Looking into the future with

Mark Childers, Atwood Oceanics

By Mike Killalea, editor, and Linda Hsieh, associate editor

MARK CHILDERS IS general manger of technical for **Atwood Oceanics**.

DC: What trends do you see developing for rig operations in 5-10 years?

CHILDERS: I believe the main trend will be in the area of overall rig operating efficiency. At today's capital and operating costs, the drilling industry must offer more "bang for the buck," so to speak. A good example is the trend towards more offline/dual/simultaneous-activity where two critical operations are performed at one time. In the past 10 years, efforts on offline/online have been extensive, and those efforts will continue into the future because we need to focus on anything that makes the drilling activity more efficient, reliable and safe. A good example is the number of joints of pipe in a stand. Most medium to large rigs in the world use 3 joints in a stand, or what we call triples. Some rigs are now starting to work with quads, or 4 joints per stand. That means about a quarter fewer connections to make in addition to faster trip times.

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What's interesting is, back in the age of steam rigs, there was one in the swamps of Louisiana that pulled 5 joints in one stand. Here we are again, thinking quads. It's really an example of what goes around comes around.

An effort we're making here at Atwood is trying to keep our drilling equipment and systems KISS — "Keep It Simple Stupid." At some point in the past 10 years, we started a tendency to outrun technology and reliability. Some of these drilling systems and equipment have not proven efficient. For example, most automated pipe-handling systems get an average of 30 stands an hour. Getting above 40 stands an hour is considered very fast. However, a good rig crew with the right borehole conditions can do 60 stands of pipe an hour. In comparison, that automated pipe-handling system isn't very efficient. Operators want safety, but they also want efficiency and are now demanding it.

Semi tender-assist drilling units, such as the Atwood Seahawk shown above, can solve the problems of weight, space and operating efficiency found with TLPs, fixed platforms and spars, said Mark Atwood, general manager of technical for Atwood Oceanics. The Seahawk worked 14 years without a lost-time incident.

One solution we've found is to KISS it. Equipment should be mentally manageable by the crews. It's unwise to have something so complex that they can't manage and maintain it, even with onshore assistance via direct real-time satellite communications.

Also, contrary to some people's belief, it has not been our experience that automation or "hands off" equals safety. Atwood's Rig 19 was a manual platform rig built in 1988 and ran until the late '90s. On the other end, we had Rig 200, which in 1995 was one of the most automated rigs in the world. Rig 19 operated its 12 years of service without a lost-time incident. Rig 200, operating next to Rig 19 for the same customer, also went its 2 and a half service years without a lost-time incident. But Rig 19 could out-drill Rig 200 by a large margin.

In our experience, the whole concept of Rig 200 was to make it automated so we could worry less about accidents. Yet Rig 19 did the same thing for 12 years without a lost-time incident, and it could operate much faster, cheaper and more efficient. I have repeatedly seen incidents where more automation does not means a better rig via operating systems and safety.

DC: Why would that be? Why would it not be safer with less interaction on the rig floor?

CHILDERS: I think safety is more a culture. It's how high the company puts it on the priority list. With **John Irwin**, Atwood's president and CEO, there is no priority higher than safety. He has instilled that culture and reinforces it everyday.

I also believe that with too much zone management and too much automation, crews can become mentally lazy. If something goes wrong when they're expecting it not to happen, they may get hurt. Throughout my career, I have always leaned towards the human element: Let the worker control his destiny rather than make rigs so automated that he can literally sleep at the switch. Those are

Q: What's needed to advance use of tender-assist drilling?

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two philosophies with some in-between, and I've always leaned towards the people involvement.

DC: I know you're quite knowledgeable about tender-assist rigs. How do you envision they will be utilized in 5-10 years?

CHILDERS: Tender-assist drilling is a very powerful tool for the right set of circumstances. It is a niche market today and very much misunderstood. People hear about their old reputation and terrible safety record, but it's not like that anymore. The Atwood Seahawk, a semi tender assist rig, has worked 14 years without a lost-time incident. It has performed much more efficiently compared with a platform rig and mono hull tender assist units.

The biggest challenge for tender-assists is education and people becoming comfortable with the concept. I think they have a big future, particularly for deepwater, because tenders can solve many problems such as weight, space and operating efficiency that TLPs, fixed platforms and spars have. The industry just needs more understanding and acceptance of tender-assist drilling, and that's been slow to come. For example, I gave a presentation on tender-assist drilling and asked a room of over 100 professional drillers if they had ever been on an operating tender-assist unit. Only 4 or 5 hands were raised. I think that underlines the problem. People must be comfortable with the concept, and if they have never seen or used it, it is more difficult to be comfortable.

DC: Would tender-assist rigs be suitable for applications like extended-reach drilling?

CHILDERS: It's a perfect match. The big nemesis of TLPs, spars and deepwater fixed platforms is weight, space and operating efficiency. Extended-reach wells are extremely challenging — more mud, casing, drill pipe, hookload, etc. If much of the casing, mud, living quarters and power plant are put on the tender, that takes the weight off of the TLP. The tender can store casing and mud in advance of planned use, thus operating efficiency can be increased significantly based on GOM and Far East experience. A big surprise with the TLPs and spars in the GOM was the heavy dependence on work boats. Tender-assist units eliminate this dependency and increase efficiency significantly.

Generally speaking, extended-reach drilling has a tremendous future. Especially in deepwater and ultra-deepwater, it can be a cost-effective method of development. So MODUs will need to fine-tune themselves to drill these wells effectively. By that, I mean there will be a shakeout among MODUs of high-pressure mud requirements, fluid storage, cuttings disposal, setback loads, automatic pipe-handling systems, etc.

DC: Do you foresee any major changes in rig size in the future?

CHILDERS: In the next 5-10 years, I think jackups won't change much. Most will stay in the 350-400 ft range. If they go much bigger, they will become too costly and there will be too many limitations on mobilization. The new-generation semisubmersibles have settled into the 50,000-ton displacement at operating draft. The general trend and answer to your question is no. I would not anticipate any significant design change or improvement in the hulls.

DC: What about when we go into even deeper waters? Will we need supersized rigs?

CHILDERS: I don't know how much deeper we can go with the large marine riser, spread moored approach. The DP versions are now up to just over 10,000 ft. From a technical standpoint, there seems to be a barrier around 12,000 ft, and it centers around the marine riser.

We've cored over 20,000 ft water depth, but I don't think we'll see much over 12,000 ft in the near future because it's enough of a challenge in 10,000 ft. Solving the mud return issue and maintaining proper hydrostatic pressure on the formation is the key issue for well control drilling in over 10,000 ft of water depth.

DC: What are some of the riser issues?

CHILDERS: The technology for handling a riser in 12,000 ft with MODU motion and ocean currents gets very complex. One of the biggest areas of concern is doing riser analysis in the disconnect mode. When connected, the riser is like a string under tension. When the riser is disconnected, it becomes a piece of spaghetti hanging in the wind, and it can become very structurally unstable. In 10,000 or 12,000 ft of water, the riser is a 2-mile-long string. It gets very complex from a structural standpoint.

DC: So you don't think we'll solve that issue in the next 5-10 years?

CHILDERS: One of the most amazing things about the oil business is, if there's a desire, we usually figure out a way to do it. This industry is absolutely remarkable. If there's a need, we generally figure out a way to do it. So I can't say we won't solve it. I just don't know if the economics and the will to do it will arise in the next 5-10 years. Anytime you try to make a quantum leap, you're going to stumble a little bit, but if it's worth it, then people will keep trying.

Q: Why wouldn't automation mean improved safety?

A: Safety is more a culture. It's how high the company puts it on the priority list.

Mark Childers earned his bachelor's and master's degrees in civil engineering from Virginia Polytechnic Institute. His distinguished career began in 1965 with Humble Oil and Refining Co. He served as chairman of the 2006 IADC/SPE Drilling Conference and was the recipient of the 2006 IADC Contractor of the Year Award.