PROCESS DEVELOPMENT AND IMPROVEMENT

The Center for Design and Manufacturing Excellence offers clients support developing new or improved existing processes employed for manufacturing of products. We work to create the most efficient, effective, and scalable processes to ensure clients maximize the return on any process-related investments made by the company.

The importance of employing the most efficient operations processes is vital in lean manufacturing. CDME conducts process mapping to identify areas of improvement within the current manufacturing operation. Techniques used might include Six Sigma, Kaizen, TPS, and 5S.

PROCESS ANALYSIS
CDME performs an on-site analysis of the client’s current manufacturing process to determine appropriate process improvements needed to ensure efficient operations. Engagements range from baselining manufacturing analysis through value stream mapping.

AUTOMATION OF PROCESS
CDME works with clients to design and implement cost-saving automation improvement projects in their manufacturing process. This includes robotics, PLC systems, Industrial Internet of Things (IIoT), and custom-developed solutions.

QUALITY IMPLEMENTATION
CDME helps manufacturing clients implement quality assurance, quality control systems, and processes. These systems and controls are often utilized in conjunction with ISO 9001 or other relevant industry certification.

TECHNOLOGY IMPLEMENTATION
Processes can often be improved significantly with the integration of new technologies into existing production systems. CDME understands emerging technologies and has access to applicable, fundamental research at the university and federal laboratory systems in Ohio.

INSPECTION SYSTEMS
The manufacture of quality products requires an investment in the product and component inspection. CDME understands the technology utilized in inspection systems from computer vision through THz surface analysis and everything in between.

CONTROL SYSTEMS
Control systems drive most automation in modern manufacturing processes. The development or implementation of more robust controls can lead to significant improvements in operational efficiencies. CDME’s staff has a strong foundation in control design and implementation.
TECHNOLOGY IMPLEMENTATION CASE STUDY: COLLISION WELDING

Challenge
- Develop a new process for optimally joining dissimilar materials together which significantly surpasses capability of existing joining methods, such as self-piercing rivets, friction stir welding, and other techniques.
- Utilize emerging technology to develop a manufacturing-ready system to join aluminum to steel, aluminum to aluminum, carbon fiber to steel, and other combinations.
- Ensure the system could fit into existing manufacturing processes to ensure a viable pathway to commercial collision welding implementation.

Execution
CDME worked with Ohio State research staff to identify foundational technology which could meet customer objectives. In support of the effort, CDME developed a commercial-grade capacitor bank system (figure 1), a single weldment system, and a pedestal linear welding system (figure 2). Successful welding and testing have been accomplished on various materials, including automotive-grade aluminum and steel alloys.

Outcome
1. mechanical design
2. electrical design
3. control programming
4. equipment assembly
5. functional testing and operational analysis
6. operational manual and safety documents
7. fully functional, dissimilar material welding system

Follow-On
We have developed a partner network of interested industry users to support the use and adoption of the technology across various manufacturing sectors. We have worked with these partners to procure multiple federal and state grants worth almost $4M to support the further development of this welding process. A fully-automated robotic welding system (figure 3) is currently being developed at CDME as a result of these efforts.

The Center for Design and Manufacturing Excellence (CDME) is the manufacturing port of entry into Ohio State. CDME is The Ohio State University’s preeminent leader in innovative applied research for product design, technology commercialization, and manufacturing for industry. Our center is an Ohio Manufacturing Extension Partner affiliate.

CONTACT
The Center for Design and Manufacturing Excellence
1314 Kinnear Road, Suite 1533, Columbus OH 43212
614.292.6888 cdme@osu.edu cdme.osu.edu