UNIVERSAL ROBOTS

AUTOMATION

How Manufacturing Automation Can Reduce Workplace Injuries and Improve Morale

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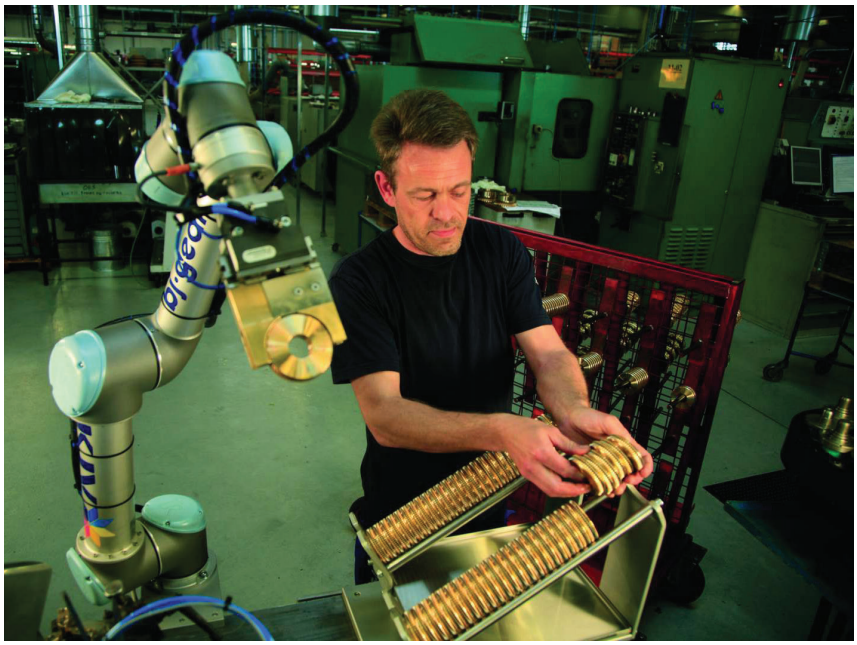


Despite concerns about recessionary headwinds in 2019, the U.S. manufacturing sector continues to outpace much of the rest of the economy. For example, during the first month of 2019 the Purchasing Manager's Index (PMI) rose to 54.9 – well above a reading of 50, indicating continued expansion. Also in January, US manufacturing also added 32,000 more jobs, bringing the total number of US workers in manufacturing to 12.84 million or roughly the same number employed prior to the 2007 recession. This resurgence in US manufacturing employment has helped the US economy to be one of the strongest and most stable since 2007's global recession. However, this growth comes with challenges.

Manufacturing by the numbers

The primary challenge facing manufacturers today continues to be their inability to fill open positions, placing a drag on productivity and growth. In late 2018, the National Association of Manufacturers (NAM) issued its latest Outlook Survey, which confirmed that finding skilled workers remains a top challenge for manufacturing executives today.

The Society of Manufacturing Engineers reports 89% of manufacturers are having difficulty finding skilled workers. And the situation does not appear ready to improve any time soon. The most recent skills gap study from Deloitte and the Manufacturing Institute — NAM's social impact arm — projects more than half of the 4.6 million manufacturing jobs created over the next decade will go unfilled.

While filling open manufacturing positions is the first challenge employers face, keeping them in those positions is a close second. Quitting and changing jobs is the primary cause (32.6%) of manufacturing workers changing positions

in 2018[1], and more than 115,500 manufacturing workers[2] and 17,000[3] warehouse workers missed workdays due to injuries, with direct and indirect costs that can match or exceed losses in production capacity. In fact, the American Society of Safety Engineers estimates that indirect costs of a worker injury are up to 20 times greater than direct costs.[4]

While direct costs are more obvious, such as medical expenses and lost production, indirect costs can impact the bottom line even more. These include hiring temporary workers, opportunity loss, the blow to morale resulting in wide productivity losses, and additional administrative burdens to manage an employee's return to work.

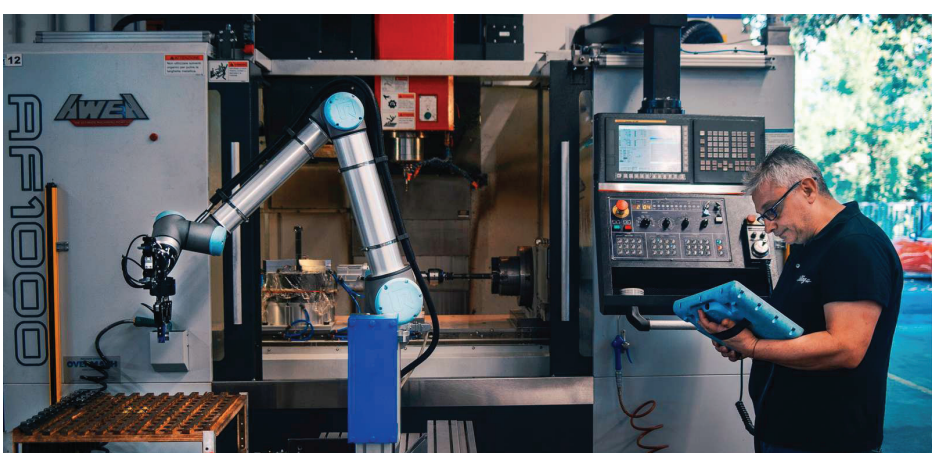
The cost of workplace injury

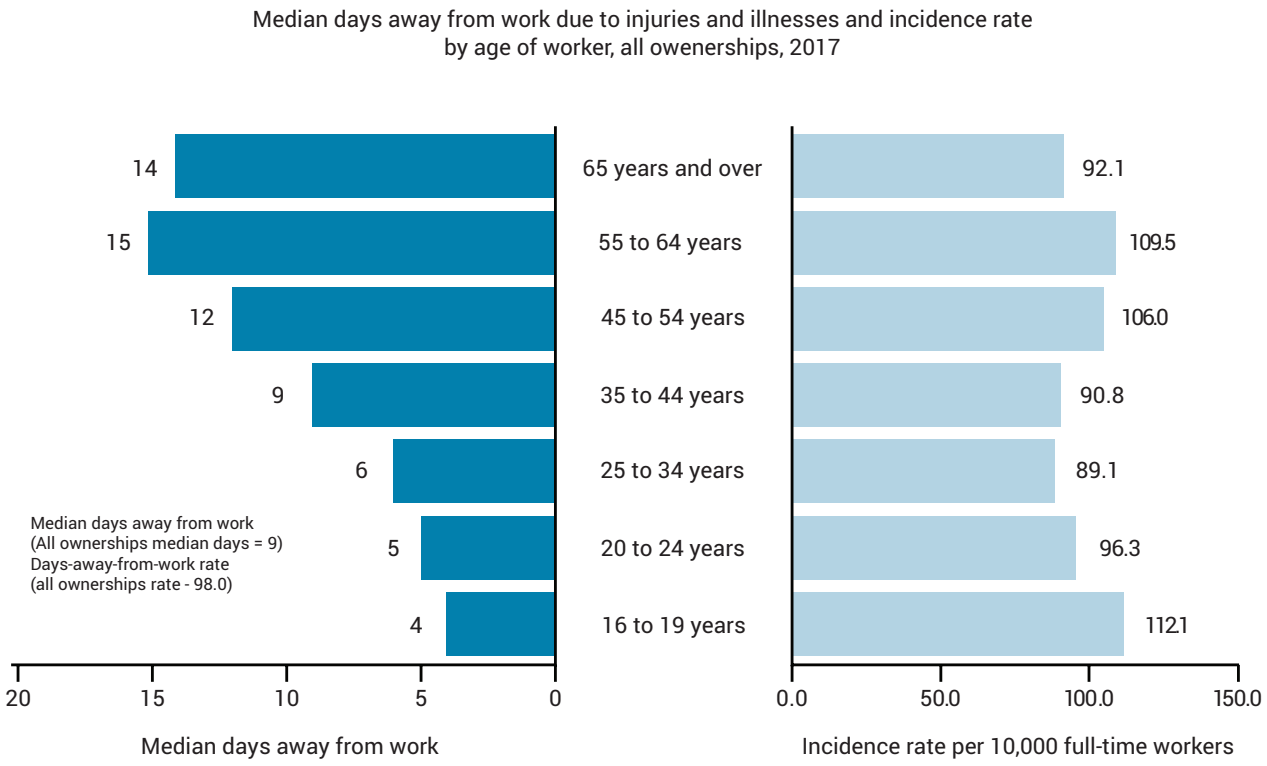
According to the National Safety Council (NSC), the total cost of work injuries in 2017 was $161.5 billion. This figure includes both direct and indirect losses, including wage and productivity losses of $50.7 billion, medical expenses of $34.3 billion and administrative expenses of $52.0 billion. This total also comprises employers' uninsured costs of $12.4 billion, including the value of time lost by workers other than those with disabling injuries who are directly or indirectly involved in injuries. Further contributing to that $12.4 billion is the cost of time required to investigate injuries, write up injury reports and so forth.

The $161 billion in work injury costs during 2017 is the equivalent of $1,100 for every employed worker in the US. More than 104 million work days were lost due to workplace injuries (70M) and fatalities (34M). This is in addition to the $95 billion that US companies pay annually in workers' compensation insurance. Bringing these national numbers down to the individual incident, the NSC estimates that the average direct and indirect cost of a workplace injury was $39,000 in 2017, and the average work-related fatality costs an average of $1.15 million.

While the numbers above represent US employment as a whole, a deeper look into manufacturing reveals the sector is outperforming the general economy in job growth as well as workplace injuries and associated costs, thanks to the nature of the work and the aging manufacturing workforce.

[1] BLS Annual total separations rates by industry and region, not seasonally adjusted
[2] BLS Employer-Reported Workplace Injuries and Illnesses 2017
[3] Ibid
[4] https://www.assp.org/advocacy/roi-of-safety





Median days away from work is a key measure of the severity of injuries and illnesses resulting in days away from work. Half of the cases involved more days and half involved fewer days than the specified median. Workers 55 to 64 years old required more time to return to work than workers in other age groups and their incidence rate was among the highest in 2017.

Make or break? A manufacturing tale

The US Bureau of Labor Statistics (BLS; www.bls.gov) places the majority of manufacturing and warehouse workers into a single occupational group: Installation, Maintenance, and Repair. This group includes industrial machinery and millwrights; electrical and electronics installers and repairers; and general maintenance workers among others. In 2016, the manufacturing industry accounted for 394,600 work related injuries – second only to health care and social assistance, including police and fire, according to the BLS.

At an average cost of $39,000 per injury, the manufacturing industry lost more than $15 billion in 2017 in direct and indirect costs due to work place injuries. While fatalities thankfully were far fewer in incidence, the tragedy of losing 335 first-line supervisors of production equipment and 330 laborers, warehouse, and material handlers between 2003 and 2016 cannot be overestimated.

An aging manufacturing workforce further complicates the problem. According to NAM, workers between the ages of 55 and 64 account for up to 27% of the manufacturing workforce today. When an older worker is injured on the job, they average three times as many days

away from work as their younger counterparts, missing an average of 15 days per injury versus 5 days for workers in their 20s, or 6 days for those in their 30s.

All of these numbers add up to one conclusion, amidst a labor shortage that is constricting the availability of skilled workers: on-the-job injuries place a heavy toll on manufacturers, both financially and operationally.

Automation: the safe solution

One well-documented solution to filling the manufacturing labor gap and shift workers away from the dirty, dangerous and dull jobs is the use of automation, including robots and "cobots."

A cobot is a "collaborative robot" that – unlike traditional industrial robots – can work hand-in-hand with humans without posing unacceptable risks of injury. Cobots tend to operate more like humans, working at human pace, capable of lifting payloads similar to a human worker. Traditional industrial robots, in comparison, move faster and have more power which can pose a significant threat to unprotected human workers, often necessitating fencing and additional costly safety precautions.

The top five types of workplace injuries include: contact with harmful objects (40%), overexertion (24%), slips and falls (19%), repetitive motion (8%), and contact with harmful substances/chemicals (6%). According to studies by Travelers Insurance, manufacturing automation – and cobots in particular – can help reduce or eliminate three out of the five leading causes for workplace injuries: contact with harmful objects, heavy lifting, and repetitive stress injuries, essentially reducing the incidence of workplace injuries by up to 72%.

While most automation projects today look to productivity improvements to justify their cost, it's easy to forget that robots were originally developed as tools to take over the less desirable tasks on the line. Unlike "dumb" automation that can't sense and react to its surroundings,

advanced automation such as cobots offers a way to protect more workers in applications that once were beyond the ability of a traditional robot or production equipment.

Unlike traditional robots that require engineer-level programming, however, cobots are designed to make programming simple through human-machine interfaces (HMI) familiar to anyone who has used a smart phone. With advances in artificial intelligence algo¬rithms, cobots are also capable of learning on the job. Often, a worker can reprogram a cobot simply by putting its arm through the desired motions; the cobot remembers the instruction and repeats it independently, without the need for new code.

By eliminating the need for a formal education in programming or robotics, such interfaces and capabilities make the skills gap and learning curve for using cobots dimin¬ishingly small. This also greatly reduces the time, effort, and cost associated with retasking a cobot for temporary tasks or burst production during busy seasons.

Taking over the factory's most repetitive and strenuous tasks means cobots not only help reduce injury, they also help human workers upskill to more complex roles such as programming and maintaining the cobots, which can significantly improve employee morale.

Industrial robot workcells often require costly and time-consuming factory customization, but a cobot's flexibility translates to significantly faster return on investment. By speeding deployment with minimal disruption to a factory layout, and by enabling minimally trained workers to safely program and use the technology to multiply productivity and improve quality, cobots' payback is often measured in weeks or months (See Universal Robots case study library for more details.)

This fast ROI is not just a function of cobot technology's lower capital cost versus industrial robots. It is enabled by cobots' ability to multiply the value of an enterprise's human assets, freeing workers to tackle higher productivity processes and acquire new skills for a modern manufacturing age.

These productivity gains, along with the inherently safe design of cobot solutions, means this new automation technology can realistically reduce up to 72% of the common causes of injury in manufacturing environments. Cobots don't come to work tired or sick; always do as they're told without complaint – including performing every safety check; and aren't impacted by repetitive, potentially dangerous tasks like machine tending, welding, and assembly. By combining productivity and quality gains with safer workplaces, cobots will be an important component in the solution to manufacturing labor gap today, and tomorrow.

To learn more about automating manufacturing tasks, download the Universal Robots ebook series, beginning with "Get Started with Cobots." Visit www.universal-robots.com for more information.