



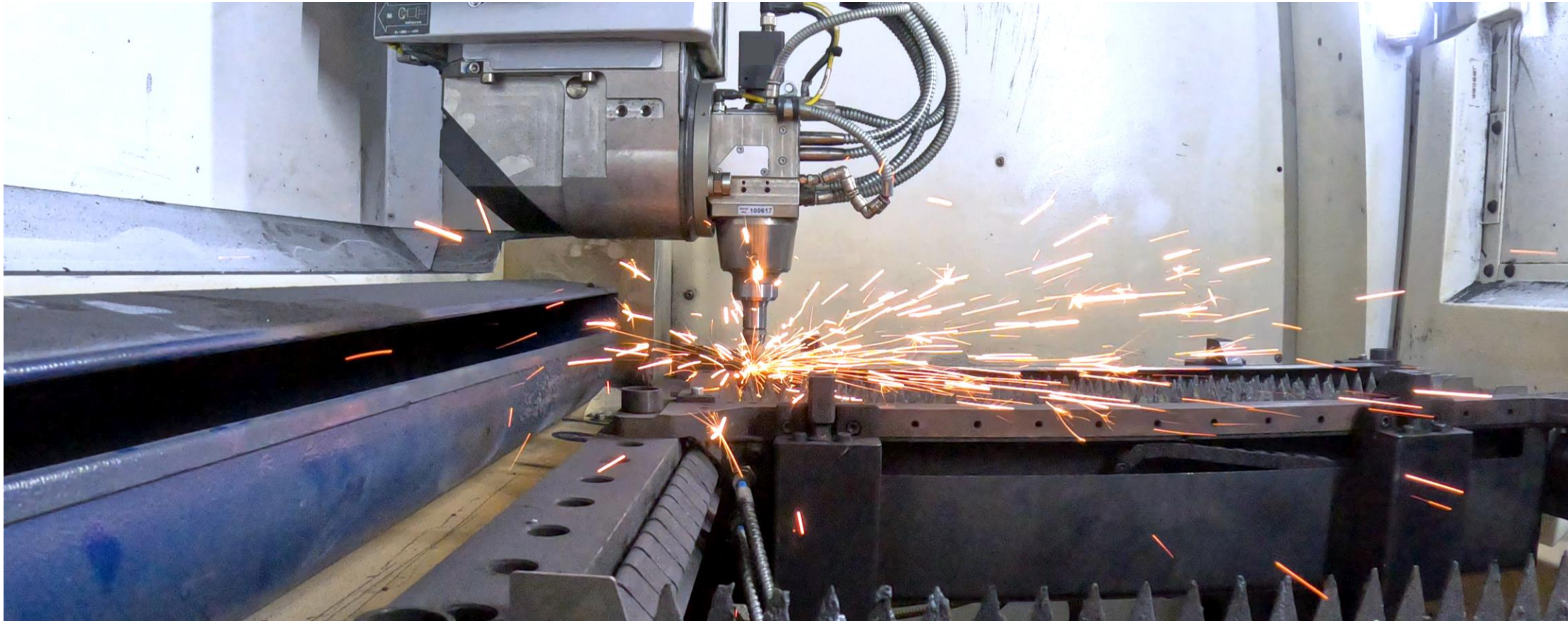
Reducing Machine Downtime using QR Codes

DETROIT, MI
April 8-10, 2025

Reducing Machine Downtime using QR Codes

INTRODUCTIONS

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TOPICS

- **Introductions**
- **About Milwaukee Tool**
- **The Rapid Innovation Center**
- **Problem Statement**
- **QR Code Solution**
- **Results of the Pilot**
- **The Future of Self-Learning**



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THE WORKFORCE DEVELOPMENT INTRODUCTIONS



Daniel Sellhausen

Journeyman Tool & Die Maker within CNC machining/manufacturing

Part of the Milwaukee Tool Rapid Innovation Center since 2015

Engineering Operator: 2015-2020

Team Lead: 2020-2021

Technical Supervisor: 2021-2024

Manager: 2024-Present

As Manager, currently leads the prototyping lab, which manufactures new product and concept parts for power tool accessories at Milwaukee Tool.



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ABOUT MILWAUKEE TOOL



- 100-year-old company, starting in 1924
- Started by producing drills (hole shooters) for Henry Ford
- Around the year 2000, we were best known for iconic products like the Sawzall®
- During this time, we were trying to be a brand for everyone, and lost focus of our core values



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ABOUT MILWAUKEE TOOL

- In 2008, our CEO made it our primary goal, to focus on our brand, and our end users
- Milwaukee Tool is not simply a manufacturer, we are a jobsite solutions company, laser-focused on our users.



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ABOUT THE RAPID INNOVATION CENTER

- The Rapid Innovation Center (RIC), started as a small test lab in the mid 2000's
- Prototyping lab started in late 2013
- The Prototyping lab created efficiencies and streamlined our new product development
- Same day results
- Cross functional support
- Growth & investment



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ABOUT THE RAPID INNOVATION CENTER



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**DISRUPTIVE
INNOVATION**

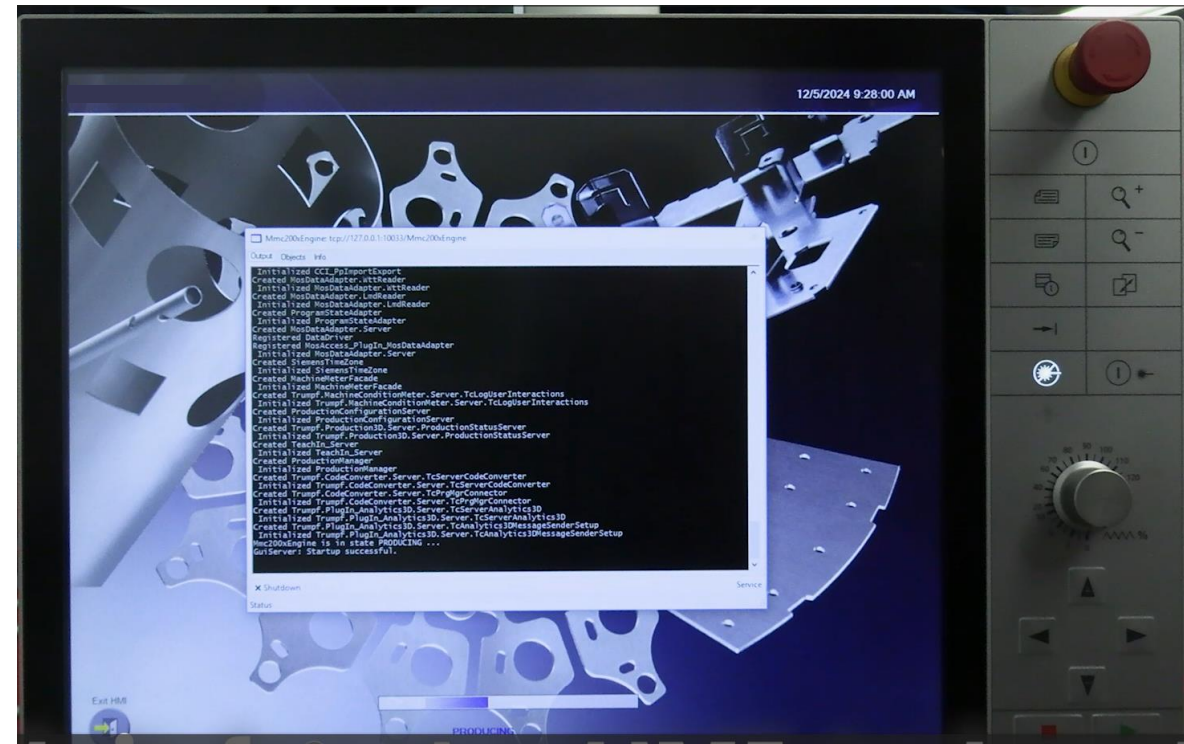
LIGHTNING SPEED TO MARKET

Confidential Document Property of MILWAUKEE TOOL Brookfield, Wisconsin 53005

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PROBLEM STATEMENT

- Dynamic project needs
- Machine information housed in multiple locations
- Troubleshooting efficiencies
- Off-shift support
- Infrequent occurrences & equipment issues



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QR CODE SOLUTION

Develop the Learning Assets

Tooling U-SME team partnered with Milwaukee Tool to identify key information for the program.

1. Machine overview presentation
2. Task micro-videos
3. Job aids
4. Links to checklists, manuals, alarm codes



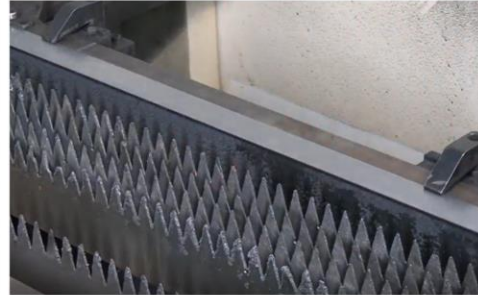
Machine overview presentation

Sequence of Events

1. Open the Main Door.



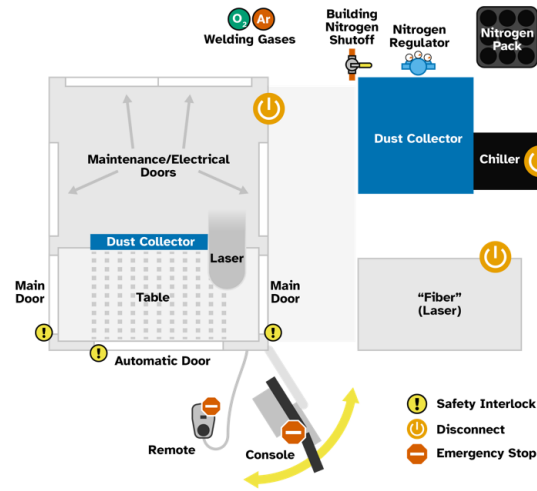
2. Clamp in the Workpiece.



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There are multiple components required for the TrueLaser Cell 3000 to perform its precision machining. This map shows the layout of all components and safety features.



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Hazards

Electric Shock
Never override electrical safety features.

Slip/Trip and Fall
Always walk; never be distracted.

Cuts
Parts may contain sharp edges.

Bump
Especially when entering machine enclosure

Burns
After machining, parts are hot.

Pinch
Keep hands clear of work clamp point of operation.

Laser Radiation
View the laser through the camera or the window with protective glass; never directly.

Crush
Stay clear of moving axes during dry runs and when jogging.

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Required PPE

Safety Glasses

Gloves

Persons with a pacemaker must not work on or near the machine.



Chiller

A temperature regulator that keeps the machine at optimal temperature to prevent it from overheating.

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Just-in-Time content via QR Codes

Micro-videos

Media Player

The white light indicates it's powered on.

LOCKOUT POINT
E06697
ELECTRICAL

CAUTION
Class 4 Laser Product
Class 4 Laser Product
1700 to 1800 nm
1000 to 1000 mW
View and handle Laser radiation when cover open and if applicable through optical devices in any manner to direct or scattered radiation.

DANGER
Class 4 Laser Product
1700 to 1800 nm
1000 to 1000 mW
View and handle Laser radiation when cover open and if applicable through optical devices in any manner to direct or scattered radiation.

00:18 00:47

Milwaukee UUGH-02

Turn on the Laser.

Job Aids

Capping Argon or Oxygen Tanks

If the nitrogen or oxygen tank are at a low or zero pressure reading, remove the tank from service by capping and unstrapping. This process is the same for both argon and oxygen.

Step 1



Turn the gas off by turning the main gas valve clockwise until hand tight.

Step 2



Use an adjustable wrench to slowly loosen the gas valve fitting to bleed off any excess remaining pressure.

Step 3



When you have sufficiently loosened the fitting, remove the regulator and set it aside.



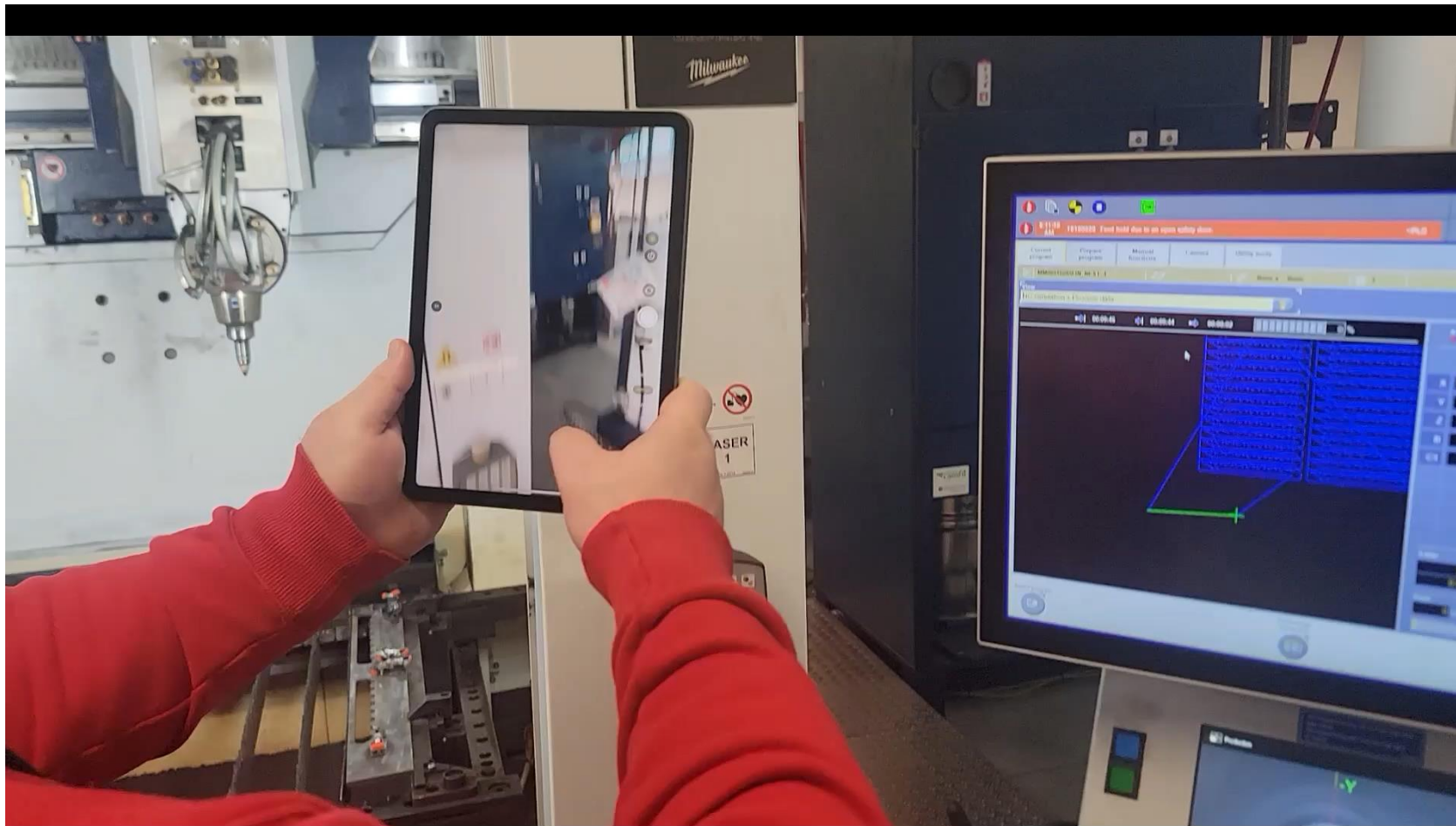
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QR CODE SOLUTION

Deploy the Learning Assets

- Create a central location for all information
- Create QR codes and post on machine
- Engage support from the IT group



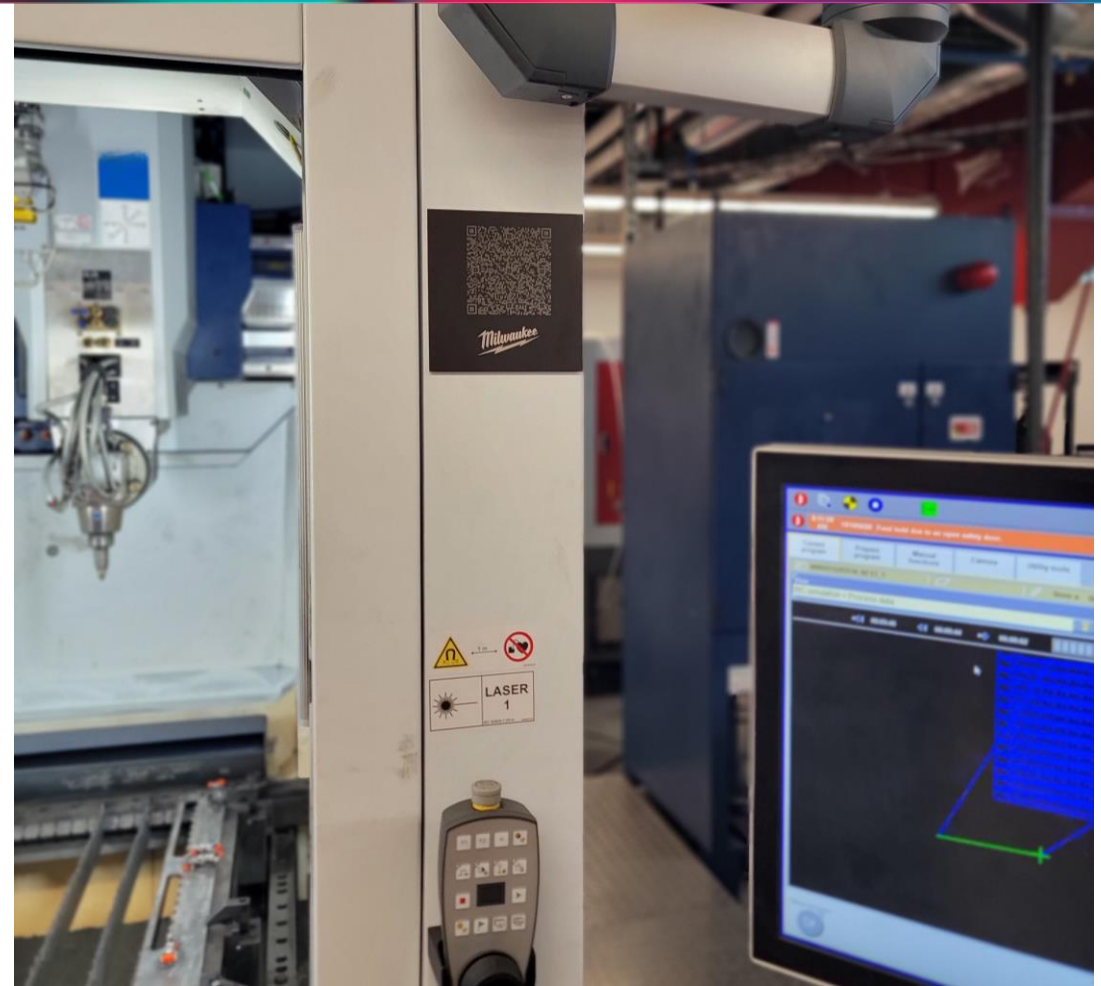
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RESULTS OF THE PILOT



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RESULTS OF THE PILOT

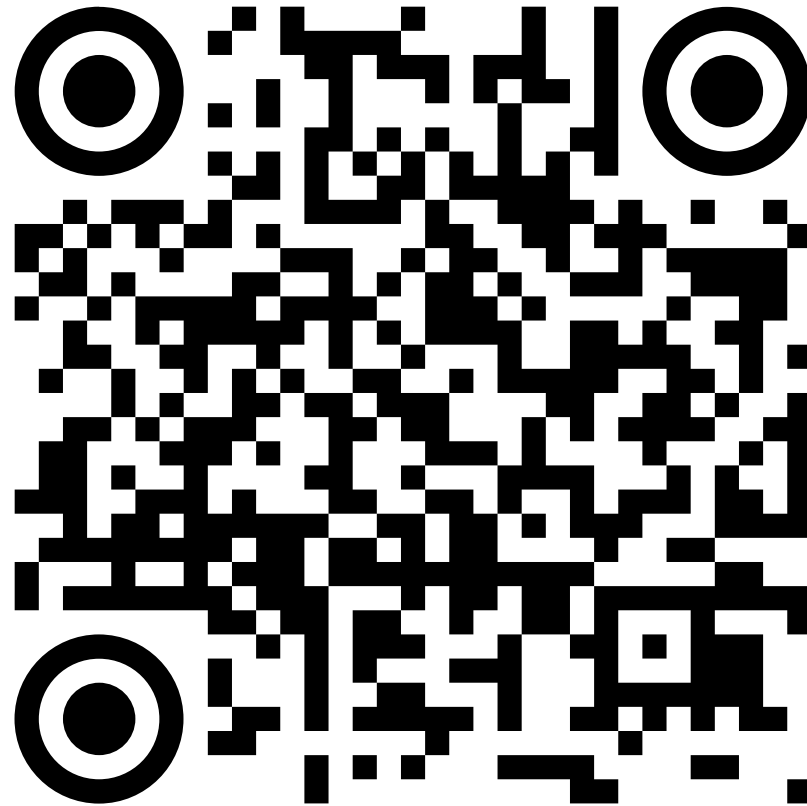
- Utilize quick scan for machine info
- Reduce time searching for documents
- Empower individuals to learn through “self-help”
- Tailored onboarding tool
 - What do we do specifically?



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RESULTS OF THE PILOT

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REDUCING MACHINE DOWNTIME USING QR CODES **THE FUTURE OF SELF-LEARNING**



High wear
Parameters
Changeover
Tag-out

REDUCING MACHINE DOWNTIME USING QR CODES **THE FUTURE OF SELF-LEARNING**

Common Challenges in Manufacturing

- Deliver enough training time to teach everything someone needs to know.
- Provide access to quality trainers that ensure consistent instruction.
- Maintain an agile workforce flexed based on changing business needs.
- Manage, deploy, and qualify changes in work across an entire workforce.





























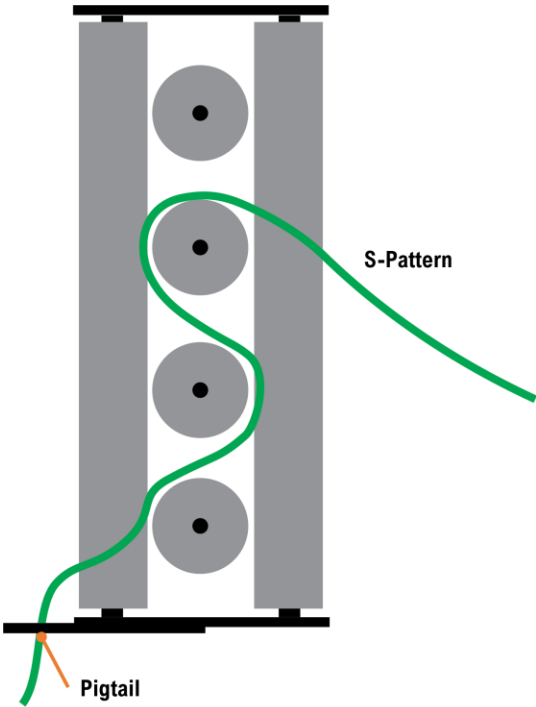
REDUCING MACHINE DOWNTIME USING QR CODES THE FUTURE OF SELF-LEARNING

How do people learn in life?

You Tube
GENERATION



<p>Procedure 3.2. Load the stem wire onto the spool.</p> <p>To add new stem wire or stainless wire to a new product set up, a familiar operator will need to thread the stem wire into the payroll.</p> <p>Step 1 - Prepare stem wire for handling.</p> <p>Notify central handling to place a full or partial stemless cable or stem pack directly underneath the stem pack spools in designated cards.</p> <p>Forward the proper wire size delivered and integrate the area by checking the label on the stem wire and comparing it against the Twister Work Order and Production Specification Sheet.</p> 	<p>Use the AFC wire gauge to check the gauge size on the tag in context.</p>  <p>For stainless wire, cut and pull away approximately 4' section of the stem wrap.</p> 	<p>Add the stem pack tag to the top of the stem pack to keep the tag in place and identify along production.</p>  <p>All stem wire needs to be processed at the stem area.</p> <p>Connect the stem by connecting the grounding clamp onto the approved copper at the bottom of the stem wire.</p> 	<p>2 Thread the stem wire onto the payroll.</p> <p>Locate and cut the locker from its storage area and position it in front of the stem guide.</p> <p>Lock the locker.</p> <p>Ensure the bottom strip is pointed down to lock the locker in place. Failure to do so could result in a fall hazard.</p> <p>Push the end of the stem wire, and start the locker.</p> <p>Feed the end of the wire through the underbank of the payroll stem guide.</p>  	<p>Thread an "S" shape through the stem guide.</p> <p>Push the wire from the payroll through the middle of the two vertical rollers and between the bottom two horizontal rollers.</p>  <p>Push the wire back through the middle horizontal rollers.</p> 	<p>Complete the "S" by pulling the wire through the middle two vertical rollers in the direction of the payroll through the top two horizontal rollers.</p>  <p>Push enough slack through the stem guide to allow for the wire to reach the payroll.</p> <p>Securely clamp down the locker and return it to the proper storage area.</p> 	<p>Consider the spacing and avoid direct path to the strand payroll station and feed the wire through the stem control roller.</p> <p>Wire should be fed through the middle two horizontal rollers.</p> <p>Note: Stainless wire sets will crossing each other entering or exiting the stem control roller.</p> <p>Push the wire down from the stem control roller and through the middle vertical rollers of the payroll entry rollers.</p> <p>NOTE: Oversee the placement of the wire through the horizontal rollers based on which payroll roll will be used to keep the strand wire.</p>  
<p>Turn on the payroll for the end to be threaded.</p> <p>At the Payroll Control Panel, put the machine in the ON position for the machine when the end will be threaded.</p> <p>The ON position is the up position on the switch.</p> <p>Push the stem wire through the payroll entry rollers.</p> <p>Using the stem wire cover the empty end onto lens and pull back so the wire can be threaded through the payroll station pulleys.</p>  	<p>First, wrap the wire over the inside groove of the large pulley.</p>  <p>Then, wrap the wire over the inside groove of the smaller one.</p> <p>Push the wire back towards the large pulley.</p> 	<p>Thread the wire back under the inside groove of the large pulley.</p> <p>Push the wire back towards the tension arm.</p>  <p>Thread the wire over the outside groove of the tension arm.</p> <p>Push the wire back towards the large pulley.</p> 	<p>Thread the wire over the outside groove of the large pulley.</p> <p>Push the wire towards the small pulley.</p>  <p>Thread the wire over the small pulley groove and pull the wire towards the tension socket.</p> 	<p>Thread the wire over the outside groove of the large pulley.</p> <p>Push the wire towards the small pulley.</p>  <p>Thread the wire over the small pulley groove and pull the wire towards the tension socket.</p> 	<p>As the wire is being pulled towards the tension socket, position the wire on the top rollers between the end guide.</p> <p>NOTE: Ensure the wire does not overlap other wires which can cause tangling during operation.</p> <p>Feed the wire end through the payroll end rollers and pull the wire towards the METSO box.</p> <p>NOTE: Ensure the wire is well separated from any other wires being fed through the end rollers.</p> <p>Next Procedure in Work Instruction: 3.3 Thread the stem wire through the closing die.</p>  	<p>Next Procedure in Work Instruction: 3.3 Thread the stem wire through the closing die.</p> 



Thread the stem wire through the payoff



To add new stem wire or stemless wire to a new product set up, a twister operator will need to thread the stem wire through the

Step # Work Steps



1. Verify the proper stem wire has been staged at the line by referencing the production schedule, materials tags, and AFC wire gauge.



2. Determine efficient threading pattern.



3. Stabilize and ground the wire for threading.

4. Thread the stem wire through the stem guide.

5. Thread the stem wire through the stem control roller.

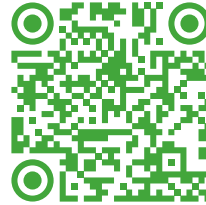
6. Thread the stem wire through the payoff entry roller.

7. Turn on payoff for the reel to be threaded.

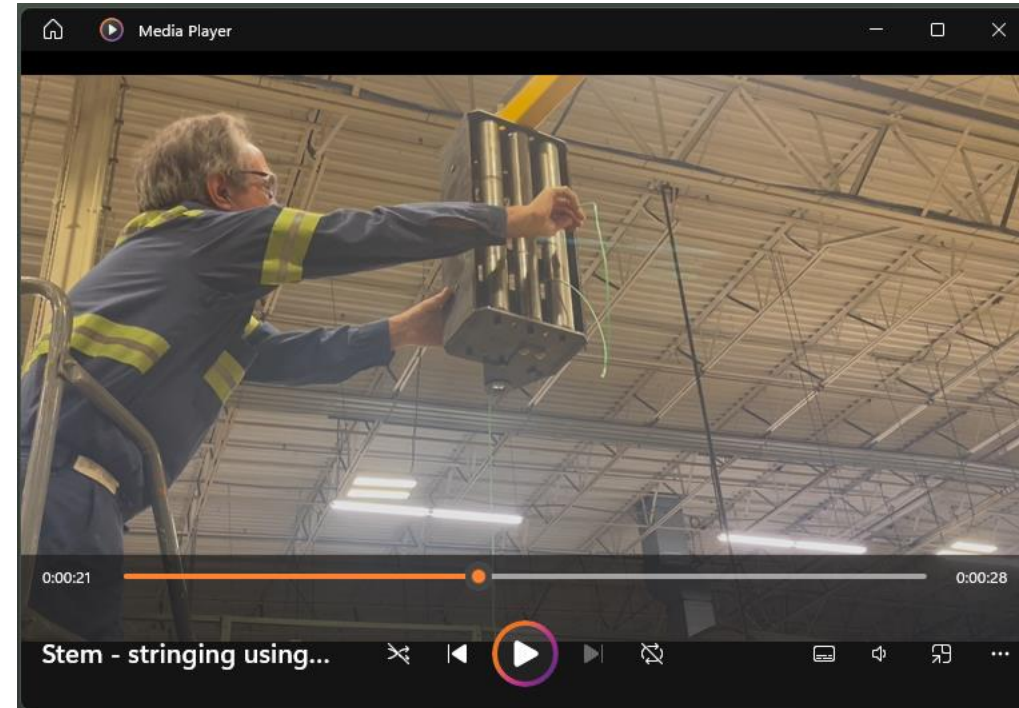
8. Wrap the stem wire over the desired empty reel.

9. Feed the stem wire through the payoff exit rollers.

10. Pull the stem wire towards the electrode box for additional threading.



Next Procedure in Work Instruction: Thread the stem wire through the closing die.



REDUCING MACHINE DOWNTIME USING QR CODES **THE FUTURE OF SELF-LEARNING**

How do we set ourselves up for success in using self-learning?

- Take time upfront to teach worker knowledge and skills to prepare them.
- Provide the tools on-the-floor to learn or refresh information faster.
- Leverage strong instructional and curriculum design for initial training and smart asset development and implementation.
- Avoid the junk-in / junk-out cycle.



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QUESTIONS





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THE MANUFACTURING WORKFORCE EVENT

DETROIT, MI

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