already familiar with joysticks because they are used with most video games. I was drilling an average of 350 feet an hour in shale with this rig. I sure hope the company will buy one of these drills because I would love to operate it."

Jerry Rice, who is a CPA by profession, says he is carefully evaluating the economic merits of the new-tech drill-rig. He is economics-driven and thus looks for the potential return on equipment investment. He is very comfortable with Schramm as a supplier to the company and that fact is a very important part of the equipment-purchasing equation. He says about Schramm, "The Company gives us very high quality service including top training programs; it likewise offers competitive pricing and it has fast parts delivery. The seven Schramm drill-rigs we own have been very reliable."

Rice continues to look a new ways to expand the company, which is mostly through diversification. The latest venture has been to launch a major training center at corporate headquarters by building a state-of-the-art multimedia training facility. Much of the programming will have to do with safety and is being offered to third-party companies. To that end, the company has a safety and training director, Luke Lazar who has a BS in occupational safety and health management. Rice says, he expects that Schramm will use the new training facilities each year for continuing training and updating his employees on the finer points on maintaining Schramm equipment.

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