

Increasing Participation and Safety of the Pick and Place Operation for a Fastener Packaging
Assembly Line at Goodwill Industries of the Springfield/Hartford Area, Inc.

School of Engineering
Western New England College
Springfield, MA

Objective

OMG, Inc. of Agawam, MA, a manufacturer of roofing products and fasteners, utilizes Goodwill Industries of the Springfield/Hartford Area, Inc. to perform some of their final packaging operations. One of the operations is to remove 50 decking screws from a larger quantity of screws on a work surface and to orient and place them into a packaging box. This operation currently requires a person to have full use of one hand for selecting, orienting and placing screws into a box and at least limited use of the other hand to safely hold the box on the work surface. The primary objective of this project is to design and fabricate a device to enable people with various disabilities, such as those who have very limited or no use of one of their hands/arms or those with visual impairments, to perform this task and thus, increase participation in this manufacturing process. The secondary objective is to improve the ergonomics associated with repetitive reaching and placing operations.

Work Scope of Design Project

This project is an interdisciplinary project involving senior undergraduate students in biomedical engineering and industrial engineering. These students are completing the design project as a requirement in their respective laboratory courses offered in Fall 2007. Students began the project by touring the Goodwill facility in Springfield and observed the screw packaging process. A standard design process is followed throughout the project. The team first brainstormed design ideas, then chose the best three to present to the laboratory instructors. Based on feedback from instructors, students made modifications to their designs which were then presented to the Supervisor of Rehabilitation and the Program Director of Employment Support Services at Goodwill Industries in Springfield; these individuals chose the design they thought would best serve the largest number of workers. Incorporating feedback from the nonprofit agency, the team is currently developing prototypes of their device. Once the prototype is manufactured, it will be tested by workers at Goodwill. Based on the results of the testing with disabled workers, the team will modify its design and validate its success with further testing by workers at Goodwill. The deliverables at the conclusion of the semester are a working device and a report meeting the standards of the NISH National Scholar Award guidelines. Modifications to the design, along with testing at Goodwill, will continue into the Spring 2008 semester to ensure that the device meets the needs of workers. A final report will be submitted to NISH by April 11, 2008. Testing of the devices by the workers at Goodwill has been approved by the Western New England College Institutional Review Board.

Schedule

9/4/07

Introduction to the Projects and Tour of Goodwill Industries in Springfield, MA

9/11/07

Project Brainstorming and Initial Design Concepts

9/25/07

Basic Designs and Present Proof of Concepts at Goodwill Industries

10/9/07

Detailed Drawing and Analysis of Designs

10/10/07 – 10/30/07

Evaluation of Initial Prototype Completed (including basic prototype testing at Goodwill Industries)

11/1/07-11/26/07

Design Implementation, Fabrication and Testing

11/27/07

Project Evaluation / Redesign Completed / Final Presentation

12/4/07

Semester Project Report

12/5/07 – 2/01/07

Final Design Fabrication, Delivery to Goodwill and Validation of Design

4/11/08

Submission of Final Report to NISH

Design Team

- Biomedical Engineering Students: Ryan Turner and Becky Cardin
- Industrial Engineering Students: Sean Salvas and Jason Eckenberger
- Faculty Advisors: Judy Cezeaux and Thomas Keyser

Budget

Request: \$250

Co-funding (Department of Industrial Engineering): \$100

Justification: Initial designs require a metal fixture to be fabricated and fixed to a work surface. The fixture will need to be adjustable. The goal of this project is to increase the number of people who could perform this operation and improve ergonomics with respect to repetitive motion disorders.

Estimated Material Costs:

Aluminum for final design: \$250

Wood for prototype design: \$50

Miscellaneous (screws, springs, etc): \$50

Machining required for this project will be performed by a machinist/model maker in the Western New England College machine shop

External Collaboration

Throughout the project planning and implementation phases, students and faculty are in contact with Anne Kaboray, Supervisor of Rehabilitation and Carol Hasenjager, Program Director of Employment Support Service at Goodwill Industries of the Springfield/Hartford Area, Inc. Anne Kaboray is responsible for choosing the workers to participate in the testing and validation of the design.

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