

CASE STUDY

***ROBOT-DRIVEN
MANUFACTURING***
**ENABLES
“LIGHTS-OUT”
PRODUCTION**

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COMPANY OVERVIEW

Ruland Manufacturing Company, Inc. (Ruland), founded in 1937, is a precision manufacturer specializing in high performance shaft collars, rigid couplings, and zero backlash motion control couplings. These components are used in applications across medical devices, robotics, machine tools, semiconductors, solar, and packaging industries. Ruland's global headquarters is in Marlborough, MA.

For more visit www.ruland.com



CHALLENGE

Ruland’s goal was to increase capacity to satisfy growing demand by robot-enabling smart factory production to run “lights out”. To hit production targets continuous unattended operation and the addition of a third shift overnight would be required to increase throughput and fulfil a growing order backlog.

Ruland selected their FANUC RoboDrill workcells for robotic automation based on the high demand and margins on the parts produced by these processes. Each machine makes over 100 different part SKUs, and required hours of manual effort every time a new job was set up which occurs frequently.

The required solution would need to provide seamless connectivity and communication with the RoboDrill machines, as well as, additional factory machinery throughout the company targeted for robotic automation moving forward. Improved part/job changeover was identified as a critical requirement based on the number of SKUs each machine runs to improve efficiency, utilization and reduce downtime.

“

One of the challenges we’ve had with previous automation projects has been the complexity of the robot to machine interfacing which Flexxbotics solves.”

Dustin Vinci
Engineering Manager
Ruland Manufacturing

SOLUTION

Ruland selected the Flexxbotics solution for advanced robotic machine tending to connect robots and machines with interoperable communication and orchestration for continuous unattended operation in “lights out” production.

Flexxbotics experts led the project to design, deploy, and digitalize the complete turnkey solution including the collaborative robots, in/out-feed changes, and standardized robotic production software. Collaborating closely with the Ruland team, Flexxbotics identified the business objectives and technical requirements for robot-enabling production taking into account everything from the machine interfacing and part presentation to facility, layout, and safety considerations necessary for success.

The advanced robotic machine tending solution from Flexxbotics directly connects robots with factory machines for robotic command and control. Flexxbotics standardized robotic production software provides powerful functionality to automatically change jobs between more than 100 different part types. This cut the changeover time required from up to two hours to 10 minutes or less.

Flexxbotics’ breakthrough FlexxCORE technology includes Intelligent Recovery™ which provides the robots with a first-of-its-kind autocorrect error resolution capability for non-safety related work stop situations so the robot can fix itself and continue to operate without the need for a human to restart the process. This innovation enables continuous operations, greater throughput and increased profit-per-part.



What’s great about the Flexxbotics solution is the complete coordination of our robots with our factory machines for direct feedback and autonomous adjustments enabling 24/7 production.”



With the tight tolerances of Ruland’s precision parts, intermittent workholding contact had the potential to cause periodic robot stops. Using a probe for closed-loop feedback Flexxbotics identifies if the robot has paused due to inadvertent contact or if a workpiece is improperly seated.

Intelligent Recovery with Flexxbotics enables the robot to autonomously restart, maneuver to the proper position for the workholding and even reseat the part if necessary so production continues without operator intervention. Flexxbotics then monitors subsequent operations to identify if there is a recurring issue, and if so Flexxbotics sends a text alert to the designated engineer for resolution.

A full set of bidirectional communication, transform and routing capabilities are available in Flexxbotics for robots and machining centers that are connected including loading programs, sending instructions, updating parameters and status awareness so the robots can communicate and control smart factory equipment.

Flexxbotics robotic digitalization delivers robot-driven manufacturing at scale with autonomous process control for advanced machining operations. Flexxbotics’ runs both online and offline so production continues with or without internet access, and Flexxbotics works with existing business systems such as ERP, CAD/CAM, SCADA/HMI, IIoT, MES, PLM and others for complete synchronization.



Using Flexxbotics we achieved a greater than 60% increase in capacity within 30 days. The optimizations Flexxbotics provided have proven invaluable”

FLEXXBOTICS **AT RULAND**

Advanced robotic machine tending automation with robot+machine multi-part operations for "lights out" production

Standardized robotic production software for robot+machine orchestration to achieve longer unattended operation

Automated changeover process for over 100 part/SKUs cutting changeover time from up to two hours to 10 minutes or less

Automatic job set-up with synchronized program loading of the robot and machine on each job for coordinated cycle start

Intelligent Recovery™ eliminates inadvertent, non-safety related work stop to reduce unplanned downtime

Smart workflows with contextualized step-by-step instructions for technicians or operators based on both the machines and robot's status

Open connectivity and interoperability between the robots and PLC controllers

Extensibility to numerous robot+multi-machine configurations and factory machinery types

RESULTS



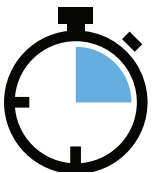
60% GREATER CAPACITY

Achieved through unattended third shift and increased efficiency compared to previous manual process



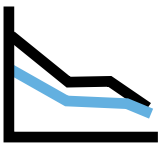
82% UTILIZATION RATE

Utilization rate improvement within 90 days and overall cost center utilization increased as existing labor able to focus on other activities



73% REDUCTION IN CHANGEOVER TIME

Automated part/SKU job changeovers which could take up to two hours to now 10 minutes or less



UNPLANNED DOWNTIME REDUCTIONS

Intelligent Recovery functionality reduced unplanned downtime by more than 21%

FUTURE PLANS

Moving forward as Ruland continues their advanced manufacturing digital transformation strategy the company has roadmapped additional targets for robotic automation across the smart factory. Using Industry 4.0 principles and business driven initiatives, the company seeks to achieve even greater levels of capacity, productivity, and operating leverage.



ABOUT FLEXXBOTICS

Flexxbotics enables robot-driven manufacturing at scale. Flexxbotics solution digitalizes robotic production with autonomous process control for next generation smart factory environments. Flexxbotics breakthrough, the unique FlexxCORE™ technology, seamlessly connects and coordinates robots with existing automation equipment, IT systems and people. More powerful, flexible and open, Flexxbotics revolutionizes the use of robotics in complex production. Visit www.flexxbotics.com to learn more and follow us on LinkedIn.

flexxbotics.com

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