

## **STANLEY BLACK & DECKER, INC.**

Mobile Robotics for Material Handling

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**Stanley Engineered Fastening (SEF)** is a \$2 billion division of Stanley Black & Decker, Inc. that manufactures and supplies fasteners across the industrial and automotive industries. With significant growth expected over the next five years, material movements will increase while floor space reduces. As a result, a project focused on improving SEFs operational performance via automated material movement and related Industry 4.0 solutions was developed. The goal of the project was to create a minimum of \$500,000 in annual savings across four SEF plants- Chesterfield Plastics, Chesterfield Metals, Montpelier, and Hopkinsville by recommending three to five business use-cases.

Three key current-state analyses were conducted across each site to investigate the need for mobile robotics: 1) Frequency and distance quantification of material flows 2) Time studies of roles associated with material flows 3) Value stream mapping of parts across the plant operations. From this, areas for significant efficiency improvement or cost-saving in both, material movement and packaging processes, were identified.

A total of six use cases were developed where the first five involve the application of mobile robotics for material movement, and the sixth involves the application of automated box packaging. The use cases regarding mobile robotics were discussed with several vendors. A decision matrix incorporating key criteria covering technological, operational, and financial factors was formulated to evaluate each vendor proposed technology. The sixth use case was discussed extensively with an existing vendor in further determining operational and financial feasibility.

A financial analysis was conducted to determine NPV, ROI and payback for each use case. Two methods were used to calculate annual savings realized: the total value method (maximum potential savings), and the P&L method (savings realized on P&L statement). Due to a payback period of over 2.5 years, Use Case 2 was determined as unfeasible. All other use cases have been recommended, and would generate a total annual savings of ~ \$850,000 with an NPV of \$2,900,000. If similar mobile robotic use cases were to be scaled across the 11 plants in SEF North America, they would generate a total annual savings of ~ \$3,000,000.