



ROBOTS:

The Next Wave!

Impact of Technology on Job Performance

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Innovation; it can't be avoided. It hits almost every industry at the most opportune time; and when it does, it can disrupt the way we do work in such a way that it can bring even large corporations to their knees. Innovators will always seek out weaknesses and leverage new ideas in their efforts to meet customers high demands or expand the market by finding ways to serve previously underserved segments. Like automobiles were to the horse and buggy and like MP3's are to the music industry, history shows us that advanced technology has been the inevitable disruptor in every industry. Just as we saw the advent of industrial robots revolutionize automobile and other manufacturing plants, we are beginning to see the early stages of this same innovation in construction.

Advancements in robotic technology are being used in construction in two ways. First, savvy contractors are learning new ways to improve their existing labor's productivity. Much like how Short Interval Scheduling (SIS®) helps contractors plan and schedule their labor's work each day and then all the obstacles that interrupt the planned work. In this case, advanced software and computer technology help identify the root cause of the interruptions on the job, allowing contractors to remove

barriers early in their project and preserve or even improve profitability. The second way advancements in technology are used is to replace the time and effort of human activity with more consistent and predictable machinery. This could easily result in a reduction of the labor force, or it could mean improvements and a safer work place by eliminating risk and increasing productivity. Of course with the pool of skilled labor shrinking, we hope for both as history has shown that introduction of machinery to replace manual labor doesn't have to decrease the work force, it can simply allow the market to expand and provide full employment for the available labor.

Using robotics in the construction industry at one time may have seemed like something from a science fiction movie or a chapter out of an old Isaac Asimov novel. However, with advances in technology, techniques, and building materials, the use of robots to perform final assembly on a job site is not futuristic at all. In fact, robots are currently being used in masonry and exterior brick where engineers have adapted early models used in the manufacturing process to assist in material handling, application of adhesives, and other common tasks that don't require highly skilled and experienced workers. Going beyond that,

we are starting to see brick laying robots that can brick an entire house in only 2 days; something that would typically take multiple workers 4-6 weeks. Other current applications include demolition and site prep work with concrete and rebar, as well as working in areas that are far too dangerous for humans, such as the two shape-shifting robots that the Japanese sent into the Fukushima reactors to check on the damage caused by one of the largest earthquakes in history. These robots accessed the damaged areas contaminated with fatal levels of radiation, potentially saving the lives of many workers.

In the U.S., large 3D printers using masonry mediums are now able to build 10 homes in a single day, and they can print a 2100 sq. ft. home for just \$5,000. Once building codes are updated to utilize this kind of technology, there will be no limit to what can and will be built by these types of methods.

Overseas, the demand for bigger, taller, and faster building construction has driven prefabrication to near perfection. This in turn has fueled the demand for more automation in material handling and manipulation. In prefabrication, robots are being used for welding, cutting, drilling, applying adhesives, and insulation –





all with greater precision and accuracy. By breaking down the work to a cellular level and then fabricating the project, overseas contractors can easily use robotic technology to help them prefabricate almost completely offsite and only perform final assembly onsite.

How does this apply today?

Retail and distribution giant, Amazon, has already implemented a program called “prime air” with several successful deliveries under their belt using autonomous drones to deliver small packages directly to the consumers, within hours of their order instead of days later. Research companies are actively seeking ways to implement similar processes with your vendors, so they too can deliver needed material to and throughout the job site utilizing drones and GPS. Drones will soon become the common means of observing job sites, by taking photographs while they fly a prescribed

path through buildings and job sites, and then sending the images back to the foreman to determine percent completion.

Technology is most successful when it is used to learn and improve existing processes or create new ones that improve the working conditions in support of the skilled tradespeople. Using JPAC®, ASTM’s Standard (JPM-ASTM Standard E2691) for tracking productivity on the job site, is a great method of tracking the success of each improvement, increasing your chances of staying on course, and advancing your bottom line. Innovative thinking; early participation; and Agile Construction® measurement tools, such as JPAC® and SIS®, will allow contractors to expand their market share and compete aggressively in both new and existing markets. Effective use of these Agile Construction® tools along with implementation of robotic technology could be the single best way for any contractor to compete against any competitor.

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