



**FORGING
THE FUTURE,
CLARIFYING
THE COMPLEX**

**INCREASING PRODUCTIVITY IN
MANUFACTURING WITH
NEW WELD TECHNOLOGY**

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The Old Way: Outdated Methods & Tools

The ability to weld around the circumference of a heavy part in manufacturing is a complicated process. Our client came to us with an old, outdated weld cell and system. Their cell didn't run as fast as they would like it to with a submerged arc system that ran between 20 to 30 inches per minute.

Despite using 15,000 lbs of force, the 50 - 1,500 lb parts slipped as they rotated in the cell. Submerged arc welding systems aren't inherently flawed, but they are known to result in quality issues occasionally.

Some of the risks of a submerged arc welding system are:

- Porosity from contaminants
- Cracking (temperature changes and strain)
- Inclusions in a weld (slag, flux, or oxide)
- An incomplete fusion

Our client needed a new cell with an updated welding system that ensured quality welds at a faster process to increase productivity in their facility.



Our clients needed a custom automation solution from a provider who understood their needs and challenges



The Specifications

For our client's new vessel cell, we needed to create a system that lifts and rotates 50 - 1,500 lb parts without slippage, uses a new welding system that decreased risk of porosity and cracking, and produces a part that our client can confidently deliver as high-quality and unproblematic for their customers. The system we were tasked to engineer had to account for:

VARIABLE REQUIREMENTS FOR ONE PROCESS

- Parts that range from 50 to 1,500 lbs all being processed through one weld cell
- Minimal input and monitoring from manufacturing operators
- Decreased risk of part slippage
- A faster welding system that decreases risk of porosity, cracking, and other quality issues

QUALITY

- Precise welds
- Faster production time
- A finished weld on a part ready to be finished and shipped



The Challenge

Our client's old weld cell was already experiencing an issue with parts slipping, despite the weld cell using 15,000 lbs of force to hold them in place.

Our team needed to figure out how to keep the parts from slipping, no matter if they were 50 lbs or 1,500 lbs, without damaging the part itself in any way.

We were tasked with finding an alternative to our client's submerged arc welding system they had previously used.

With the advancements in technology since they implemented their weld cell, we had a few options that would increase their productivity overall.



**UNDERSTANDING THE
COMPLEXITY OF OUR
CLIENT'S MULTI-STEP
PROCESS WAS
CRUCIAL FOR OUR
CLIENT**



OUR SYSTEM WAS DESIGNED TO:

- Operate remotely
- Increase productivity with a faster welding system
- Decrease the risk of slippage of our client's parts
- Decrease issues with the quality of the finished product
- Be an adaptive system with minimal input needed from the operator

OUR PARTNERS

To build the system, **Navus** worked with key vendors:

Miller Welding — Welding System

Servo Robot — Seam Tracking

Intelligent Machine Solutions — Headstock & Tailstock

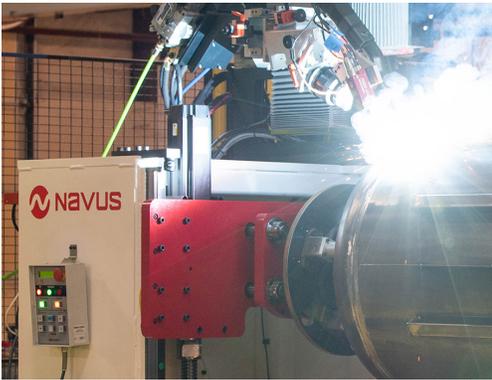


SERVO-ROBOT

iMS



The Result



The resulting process utilizes only 1,300 pounds of force to handle parts ranging from 50 to 1,500 pounds. The final system was also a beta test from Miller Welding!

A vessel weld cell that can handle parts ranging from 50 lbs to 1,500 lbs with only 1,300 lbs of force. The weld cell features a heavy duty, spring-loaded tooling system that our team created themselves to prevent slipping issues. The weld system was a beta test from Miller Welding, and it's the first of its kind on the market!

Each torch in the advanced welding technology has two power supplies. One is for the actual arc welding itself, the other power supply is an induction heater for the weld wire coming through the gun. The heater preheats the weld wire before it applies the weld. This system has the ability to lay down a weld up to 60 inches per minute.

AUTOMATING PROCESSES, OPTIMIZING PRODUCTION

OLD WAY

- **Unreliable Tooling** that caused parts to slip during the welding process.
- **Cost** due to defective parts from an unreliable welding process.
- **Risk** of delayed production time associated with parts not passing the QA process.

NEW WAY

- **Save** time and money through reliable tooling.
- **Reduce** safety risk to operators through remote operation that requires minimal manual input.
- **Save** time through unique, advanced welding technology from Miller Welding.
- **Reduce** risk of projects being stalled because of imperfections in welded parts.



How Does it Work?

System Breakdown

- Operator selects partmodel from recipe on the operator interface (HMI).
- Tailstock moves into position.
- Operator requests access to light curtain area.
- Operator loads part onto positioner roller bed cradle.
- Operator leaves light curtain area.
- Operator initiates automatic processing sequence.
- Tailstock moves to correct width and clamps part.
- Tailstock lifts part to correct in-process height.
- Part begins rotation.
- Torches and seam tracking move into position.
- Seam is tracked and weld begins.
- Once weld is completed, part rotation is stopped.
- Part is lowered to roller bed cradle and unclamped.
- Tailstock moves to fully open position.
- Operator requests access to the light curtain area.
- Automatic sequence is stopped and safety stops are engaged.
- Operator removes part from the roller cradle.

These components and individual steps combined result in a fully welded part with minimal risk of slippage and defects.



The welding system, seam tracking, and headstock and tailstock all work together to result in a fully welded part with minimal risk.



The Result

The new weld cell that Navus designed can lay down 60 inches of a weld per minute!

Our client's needed to increase throughput in their weld cell to increase their volume of production. They also needed to decrease the risk of their parts slipping during the weld process.

Navus engineers developed a unique tooling system using 1,300 lbs of pressure to keep the part in place. They installed weld torches on both sides of the cell, fed by a power source operating the weld arc itself, and one preheating the weld wire as it's fed through the weld gun.

The result of this brand new cell for our client was a safer alternative to their old system that can lay down 60 inches of weld per minute. That's **2-3x faster** than their old weld cell!

Our client's custom automated process increased their productivity with faster welding times and the decreased risk of slipping parts interrupting the process. The collaboration of our team of engineers at Navus not only solved our client's challenges, but revolutionized the same process they experienced every day.

ABOUT NAVUS

Navus Automation Inc. is a leading full-service automation integrator. Our world class team has a reputation for applying ingenuity to solve complex challenges and deliver customized turn-key systems solutions. From concept to completion, Navus provides robotic welding and automation systems built upon our unwavering commitment to excellence, precision and reliability



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Executive Summary

Navus was tasked with finding an alternative to our client's submerged arc welding system they had previously used. With the advancements in technology since they implemented their weld cell, we had a few options that would increase their productivity overall.



The result? A new weld cell designed by Navus that lays down a weld two to three times faster than their old process!

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