

AMERICAN INDUSTRIAL PARTNERS - CANAM GROUP

Joist Trek: The Next Generation

STUDENT TEAM:

Jack Claucherty – EGL (BSE & MSE Industrial and Operations Engineering)

Almira Dogruyol – EGL (BSE & MSE Industrial and Operations Engineering)

Elena Stefanko – EGL (BSE Electrical Engineering & MSE Industrial and Operations Engineering)

PROJECT SPONSORS:

Danny Davis – Partner, American Industrial Partners

Gregory Matson – Director of Planning, Canam

Joel Stanwood – Partner, American Industrial Partners

FACULTY ADVISORS:

W. Monroe Keyserling – College of Engineering

Eric Svaan – Ross School of Business

American Industrial Partners - Canam Group (Canam) was acquired by the private equity firm American Industrial Partners in 2017. Canam is the largest fabricator of steel components in North America, specialized in designing construction solutions and fabricating customized products. The 2019 Tauber project focused on Canam's Construction Industries business segment and the facilities and processes for fabrication of steel joists for the construction of commercial buildings. The Tauber team's home base was Canam's Point of Rocks MD facility, the company's most efficient plant for the production of mid-span steel joists. The team's mission: to envision the future state for mid-span joist manufacturing, by evolving current processes to include automating various production steps. Senior management identified labor efficiency, safety and capacity improvement as the critical metrics for this future state.

After a deep dive into Canam's current state of plant configuration and existing processes in those plants, the team built a framework to evaluate costs, benefits and risks for future design alternatives, as follows.

- **Investment:** time-phased capital and operational costs
- **Benefit Analysis:** cost savings, safety, improvements in workplace quality of life, and other less tangible benefits
- **Risk Assessment:** qualitative analysis in 6 dimensions: customer, supplier, technology, product performance, safety, and market

Based on analysis using this framework and in-depth discussions with the R&D team and key stakeholders, the team proposed a course of action to realize Canam's ideal future state, resulting in the following improvements.

- **Labor Efficiency:** reduce the required labor to manufacture a joist by 54%
- **Safety:** eliminate the root cause of 33% of current safety incidents
- **Capacity:** increase mid-span steel joist production to 20,000 tons/year per line, up from existing levels which range from 4,000-14,000 tons/year

To support these recommendations and enable further design and future implementation work, the team developed and transferred to Canam team members several proof-of-concept models to compare the current state to future state options. These models include a cost per crane touch analysis to quantify the risks and costs associated with using cranes to move material, a flow simulation for identifying bottlenecks and quantifying WIP, and a master analysis spreadsheet with what-if capabilities to accommodate future technology changes.

In the Point of Rocks plant, projected yearly operating cost will be reduced by \$1.4M, resulting in an estimated payback period of around 4 years. These improvements will scale up when implemented across all 7 plants, netting the company upwards of \$10M in annual operating cost savings.