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UPSTREAM Pumping SOLUTIONS

Rig Data Capture, Control & Monitoring

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Adding technology to service rigs is no longer an option but a requirement.

For decades, rig personnel were the definition of a blue-collar worker. They were rough and tough and not usually technically inclined. While the oil and gas industry has changed dramatically through the decades, in many ways the well servicing industry is the same as 30 years ago, especially regarding the use of technology on the well servicing rig.

In the 1980s, any data from the drilling rig was captured on paper, until Pason introduced the idea of bringing electronic information to drilling rigs. For the first time, the rig manager, rig crew, operator, geologist, mud logger and the driller were linked by a common data network. At first, personnel resisted this new technology. Some saw the first electronic drilling recorder (EDR) as "Big Brother" watching over the workers, but time would prove that the new technology was a valuable addition to the rig.

Slowly, this robust system of computers, instrumentation and monitoring equipment networked around a rig became widely accepted. The efficiency and safety benefits gained by using EDRs during the last 30 years

Above: An operator enters information into the system interface regarding the activities being performed at the well servicing rig. This information, along with data captured from sensors on the rig, are transmitted (via satellite or cellular connection) to central servers for processing and analysis.

The efficiency and safety benefits gained by using EDRs during the last 30 years have been tremendous.

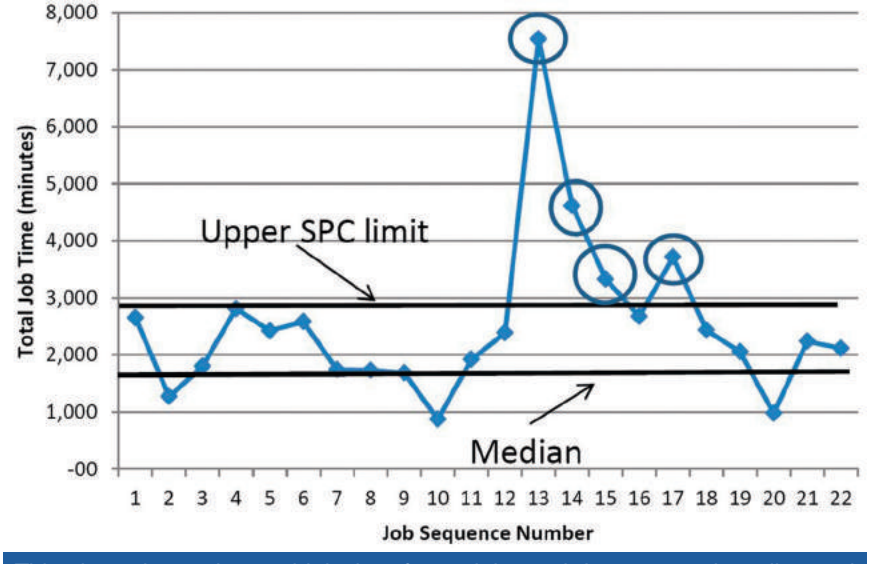
have been tremendous. Electronic drilling recorders have allowed companies to measure and share critical information in real time to enhance productivity and improve quality. These devices have been so effective that all major drilling and exploration and production companies have adopted their use. Today, if a rig does not include an EDR, it will not go to work.

Oddly, during the same period, technology on well service rigs has improved much less. In many ways, little difference exists between well servicing rigs today and those that operated 30 years ago. Unfortunately, the well servicing industry has not risen to the occasion and implemented available technology.

If It Is Not Measured, It Cannot Be Improved

The time has arrived to bring intelligence to well servicing field operations and catch up with today's state-of-the-art drilling rigs by implementing similar technologies on well servicing rigs. Simply put, investing in real-time monitoring systems allows stakeholders to track rig activity, 24 hours per day, seven days per week. Today's rig data capture systems, while not widely adopted, allow rig operators to feed data from each job into a central data store. This process enables performance comparisons between similar jobs to establish performance benchmarks. The data capture systems supply rig crews with information used to improve safety and efficiency and to identify opportunities for reducing non-productive time.

These systems can also track and measure operational activities that are verified by sensor data. They can lower overall intervention costs by improving wellsite safety, quality and efficiency. All these capabilities translate to getting more production online and getting the hydrocarbons produced faster, improving revenue and profits for the oil and gas operating companies.



This chart shows the total job time for 22 jobs and the expected median and upper limits. Using a technique known as statistical process control, in this example, four jobs that fall outside the expected limits have been identified. These are candidates for further investigation and remedial action.

Driving Quality Through Innovation

Improved information drives improved quality. With accurate, real-time data, operators can enhance job quality and achieve better operations including rod makeup, better tubular makeup, the proper setting of tubing anchor catchers and the proper setting of mechanical set packers. Recent statistics have shown that for those companies that implement this technology, rod failures have dropped by up to 40 percent. These lower failure rates result in less downtime and lower costs.

Rig data capture and control systems also reinforce proper procedures, which can contribute directly to improved job quality and a reduction in premature well failure. The systems' reporting and analysis capabilities allow rig operators to ensure compliance with standard operating procedures. Recorded information on the rig's performance allows service companies to implement proactive maintenance programs. These systems can also include quality score carding and reports to identify improvement opportunities. These systems help create better crews and better performance, which mean less rework and more cost savings for operators.

Game-Changing Efficiencies

Well servicing is not a cookie cutter solution. The scope of work conducted during workovers, for example, is

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quite broad. Because of this changing work environment, crews tend to have a lot of hidden non-productive time. Electronic monitoring can create new levels of efficiency and optimization during these projects. With rigs capturing activity data, analysis of time spent can lead to optimized activities and improved planning and benchmarking.

Trip speeds, for instance, can be optimized according to pipe or rod specs, joint make up and carding. Operators can compare planned times to actual times and optimally allocate resources for planned, unplanned and wait time activities. Well servicing times can be reduced by using verifiable information to identify efficiency improvement opportunities, underperforming rigs or crews, or training opportunities. These systems also identify inefficiencies for third-party service providers on location, and supervisors gain an advantage on managing operations with accurate information in real time to improve their performance.

Working Smarter & Safer

Safe practices can contribute to a corporation's competitive edge. Today's control and monitoring systems can reduce incidents through automated safety systems, but they can also improve safety behaviors by informing crews when they stray outside standard operating procedures. They provide automated warnings and alerts, sent by email and directly to smartphones, both on and off location. Safety score carding and reports that identify improvement opportunities also increase the likelihood of a safe working environment for all. Confirming that these wellsite safety controls and procedures are in place could reduce insurance premiums and improve the likelihood that workers go home safely to their families.

Ultimately, these systems offer a smart way to do business and lower the cost of wellsite interventions, which reduces the cost of putting oil in the pipeline. With rig data capture and control systems, operators can increase production and uptime in their fields. In addition to reducing operational costs, they help reduce the costs associated with well equipment failures and, therefore, the total cost of ownership. They enable operators to evaluate and analyze suppliers using hard data. For example, these systems can identify the wait times associated with third-party vendors and allow operators to improve their material logistics, scheduling and supply chain management.

A New Generation Leads the Charge

With the turnover of personnel in the oilfield and a new generation of inexperienced workers entering the industry, adoption of this technology must increase accordingly. The industry will experience a huge crew change as older, more experienced workers retire. Many new workers—born in the 1980s through the end of the millennium—grew up with cell phones, instant messaging, Myspace and iPods. Not only are they open to technology, but they expect it everywhere, including in the oilfield. The next generation of customers, professionals and engineering graduates will lead the charge for adopting new technology that will change the way workover services are performed.

The Time for Change Has Come

As the industry changes, technological development and adoption is imperative. Today's well servicing rig should be as much about software and electronics as brawn and muscle. If everyone in the well servicing industry had access to all critical rig data at all times, the entire industry would improve. The benefits are clear. The efficiencies are proven. The time has come for everyone to embrace this technology and move forward as a smarter, safer and more productive industry. This industry has met challenges head on many times before. It can now. The world is becoming more connected and informed every minute, and together, the well service industry will too.

Jeff Aitchison has a mechanical engineering degree from the University of Manitoba and a master's of applied science in mechanical engineering from the University of British Columbia. He has 20 years' experience in the technology industry and more than 14 years' experience in technology related to oil and gas automation and control. Aitchison joined Key Energy Services in 1997 working on technology development and later managed the technology development engineering team. In his current role, he leads the company's technology direct sales and business development. Aitchison may be reached at jaitchison@keyenergy.com.