

4-2021

## Shipment Efficiency

William Dembicki

*Iowa State University*, dembicki@iastate.edu

Kyle Gilbert

*Iowa State University*, gilbertk@iastate.edu

Owen Cline

*Iowa State University*, orcline@iastate.edu

Colin McKay

*Iowa State University*, cmmckay@iastate.edu

Michael E. Anderson

*Iowa State University*, mea1@iastate.edu

*See next page for additional authors*

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### Recommended Citation

Dembicki, William; Gilbert, Kyle; Cline, Owen; McKay, Colin; Anderson, Michael E.; and Koziel, Jacek A., "Shipment Efficiency" (2021). *TSM 416 Technology Capstone Projects*. 100.  
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## Shipment Efficiency

### Problem Statement

Cline Design Creations produces custom-made plasma cut steel signs for customers worldwide; they are produced and shipped from one location in Guernsey, Iowa. Their packaging and shipping room is 15 ft by 25 ft, so saving space is a priority for this project. Cline Design Creations wants to redesign this room for faster packaging, as the packaging process takes up a sizable part of the total time required to get the product out the door. Since the company has very few employees, the production of new signs and the packaging of already cut signs cannot occur simultaneously, so if time can be reduced, the rate at which Cline Design Creations can produce and ship out signs will increase.

### Disciplines

Bioresource and Agricultural Engineering | Industrial Technology

### Authors

William Dembicki, Kyle Gilbert, Owen Cline, Colin McKay, Michael E. Anderson, and Jacek A. Koziel

# IOWA STATE UNIVERSITY

Department of Agricultural and Biosystems Engineering (ABE)

TSM 416 Technology Capstone Project

## Shipment Efficiency

William Dembicki <sup>a</sup>, Kyle Gilbert <sup>b</sup>, Owen Cline <sup>c</sup>, Colin McKay <sup>d</sup>, Michael Anderson <sup>e\*</sup> and Jacek A. Koziel <sup>f\*</sup>

<sup>a</sup> William Dembicki, Industrial Technology, ABE, ISU, [Dembicki@iastate.edu](mailto:Dembicki@iastate.edu)

<sup>b</sup> Kyle Gilbert, Industrial Technology, ABE, ISU, [gilbertk@iastate.edu](mailto:gilbertk@iastate.edu)

<sup>c</sup> Owen Cline, Industrial Technology, ABE, ISU, [orcline@iastate.edu](mailto:orcline@iastate.edu)

<sup>d</sup> Colin McKay, Industrial Technology, ABE, ISU, [cmmckay@iastate.edu](mailto:cmmckay@iastate.edu)

<sup>e</sup> Dept. of Agricultural and Biosystems Engineering, ISU, 2358 Elings Hall, Ames, IA 50011, [mea1@iastate.edu](mailto:mea1@iastate.edu), 515-294-2129

<sup>f</sup> Dept. of Agricultural and Biosystems Engineering, ISU, 4350 Elings Hall, Ames, IA 50011, [koziel@iastate.edu](mailto:koziel@iastate.edu), 515-294-4206

\*course instructors and corresponding authors.

**Client:** Cline Design, Address, Guernsey, Iowa, 52221, [clinedesigncreations.com](http://clinedesigncreations.com)

- Contact(s): Owen Cline, Company Co-Owner, [orcline@iastate.edu](mailto:orcline@iastate.edu), 319-512-8193

## 1 PROBLEM STATEMENT

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### Problem Statement

Cline Design Creations produces custom-made plasma cut steel signs for customers worldwide; they are produced and shipped from one location in Guernsey, Iowa. Their packaging and shipping room is 15 ft by 25 ft, so saving space is a priority for this project. Cline Design Creations wants to redesign this room for faster packaging, as the packaging process takes up a sizable part of the total time required to get the product out the door. Since the company has very few employees, the production of new signs and the packaging of already cut signs cannot occur simultaneously, so if time can be reduced, the rate at which Cline Design Creations can produce and ship out signs will increase.

### Business Case

- A. The shipping process currently takes over five minutes per sign to prepare it to be shipped. This costs Cline Design Creations roughly 500 minutes (about 8 and a half hours) per week to prepare products to be shipped.
- B. Cline Design has only two workers, making efficiency and time utilization especially important.
- C. The time saved here will help Cline Design focus on other processes, such as designing new products and allowing more signs to be shipped per day.

## 2 MAIN OBJECTIVE

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### Main Objective(s) and Specific Objectives

The main objective is to decrease the time needed for shipping. This will provide benefits for both the customers and the workers. By improving the efficiency of shipping, Cline Design will be able to ship more signs allowing customers to receive their orders faster and lessen workers' load.

### Specific objectives include:

- A. Decrease shipping cycle times by 20%
- B. A spaghetti diagram showing foot traffic in the area

### Rationale

- Once shipping times are reduced, the customers will receive their orders faster, leading to higher customer satisfaction. The time saved will be used to design more signs for customers to choose from.
- A spaghetti diagram will tangibly show the wasted motion before the solution is incorporated and how the solution saves motion.

### Project Scope

The project is limited to the shipping department of Cline Design. The cutting and painting of the signs are not incorporated within this project, so the focus was narrowed onto how to make this one process better.

## 3 METHODS/APPROACH

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By implementing a fixture for boxing and a new shipping table, Cline Design will be able to consistently package all boxes the same way while being able to box them faster. The new table will be able to save the wasted movements needed for retrieving tools needed for the packaging process and will improve ergonomics.

### A. Methods/Approach

- Uline had a multitude of shipping tables and other shipping products in their catalog that we used to base our designs from. Combined with the specifications of the building's layout and other requirements, we designed and built our own custom packaging table.
- **Data collection:**
- Time trials will be used to find the average time it took before any solution was implemented in the shipping department, then then the same trials will be used again when the solution is has been added to Cline Design to see how successful the solution was at reducing the time it took to package.
- **Skills:**
- Skills used to find an adequate solution were time studies to show total reduced time, solid works to show how the shipping area would be rearranged after, as well as spreadsheets to calculate the data gathered in an organized and easy to understand the method.

### Organization:

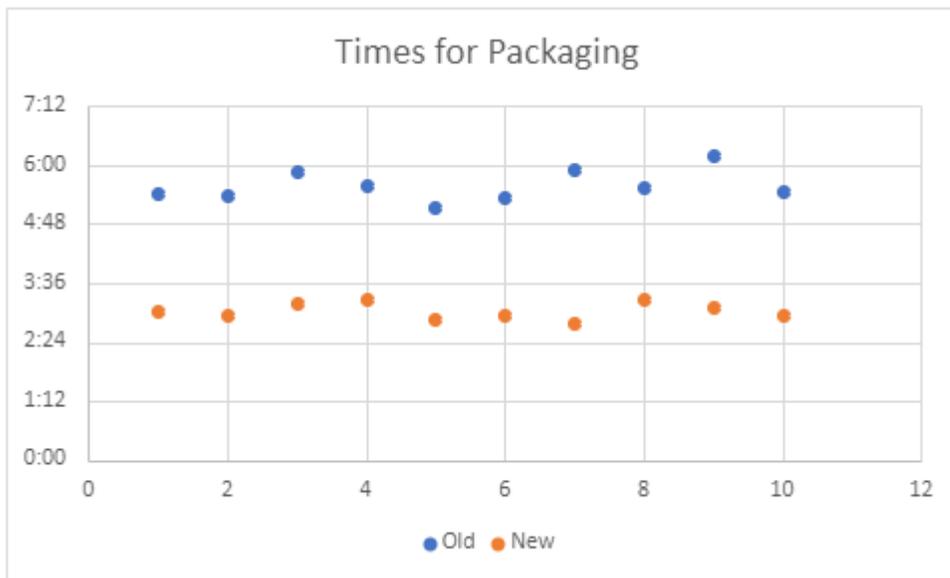
- Our team would meet once a week to discuss where we were during the project. We would make sure that we were always on the same page to avoid confusion.
- Weekly meetings were also held with the client to see if there were any changes to the project's scope.
- Our first site visit was a major milestone once we visited the site to see how things were done and see how much space we had to work with.

## 4 RESULTS

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### Results/Deliverables

The before cycle time had an average of five minutes and thirty-two seconds, and the after cycle time had an average of three minutes and two seconds.



### Recommendations

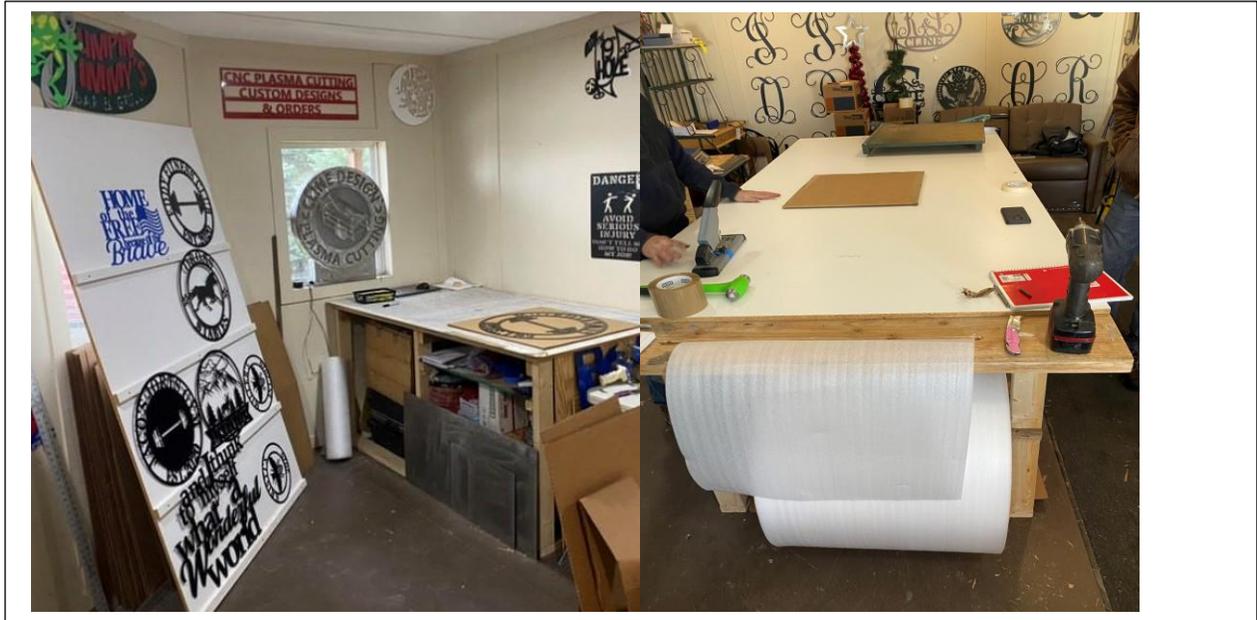
- A new shipping table to ensure no wasted movement for when retrieving tools, and packaging material.
- A fixture to speed up boxing so that the packaging can be done faster and more reliable.

## 5 BROADER OPPORTUNITY STATEMENT

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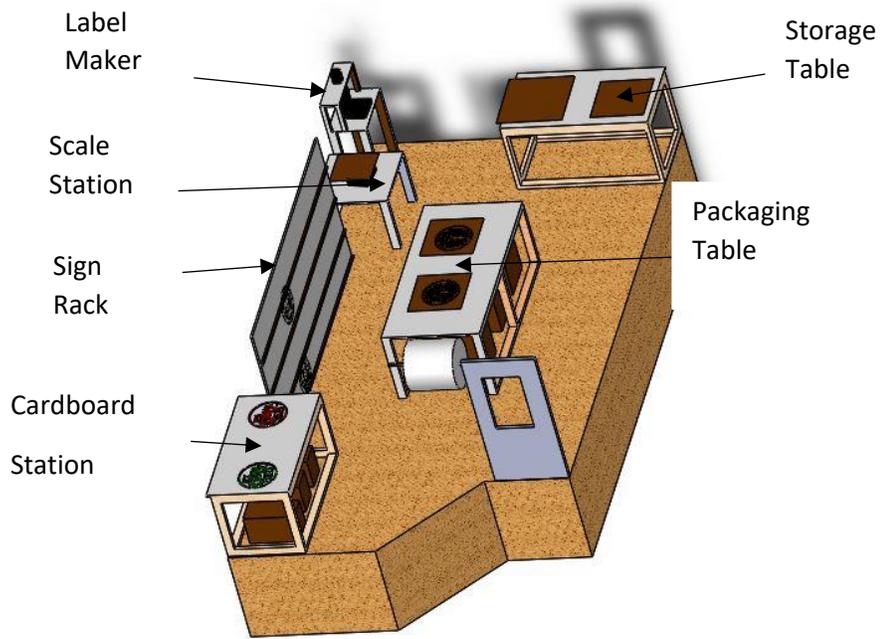
In the age of Amazon and Covid, online shopping has become a new normal. People want to stay at home for safety and convenience, making shipping more important than ever. Companies are now shipping directly to the consumer, and the consumer is expecting quick and hassle-free deliveries.

## 6 OLD/NEW SHIPPING TABLE

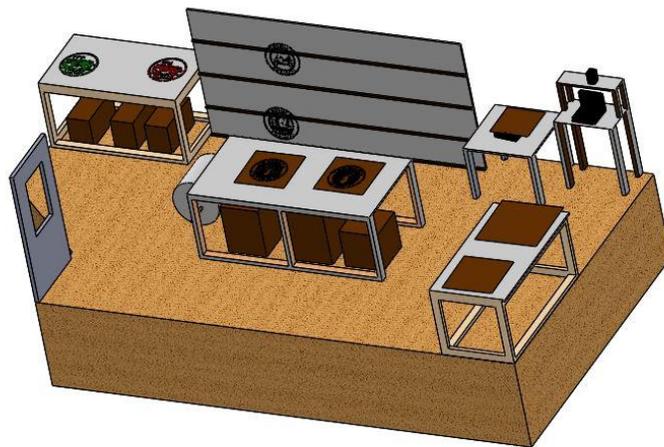


## 7 REFERENCES

- U-line Catalog
- Manufacturing Facilities Design and Material Handling by Fred E. Meyers and Matthew P. Stephens
- CAD layout of new design



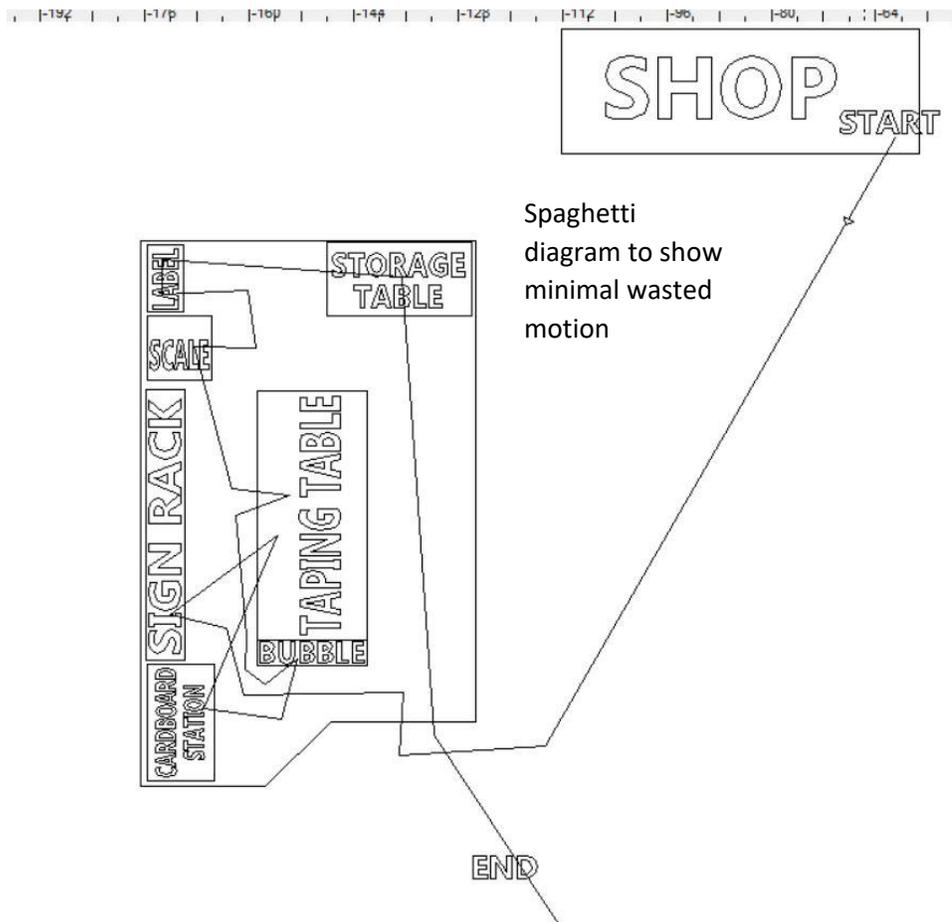
- The alternative view of the shipping room



## 8 APPENDIXES

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- Cline Design Fixed Data
  - Width of space needed
- Relevant Course work
  - TSM 444
  - TSM 440
  - TSM 310
- U-line catalog listing



- Shipping table design borrowed from U-line.

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