

Increasing Participation for the Expansion of a Tabbed Box in the 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 convert flattened tabbed packaging boxes into expanded boxes ready to be filled with decking screws. The primary objective of this project is to design and fabricate a device to enable workers who have a variety of disabilities such as the limited use of use of one of their hands/arms or visual impairments, to perform a task that currently requires a sighted person with full use of both hands to accomplish. As a secondary objective, this design seeks to minimize the potential for repetitive motion disorders as there are currently 100's of boxes expanded and tabbed each day.

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: Amanda Feldman
- Industrial Engineering Students: Devon Masse, Paul Eldson and Mike D'Aquila
- Faculty Advisors: Judy Cezeaux and Thomas Keyser

Budget

Request: \$300

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

Justification: Initial designs require a movable and adjustable metal jig/fixture be constructed. This jig/fixture will be mounted to a work surface in order to increase the number of disabled workers who could perform this operation and improve ergonomics with respect to repetitive motion disorders.

Estimated Material Costs:

Aluminum for Final Design: \$150

Slides and Gear Mechanisms: \$150

Wood for prototype design: \$50

Miscellaneous (screws, locking pins, 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.

Contact Information

Judy L. Cezeaux, Ph.D.
Professor of Biomedical Engineering
Western New England College
Box S-5004
1215 Wilbraham Road
Springfield, MA 01119
Phone: 413.782.1618
Fax: 413.796.2116
jcezeaux@wnec.edu

Thomas K. Keyser, Ph.D.
Associate Professor and Chair of Industrial Engineering
Western New England College
Box
1215 Wilbraham Road
Springfield, MA 01119
Phone: 413.782.1210
Fax: 413.796.2116
tom.keyser@wnecie.org