

Future offshore well construction to be defined by collaboration, remote solutions

THE OFFSHORE ENERGY INDUSTRY FACES CONSIDERABLE challenges, including smaller capital budgets and mounting pressure for improved operational sustainability.

To meet these challenges and remain competitive in a future marked by energy transition, we must adopt new well construction technologies and strategies that enable us to be more agile and efficient as well as good environmental stewards. Achieving these objectives, however, compels a shift away from traditional well construction processes that require ongoing involvement from various personnel performing a wide range of manual tasks at the rig site.

While many offshore well construction fundamentals remain largely unchanged since the 1960s, how we drill and complete a well today is very different. Some of the most significant progress in this space in recent years has been around advanced remote operations and autonomous drilling.

In the late 2000s, energy service companies began offering real-time field activity monitoring, representing a significant step change for the offshore energy industry. Since then, remote operations have steadily evolved into increasingly digitally connected solutions, transforming the operating model from real-time monitoring to live remote operations control.

Today, many aspects of the offshore well construction process are controlled remotely in real time due to digital advances that connect people with technology and key stakeholders. What this translates to for offshore operators is greater cost efficiencies and operational sustainability.

Leveraging a live remote operations control model, engineers perform their mission-critical tasks from offices in town and are no longer needed at the rig site. This reduces carbon emissions from personnel logistics, on-site housing, and equipment transportation. Furthermore, this model centralizes executional decisions to a smaller number of people while expanding access to domain experts from around the world. This increases collaborative opportunities that enable offshore operators to make faster, better decisions while improving their operational consistency. The results: improved drilling and completion efficiencies that save rig time and minimize environmental impact.

In the Gulf of Mexico, live remote operations control enabled an operator to optimize its well construction process and reduce wellsite footprint from five to one. The transition of personnel from the wellsite to an office directly improved the efficiency of operations by eliminating nearly 200 crew changes and nearly 1,500 staff days offshore per rig per year. This reduced average wellsite crew size by nearly 50%, with most services delivered

with a single wellsite crew member. During this project, the operator achieved a 19% improvement on shoe-to-shoe drilling.

The next performance leap for offshore well construction efficiency and sustainability is autonomy. Unlike automated systems, technology, and processes, which replace some manual tasks performed during the well construction process, fully autonomous systems eliminate virtually all manual tasks, enabling more efficient, consistent, and sustainable operations.

Much like the auto industry's endeavor to build and deploy autonomous vehicles, our industry has been on a similar journey in the well construction domain. The future of well construction is a fully autonomous bottomhole assembly drilling every section of a well. This system will constantly analyze its position, formation characteristics, conditions, and trajectory to optimize steering and well placement.

While many of the building blocks of autonomy already exist today, including digitally connected technologies and hardware, edge intelligence, and live remote operations control capabilities, our industry is still several years away from delivering a fully autonomous solution for well construction—but we are making significant inroads.

The quest for system autonomy and self-direction is difficult to map out perfectly, and is more of an organic progression. Our industry's journey toward autonomy, and increased system cognition, can be aligned to six successive degrees. The baseline is defined by full human control and no automation, and the final step is fully autonomous systems. Today, the industry is deploying systems capable of performing single-workflow autonomy, where the system autonomously prioritizes and responds to simultaneous events. The next step in the journey is to reach orchestrated autonomy, where the system can prioritize multiple workflows. This is what our industry is advancing toward and where significant opportunities exist to increase drilling and completion performance.

In our dynamic industry, efficiency, consistency, collaboration, and sustainability are the major themes that link us all together. By adopting more collaborative remote working solutions and embracing the journey toward autonomous well construction, more efficient, sustainable operations are possible. This will help offshore operators increase their margins in today's environment and remain relevant and competitive as we move further into the energy transition.

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