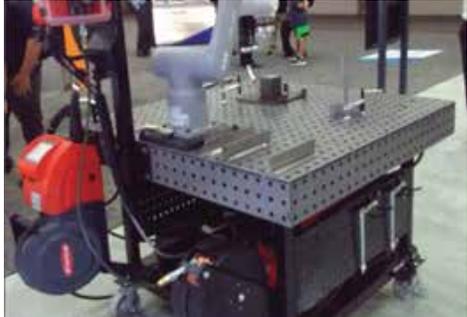
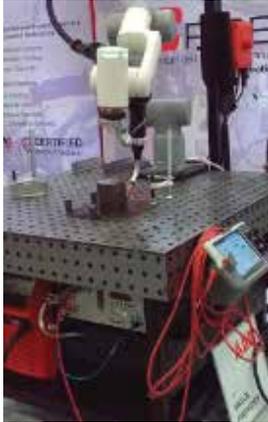


How To **MAXIMIZE** Your Workstations & Welding Cells with Automated Robotic and Cobot Applications

Working through transitions from human focused methods, to machine and human collaborative processes, to fully automated.





A Better Solution

Manufacturing leaders today vary with how their facilities are set-up with industrial 4.0 automation trends from human focused methods, machine and human collaborative processes, to fully automated. Some plants could have one or all three types of processes in their facility as each are effective depending on the application for machine tending from assembly, welding, painting, cutting, pick and placing, and many others.

Robotics for manufacturing started in the 60's and the first was installed in a General Motors plant. Collaborative Robots or Cobots were invented in the 90's. They are smaller, less expensive with easier to program software, and easier for non-experts to manage than robotics. They are devices capable of learning multiple tasks to assist humans. Cobots have built in safety features, so they can perform more complex jobs with humans co-existing side by side.

Manufacturing leaders use automation along with their current workers to drive productivity in many areas of the manufacturing or metal fabrication facility such as machine tending for CNC machine or injection modeling, process tasks for welding or assembly for industries like manufacturing, agriculture, oil and gas, mining, etc.

Robotics & Cobots are a solution to the labor shortage or lack of skilled workers to achieve manufacturers production goals. These types of robotics or cobots solve for performing tasks with greater strength, accuracy, and data capabilities. But to keep up with the production, organizations need to utilize lean methodologies to create greater efficiencies. And as a consideration, leaders must think of the necessary systems to put in place to assure the safety of human workers when working in tandem with these types of automation.

What is Lean Manufacturing?

- Lean manufacturing is a production method aimed primarily at reducing times within the production system as well as response times from suppliers and customers.
- Lean is the purposeful elimination of all wasteful activities.
- Lean empowers workers as a foundation.

How Lean Benefits Your Organization



Elimination of waste is key with lean methodology. If your business can create workstations with workers tools within reach in an organized and standardized way, organizations can reduce waste; waste of motion of workers and truck movement, workers looking for items such as tools, machines, or materials, you will achieve more efficient productivity. When tools and machines are well thought out as to placement in the process, efficiencies are increased. This organization, standardization, and easy access of only necessary tools creates maximum productivity.

5S emphasis is on standardization. The less time spent on any task, meaning tools and machines should be in a specific area of the process within reach and at-a-glance for maximized efficiency. How can this be achieved? The emphasis should be placed on streamlining the work areas. Create a workstation or work cell that is efficient. You want to decrease the waste of motion and unnecessary reaches. If all the workers tools and parts are on one area according to each process, the workstation is maximized. This decreases the amount of pedestrian and truck traffic moving around searching and delivering needed parts and tools.

Part of lean principles involve respecting and empowering people, so allow your workers to create their workstation based on the processes. If your team works in shifts, allow these workers to create a workstation together. Having a workstation set up with visual cues and the exact process in place, whether it be packing out a shipment in a warehouse or distribution center, assembling parts in an aerospace facility, or grinding metal in an automotive manufacturing facility, it is the most ideal to have a maximized workstation to make actions repeatable, so results are the same every time, no matter who is completing the task.



Here are some ideas to help create a lean and ergonomic workstation:

- All tools and materials should be in arms reach to the application or process; create smooth, rhythmic, and continuous movements versus zigzags or cross overs
- Steps should be thought out, marked in order of the process, and follow the ideal sequence for accuracy
- Utilize hooks, bins, or swing arms for each material, tool, or fixture used in the process, again in the proper order
- Relieve hands of work that can be done more efficiently by a jig or fixture
- Create a flexible design with adaptability including extensions and fixturing blocks for maximized flexibility; facilities evolve and product lines change, so must the workstation design
- Optimize floor space; creating a lean workstation will free up floor space
- Utilize strong and durable materials that create the workstation
- Consider using locking casters if workstation must be mobile for best efficiencies
- Ensure proper lighting in the process area
- Make sure workstation is cleaned after each shift
- Keep machines and tools maintained and prepared for each shift

Results will be workstations that are organized with tools within reach, so workers can tell at-a-glance if something is missing, and all materials are available. Everything should be color-coded by step, maximizing efficiencies within reach for a lean and 5S workflow. This 5S methodology can reduce finished goods inventory, reduce work in process, produce shorter lead times, and fewer back orders.

Ensuring Throughput with Humans & Robotics/Cobots Utilizing Lean Methodology and Workstations

Robotic speeds are fast compared to humans. Cobots typically work at a similar speed to human workers, but they can work around the clock, so an increase in productivity is likely for both. Cobots maintain the productivity needed on repetitive work, so that a worker who would normally do the work, can shift this repetitive project work to other higher-value activities. To ensure consistent throughput of the processes with cobots and humans, setting up proper cobot/human workstations with lean methodologies in mind is key. Workers who have their workstations set up with all the proper tools and materials at their stations within reach will be the most efficient allowing them to keep up with the cobot output without interruptions. To design a lean cobot workstation, the process must be thoroughly planned. What are each of the steps, including your lean and 5S processing. What is a Lean/5S Workstation?



7 Steps to Integrate a Lean Workstation into a Robotic/Cobot Application in a Manufacturing Facility

- 1) List the processes and applications that must be achieved: Welding, Assembly, etc.
- 2) Research companies who manufacture workstations and welding tables that can be used for cobots and who have experience in automation workstation processes. Choose a manufacturer that has ongoing training and software updates for upgrades.
- 3) Look for cobots that can be easily added to a workstation, welding table, or cart.
- 4) Once both cobot and workstation are at your facility, configure them in your work cell with a table or cart.
- 5) Think about how items should be organized and standardized in your cell with tool and material storage.
- 6) Start a training program with workers who will be manning the cobot and introduce safety steps. *
- 7) Work with your cobot manufacturer for onsite training of both software utilization of the cobot along with showing you how to set up your work cell with your manufactured products/solutions.

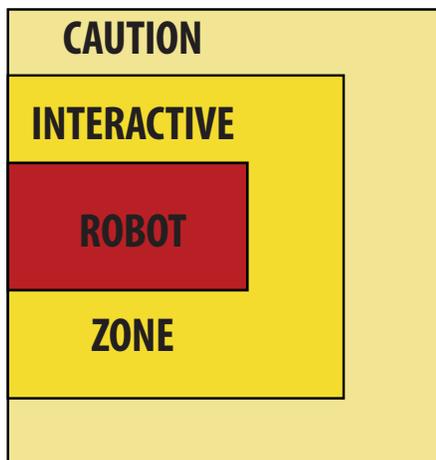
Safety Tips for Cobot Applications and Work Cells*

Currently, there are no safety specific OSHA standards for the robotics industry. So, OSHA recommends facility and safety leaders uphold the general industry standards for hazard standards for machinery, hazardous energy, woodworking machines, abrasive wheel machinery, and so on. There are multiple ways by which we can achieve safety of robots as the humans moving around it. Below are a few methods by which these safety criteria could be met in a dynamic factory floor scenario.

OSHA indicates studies show that many robot/cobot accidents occur during non-routine operating conditions, such as programming, maintenance, testing, setup, or adjustment. During many of these operations, the worker may temporarily be within the robot's working area where unintended operations could result in injuries.

7 Industrial Robotics/Cobot Hazards and How to Avoid Them

- 1) Human Errors:** Human error occurs in day-to-day activity, and this is no different with a robotic work cell. Whether it is programming, preventative maintenance, or using a teach pendant control, operators have the potential to place themselves in hazardous positions due to over familiarity or lack of knowledge of the robot's motion path.
- 2) Control Errors:** Errors in the controls software and hardware can lead to hazards within a robotic work cell. If the controls system faults, the system response may lead to a dangerous working environment if it is closely coupled with human interaction.
- 3) Unauthorized Access:** Access by an unauthorized operator into a safeguarded robotic work cell. If an operator is unfamiliar with the safety hardware associated with the robotic work cell, they can find themselves in a dangerous and potentially fatal area.
- 4) Mechanical Failures:** During the design and programming stages, mechanical part failure is not always considered. When an unexpected failure occurs, this can lead to a potentially hazardous situation for the operator.
- 5) Environmental Sources:** Outside factors and communication interference can create an undesirable effect on a robotic work cell. Unsuppressed power surges or power loss can lead to injury if they are not planned for during the initial stages of the project.
- 6) Power Systems:** Power sources that have communication to the robotic cell can be disrupted and lead to undesired actions. This can produce a release of energy, creating a hazardous environment for an operator.
- 7) Improper Installation:** Any time an industrial robot is installed it is vital to the success of the project and safety of the operators that the system is installed correctly before it is fully operational. If the robotic work cell is incorrectly setup, future hazards may occur due to variance from the original design.



Robot/Cobot Grid for Safety

One of the methods is to restrict the robot from going to such highly dynamic and safety-critical areas using a virtual fence or a physical block, as you create the concept of a safety bubble to act as a barrier. This can be accomplished by sensors, fences, walls, floor tape, and / or curtains or a use of multiple barriers.

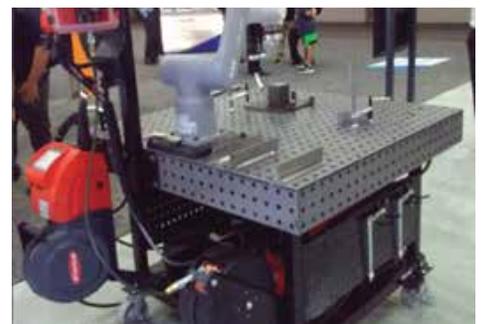
Welding and Cobots as the Future of Manufacturing

American Welding Society forecast the projected number of new welders needed by 2026 is over 335,000. The average number of welding jobs that will need to be filled annually between 2022-2025 is over 80,000 each year.¹ Reasons for these numbers include attrition due to retirement and advancement and changing industries. The total number of welding degrees awarded in 2020 was just over 40 thousand, which was a decline from the previous year by just under 9.5%.² The number of graduates each year is almost half what is needed to fill jobs each year. This is a problem.

The only solution will be for manufacturers to utilize some sort of automation, like a welding cobot to keep up in the future. Creating lean, efficient, organized, and standardized workstations will be imperative to help workers who will be managing these cells.

5 Top Features to Look for in a Welding Workstation

- 1)** Welding Workstations that are sold individually, paired with fixturing kits, and as part of a complete Welding Station System as different options.
- 2)** Durability, stability & quality – Look for a tabletop that features a 2" grid pattern supported by a robust strut system.
- 3)** Find a workstation system that is designed for Lean and 5S workflows for reduced wastes and costs and increased productivity and efficiency.
- 4)** Look for extra tool and material storage for easy access to tools when you need them. Find a workstation system with welding tables that can be extended with fixturing blocks, but also as an industrial workstation system that works together. A system that can be interlinked for maximum capacity and efficiencies within work cells, departments, and facilities for all applications.
- 5)** American Made, so your workstation can be delivered right away.



Examples of cobot workstations for welding applications.

MAXIMIZE Your Workstations & Welding Cells with Automated Robotic and Cobot Applications



Flextur™ Industrial Workstations Featuring Gridlok® the Strongest 14-Gauge Metal Tool Board for Efficiency Within Reach.

Flextur, the only industrial workstation system featuring Gridlok, the strongest, 14-gauge metal tool board with patented unique slot design for extra stability and strength, was engineered to solve unmet lean and 5S workflow needs. Flextur weld tables, fixturing kits, and accessories, as well as, work benches, work carts, teardown carts are used in welding, cutting, stamping, grinding, painting, assembly, and maintenance for efficient workflow. Flextur packaging stations were developed for shipping and receiving applications.

The Gridlok patented slot design in the tool board panels are featured on all Flextur workstations with Gridlok accessories as options. Gridlok is also sold separately as a wall mount system and stationery or mobile tool board workstations. Gridlok accessories include hooks up to 50lb capacity, bins, can holders, trays, shelves, dispensers, socket holds, and more to keep all your tools within reach.

Flextur™ and Gridlok™, brands owned by Pioneer®, a metal manufacturing company, offers innovative lean and 5S workflow solutions developed out of the company's own Lean journey. Flextur featuring Gridlok are industrial workstation solutions that drive productivity, decrease costs, and improve compliance. Flextur and Gridlok solutions improve workflow, efficiency, throughput, and standardization to support Lean and 5S initiatives within any organization. These brands come from a 40-year history of delivering innovative, quality products, and elite customer service. All products are made in the USA. www.flexturusa.com

Flextur™

Workstation Systems featuring Gridlok.

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