Industry
Food and Beverage

Technologies
Sensing
Connectivity
Data Contextualization
Predictive Modeling

Solutions
Manufacturing Productivity
Quality Improvement
Waste Reduction

CESMII
THE SMART MANUFACTURING INSTITUTE

PROJECT CASE STUDY

Optimize Continuous Cooling Tunnels for Industrial Food Processing

PROJECT LEAD

G-W Process Optimization, Inc.

PROJECT TEAM

Nutrition Bar Confectioners (NBC), Central New York Technology Development Organization (TDO)

PROJECT OBJECTIVE

- Collect and contextualize production data via the CESMII Smart Manufacturing Innovation Platform
- Implement a data-driven algorithm that:
  - Predicts product quality based on operational performance along a cooling tunnel
  - Predicts when conditions are suboptimal
  - Advises what interventions are needed to ensure product quality

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Nutrition Bar Manufacturer Sees 10% Throughput Increase by Implementing Smart Manufacturing Tools

BENEFITS TO OUR NATION

American food processors will improve productivity and product quality by implementing the smart manufacturing machine profiles developed in this project. Approximately 10% of the US manufacturing base, or 37,000 companies, are food manufacturers. Industrial Food Processing manufacturers include pastries, cakes, and cookies; nutrition-, energy- and candy- bars; pastas; meat, poultry, and fish; vegetables and fruit; and prepared food. The most popular types of nutrition bars are Snack, Meal Replacement, Nutrition, Performance, and Weight-loss. The US Nutrition Bar market alone in 2019 was $9.6 billion. Industrial baking has an estimated value of $94.2 billion for 2020. Even slight improvements in food processing techniques will yield millions of dollars in savings annually.

BENEFITS TO INDUSTRY

Successful implementation of smart manufacturing tools at Nutrition Bar Confectioners will demonstrate broader applicability to other industries that use cooling tunnels, industrial mixers, and kettles. In addition to Food & Beverage, this includes Cosmetics, Chemicals, Pharmaceuticals, Water & Wastewater, and Mineral Processing,

PROJECT DESCRIPTION

TECHNICAL APPROACH

Install sensors before the tunnel to characterize the product. Create a smart manufacturing profile for each type of machine (cooling tunnel, kettle, mixer). Generate a predictive algorithm, Utilize the CESMII smart manufacturing innovation platform to collected data to verify the newly generated G-W Process Optimization predictive model. Create dashboards for visualization. Utilize predictor to manually intervene in real-time.

ACCOMPLISHMENTS

- Sensor installation and testing
- Established connections between the Smart Manufacturing Innovation Platform and the following Nutrition Bar Confectioners (NBC) equipment:
  - Colling Tunnel
  - Kettle
  - Mixer
- Prediction model defined, configured and integrated with smart manufacturing machine profiles

DELIVERABLES

- Developed visualization dashboards showing process performance parameters
- Developed and delivered human-machine interface at process edge
- Delivered smart manufacturing machine profiles for integration to the CESMII SMIP:
  - Cooling Tunnel Profile
  - Kettle Profile
  - Mixer Profile

REUSABLE OUTCOMES / SM MARKETPLACE

- Cooling Tunnel Smart Manufacturing Profile
- Mixer Smart Manufacturing Profile
- Kettle Smart Manufacturing Profile
- Training methodology for small and medium sized manufacturing production personnel

RESULTS

↑ $12k/yr

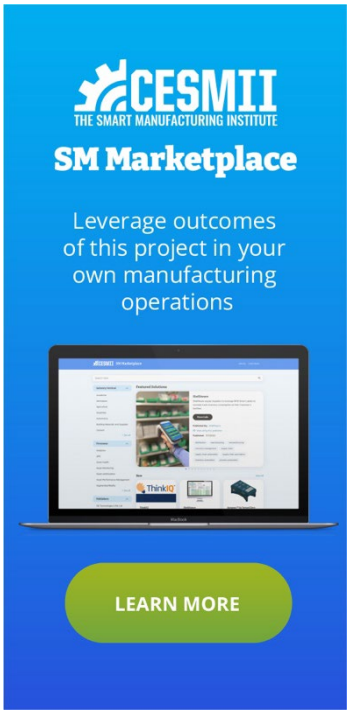
Potential to save $12k/year per cooling tunnel in reduced energy costs.

↑ $40k/yr

Potential to increase productivity by $40k/year at the Nutrition Bar Confectioners plant due to reduced waste and improved product quality.

↑$700k/yr

Potential to increase throughput worth $700,000 of additional product per year at NBC plant.



PROJECT DETAIL
Budget Period: BP4
Submission Date: 06/01/2022
Sub-Award (contract) Number: 4550 G ZA026
SOPO: 2331

Insert Acknowledgements

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