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 New York Tech

Transforming Integrated Manufacturing in the Nuclear Sector: The Vision of Oxford Engineering

Story by Jake Smiths • 10/21/2024

The nuclear sector stands as one of the most rigorously regulated industries globally, a necessary stance given its immense potential for both innovation and risk. Navigating this complex landscape requires precision, dedication, and a relentless pursuit of excellence. Active since 1990, [Oxford Engineering Ltd](#) has been at the forefront of this transformation, leveraging its expertise to deliver integrated manufacturing solutions that meet the stringent demands of this industry.



Even though the government recently launched Great British Nuclear (GBN) – the aim of which is to put the UK ahead in the ‘global race’ to develop the sector, the regulations in the nuclear sector are a double-edged sword. They ensure safety and reliability but also create significant barriers to entry and partnership. These regulations are essential due to the potentially catastrophic impacts of any failure. Chairman of Oxford Engineering Karim Sekkat ties parallels between skydiving and nuclear manufacturing. An avid skydiver himself, he asserts, “There is no room for error in both states.” He draws this from his experience of over 155 jumps, including high-risk dives with paratroopers in the Seychelles. Preparation, understanding, and execution must be flawless the first time. The company embraces these challenges, seeing them more as an opportunity to apply its high-technology abilities and precision processes to an industry where the margin for error is virtually nonexistent.

The complexity of nuclear projects means that any delay can be detrimental. Projects often involve prototypes and bespoke solutions, requiring meticulous attention to detail at every stage. Oxford Engineering addresses this by leveraging a unique software that schedules work orders with pinpoint accuracy. The company analyzed all available software in the market, ultimately choosing the one best suited to them while adapting features that ensure an optimal level of system performance.

They ensure that each part is perfect before moving to the next stage through a thorough contract review of each drawing, a necessity in an industry where rework is not an option. It considers various factors such as material availability, machine readiness, and personnel qualifications, to optimize the entire manufacturing process. The result is a seamless operation that meets quality standards and deadlines crucial in the nuclear sector.

"We've been refining our processes for the past 20 years," Karim notes. "It allows us to manufacture products that are delivered around the world, including Europe and the United States, for our strategic partners." Oxford Engineering's commitment to state-of-the-art facilities and machinery is paramount with millions invested in technology. Karim uses the analogy of car maintenance to emphasize this. "The value of a car is often determined by its age or mileage, however, it is the engine and the other unseen parts that truly matter. Therefore, A car that has been diligently maintained can perform like new, yet a newly purchased car that has been ignored is potentially unsafe. We, at Oxford Engineering, understand this, especially because of the sector we work in. That is why we have regular in-house specification assessments to ensure that the machines we utilize operate as they did on purchase." This data-driven approach ensures that every part produced is of the highest quality, reinforcing the company's reputation for meticulous attention to detail.

The integration of artificial intelligence (AI) into Oxford Engineering's processes is another testament to their innovative spirit. The AI system, in development, will standardize and optimize manufacturing paths. "Ask ten engineers about a part, and you'll get ten different answers based on their respective expertise," Mr. Sekkat explains. "Our AI tool aims to provide the best path, considering all variables, and to program the part and select the machine efficiently. This reduces variability and enhances precision."

The company's strengths in the nuclear sector are bolstered by its experience in other high-tech industries like medicine, instrumentation, aerospace, and oil & gas, to name a few. This cross-industry knowledge has equipped the company to handle the nuanced challenges of nuclear manufacturing. "We learn from the problems we encounter in different sectors," Karim says.

Continuous improvements in advanced technologies are a cornerstone of Oxford Engineering's strategy. The company utilizes business intelligence tools to drive research and development, ensuring that every acquisition, development, or integration is fact-based and strategically sound. "Our resilience stems from these well-researched strategies," the chairman asserts. "We don't make decisions based on gut feelings but on thorough evaluation and factual analysis."

Visualization and detailed mapping are integral to Oxford Engineering's operations. Karim describes how prior to software availability, their 'war room' of post-its, was a physical manifestation of their meticulous visualization of all company processes, in an attempt to map the world of Oxford Engineering. They use Goldratt's theory of Constraints to identify and address bottlenecks. This visualization aids in maintaining the highest standards of quality and efficiency throughout the manufacturing process.

The accolades reflect the company's excellence. Oxford Engineering received two Siemens awards for innovation and excellence for introducing one-piece flow operations, which efficiently moved products from one stage of the process to the next. This allowed for the reduction of product delivery from weeks to a single day and immensely improved the quality. To achieve this caliber, Karim even installed an alarm system at their workplace, which halted all activities when a problem was discovered on the shop floor. The alarm was transmitted to places such as the manager's office, conference room, and even the main office, prompting all managers to pause and handle the problem firsthand. This strategy effectively eliminated defects from the process, illustrating the value of identifying and fixing issues early on.

Oxford Engineering's mission is truly to be held in high regard for its precision and innovation. Featured in Timothy Forster's book '101 Great Mission Statements,' the company's commitment to excellence is well-documented. Their vision is not just to meet industry standards but to set them, positioning themselves as leaders in high-tech manufacturing.