

Peer-to-Peer Network Forum: Advanced Automation & Industry 4.0 Tech Scale-up at the Cummins Fuel Systems Plant

Event Summary

Conexus Indiana held a Peer-to-Peer Network Forum on Thursday, June 16, 2022, to tour Cummins' world-class Fuel Systems plant in Columbus, IN. It served as an opportunity for attendees to learn about several Industry 4.0 technologies and best practices that have been deployed to meet market needs and enhance global competitiveness. Participating organizations included the University of Notre Dame, Purdue University, Cummins, Eli Lilly, Heartland Ventures, Major Tool & Machine, Mursix Corporation, and Conexus Indiana.

Cummins Industry 4.0 Journey & Scale-up

The Cummins Fuel Systems plant is fitted to perform roughly 220 manufacturing processes. To enhance efficiency, workplace safety and optimize the mix between automation and human labor, in the last 3 years Cummins has deployed 40 collaborative robots (cobots) and 10 autonomous robots (AMRs). In fact, 15% of all cobots at Cummins globally are hosted in this facility. While this Industry 4.0 tech scale-up has been rapid on many accounts, there are yet further plans to increase deployments and expand use cases.

Workforce Development: Young Professionals Under 30 Are Leading Technology Implementations

The Industry 4.0 project team at Cummins are almost all under the age of 30—they are the group leading deployments in the Fuel Systems plant and taking ownership of the projects. While both the vendor and technology selection are a group decision, the domain expertise and upskilling always stays with the machine operator. For example, when a particular manufacturing process is automated, the operator responsible for supervising that process / working with a particular machine will be upskilled on how to use the new technology (i.e., cobots for machine tending or AMRs for material handling).

Industry 4.0 Technology Use Cases

Cobots for Machine Tending & Part Picking/Packing

- While a cobot is slower than an industrial robot, Cummins production bottlenecks lie at the machine tending and part handling stages of the manufacturing process—an excellent use case for a cobot automation.
- During machine tending, the cobots build a layer of protection for the machine operator. For example, an operator is no longer handling oils, exposed to chemicals, near pinch points or leaning in an out of machines.
- Because cobots require less safety guarding than an industrial robot, the operators can view and inspect both the parts and machines any time throughout the process. This is especially crucial if an employee needs to troubleshoot.

- Cobots are improving workplace ergonomics because employees are doing less part handling in and out of machines.
- Just one operator can work alongside 5 machines and 5 cobots. 3 years ago, the 5 machines would require 5 individual machine operators.

Additive Manufacturing for Cobot Grippers and Tooling

- Cummins uses 3D printing to manufacture its own cobot grippers and tooling. Producing the grippers in-house saves money in the long-run and enables them to produce and keep spare parts on hand.

Autonomous Mobile Robots (AMRs) for Material/Part Handling

- The AMRs transport parts and materials around the shop floor as they move through the manufacturing process. The technology eliminates the need for an employee to walk from station-to-station transporting parts or materials.
- Employees can spend more time troubleshooting or programming a cobot.

A key intention of the facility tour was to expose several of the Manufacturing Readiness Grant recipients, which are primarily small-to-mid sized manufacturers, to the *art of the possible* at Cummins. The implementation of cobots served as an exceptional example of what a rapid technology scale-up looks like within 3 short years. With leadership from its team of young professionals, the Cummins plant has grown its Industry 4.0 capabilities from 0 cobots and AMRs in 2019 to 40 cobots and 10 AMRs in mid-2022.

To learn more about cobots, watch a past Conexus Indiana Emerging Tech Showcase webinar here: [Enhance your production agility and flexibility with collaborative robotics \(cobots\) on Vimeo.](#)

Get Involved

Conexus Indiana's Peer-to-Peer Network is an invite-only forum for Indiana manufacturers and logistics companies to share knowledge and best practices about advanced technology they have utilized or are seriously considering. Ultimately, we hope these conversations will drive greater adoption of advanced technologies by allowing a variety of stakeholders to learn about technology among engaged and informed peers. Reach out to Conexus Indiana to get involved.