

JUSTIFYING THE COST OF A ROBOTIC WELDING SYSTEM

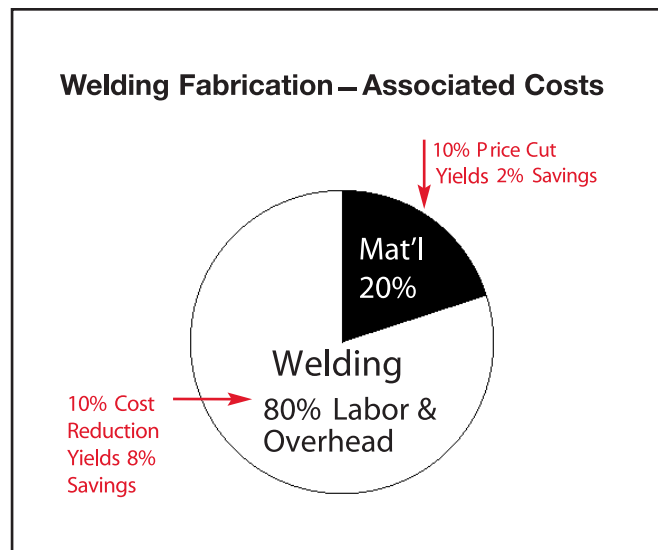
Do you think your shop is too small for a robotic welding system? Do your calculations show that you are not producing enough parts to consider automation? Do you think you would never be able to justify the cost of a system to top management? If you answered “yes” to any of the above questions, you may be surprised to note that shops who may have never considered automation before, are now turning to robotic systems in record numbers.

The reasons?

First, a changing economy is revealing that there are not enough welding operators in today’s marketplace. Rather than attending vocational schools to be trained as welders, more and more of this country’s high school graduates are headed to college. This means that there are not enough young welding operators coming into the industry to replace those that are retiring. Because of this, companies are spending an incredible amount of money recruiting and training welders—much more money than many companies realize.

Second, robotic welding in the past was thought of as something only for high volume part producers such as automotive suppliers. But, technology has come a long way in the last few years and now rapid part changeovers and interchangeable tooling nests (or fixtures) mean that even a company that produces small batches of a number of different parts, may be able to take advantage of automation.

The goals of automation should be to decrease manufacturing cost and increase weld quality. In this article, we will explore some of the reasons companies may be able to justify the cost of a robotic welding system. With the cost of a complete cell starting at approximately \$50,000 – it may be more affordable than you think.



1. Justify Costs By Calculating a Fully Burdened Labor Rate

Most companies look at what they pay their employees in hourly wages plus benefits and determine that it is far more cost effective than investing in a robot. What many don't factor in is the fully burdened labor rate. This rate takes into consideration such things as the cost of the building, taxes, utilities, transportation, etc.—all the costs of doing business. The company which looks at a fully burdened labor rate might be surprised to note that it could be as much as \$80 to \$90 per hour per employee as compared to the employee's direct rate of pay which may only be \$35 to \$40 an hour.

2. Justify By Realizing Added Productivity

Of course, one of the main ways to justify the cost of a robot may be to look at the productivity that your company could receive versus what you are currently achieving with your manual or semi-automatic welding systems. In many cases, welding with a robot is two to five times as fast as other methods. This means that every hour, there could be two to five times the number of parts completed than



The cost of a complete cell starts at approximately \$50,000.



Productivity soars in minimal floor space with one worker and two welding robots.

you are doing now. For example, the Tandem MIG system, which uses two arcs in unison, coupled with robotics has helped several component manufacturers greatly increase plant productivity.

And, if you have a difficult application, don't automatically assume that robotic welding is not for you. Today's newest fixtures can hold up to 20 parts which means that integral designs and difficult geometries can easily be accommodated.

3. Justify by Recognizing Reliability

As much as you hate to admit it, employees can sometimes be unreliable—they don't show up for work or have bad days. Robots are reliable—they are there everyday and can work numerous hours without taking a break or stopping for lunch. In addition, you will not experience employee turnover with robots—they are loyal to your company and will not leave after they've been trained. Everyone from steel furniture manufacturers to automotive firms have found this to be true.

4. Justify by the Ability to Increase Volume

When you get a new contract or decide to expand the scope of your operations, robots can easily handle the extra volume. Also, since they need less floor space than an employee does, as business increases, you don't have to worry about building, renting or buying extra space. In most cases, robots show a return on investment in six months.

5. Justify by Eliminating Variability

A robot will put the same weld in the same spot every time. Because of this, it is usually able to help a company realize increased quality and efficiency. With robotics, companies invest in making good parts upfront, not trying to correct problems after they occur as is the case with manual or semi-automatic welding in many instances. Also, with robots, a visual inspection is usually all that is needed to check the part—semi-automatic or manual welding may require additional testing such as random destructive testing, radiography or a dye penetrate test.

6. Justify By Calculating the Increased Number of Parts

As was discussed above, some companies feel that they don't have the volume of parts to warrant investing in a robotic system. But, tooling is now commonly designed for rapid changeovers. For instance, companies are taking advantage of flexible layouts that can surround the robotic welding unit and offer room for a number of different tooling nests. The robot can be programmed to run all day in position A with a particular set of tooling nests, or it can change between positions A, B and C—doing small batches of each part. These tooling nests have also been designed for rapid changeovers so that a couple of motions will allow the operator to completely change out one tooling nest for another. And, since the



With one setup, six parts are welded

robot can store many different programs in its memory, the operator just has to change from one program to the other and the robot will be welding a completely different part.



Operators learn quickly with a few hours of instruction

7. Justify By Examining Savings in Filler Metal

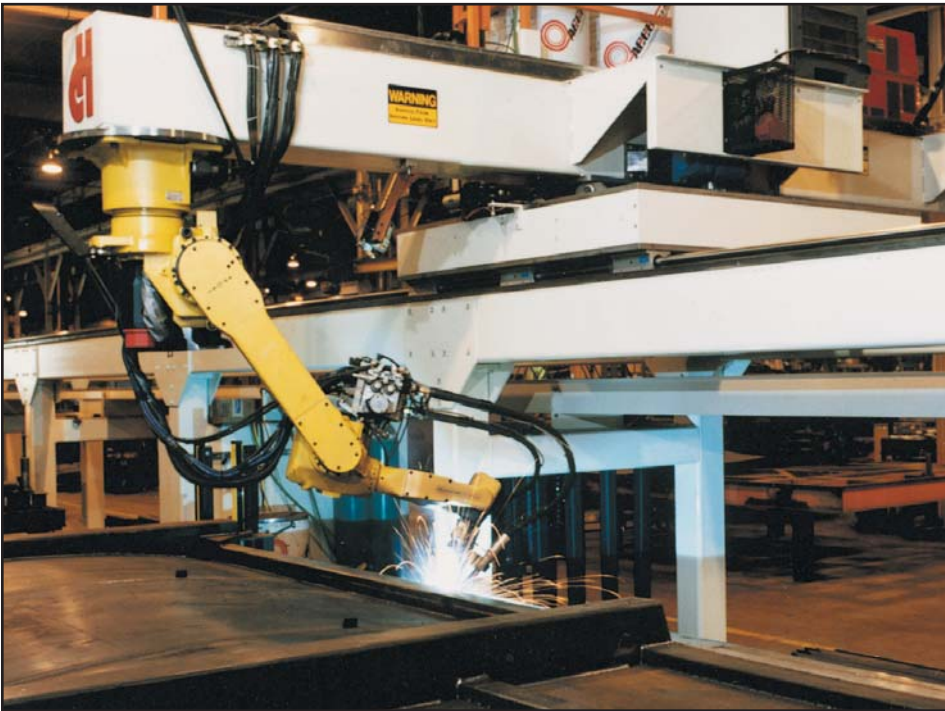
Investing in a robot reduces the amount of overwelding that occurs with manual processes. When left up to the operator, a margin of safety is usually built into every weld he makes. The end result is that the operator usually puts down more filler metal than necessary and will also make the bead longer than it needs to be. A robot is much more exact and will lay down only the amount of filler metal that is absolutely necessary. In addition, a robotic process usually equates to less spatter and less wasted filler metal. For example, a job shop helped justify the purchase of a robotic system with just the savings of less metal finishing (grinding) on the completed weld assemblies.

8. Justify by Reducing the Cost of Training

As was already established, it is difficult to find trained workers in today's market. What is even more challenging is in environments where code work is required, where welders have to constantly be re-qualified and keep up their skills. Some companies have gone as far as providing their own



When interfaced with a positioner, complex parts are quickly welded downhand.



A robot on a gantry means big parts are not a problem.

training facility on-site. As compared to paying a skilled welder, it can be less expensive to hire someone who can simply load and unload the robotic welding fixtures.

provide a running summary of any changes that were made in the robotic welding process during actual production time. All of these software packages are designed to help

companies maintain high quality standards with new or changing personnel on the production floor.

Closing

Hopefully these justification tools will help you be able to make a decision to use automation in your facility. In many cases, companies should be looking at automation as a question of “when” and not “if.” If you are going to install a robot for the first time, make sure you look for a reputable manufacturer, such as The Lincoln Electric Company, to work closely with you to design a system custom-tailored to your individual needs. Technical support and training are important to the success of any welding automation project. Lincoln’s automation systems come with a 60-day money back guarantee and over the last ten years of selling robotic welding systems, Lincoln has not yet had one system returned. Keep in mind that the goals of automation should be to decrease manufacturing cost and increase weld quality—if you can achieve that with robotics, justification may be simple.

9. Justify by Improved Manufacturing Accountability

Today’s available robotic software allows companies to improve the tracking of manufacturing processes. One example is arc data monitoring software, which monitors, records and reports weld data on a “real time” basis. This can be done over the Internet (Ethernet) to a central location in the plant. A second software program is auto-error recovery that provides for a fast recovery from an unexpected robot fault should one occur on the production floor. Lastly, password protection with logging will



The Teach Pendant makes programming easy.

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