

2014

# Meritor brake assembly bench part setup process improvement

N. Drenosky

H. Dupree

C. Guinn

F. Petroski

M. Sidhorn

*See next page for additional authors*

Follow this and additional works at: <https://tigerprints.clemson.edu/foci>

---

## Recommended Citation

Drenosky, N.; Dupree, H.; Guinn, C.; Petroski, F.; Sidhorn, M.; and Dorlette Paul, M., "Meritor brake assembly bench part setup process improvement" (2014). *Focus on Creative Inquiry*. 83.  
<https://tigerprints.clemson.edu/foci/83>

This Article is brought to you for free and open access by the Research and Innovation Month at TigerPrints. It has been accepted for inclusion in Focus on Creative Inquiry by an authorized administrator of TigerPrints. For more information, please contact [kokeefe@clemson.edu](mailto:kokeefe@clemson.edu).

---

**Authors**

N. Drenosky, H. Dupree, C. Guinn, F. Petroski, M. Sidhorn, and M. Dorlette Paul



**Abstract:** In partnership with Meritor’s Manning, SC facility, this capstone project is focused on the changeover process of the brake assembly process at this facility .

**Problem**

The changeover process is the greatest source of the downtime an operator spends preparing the workstation for the next set of brake orders.

**Objective**

The teams goal is to use process improvement techniques to reduce downtime in between brake orders.

**Introduction:**

The team met with Meritor, a Brake manufacturer for industrial vehicles to understand the changeover process during brake assembly. Five concepts were chosen for testing after concept generation.

The key business goals for our final concept to be chosen

- Reduce the downtime at each brake assembly bench by 32%,
- Have a return on investment within 1 -1.5 years
- Reduce the need for overtime workers and a second shift workforce
- Reduce the physical strain on employees.

**Current State of the System**

- Project area within the facility involves 4 benches called “Cell 3”
- Total of 12 brake assembly benches present in the plant
- Each bench contains two workers
- Current changeover process can take as long as 20 minutes for experienced workers

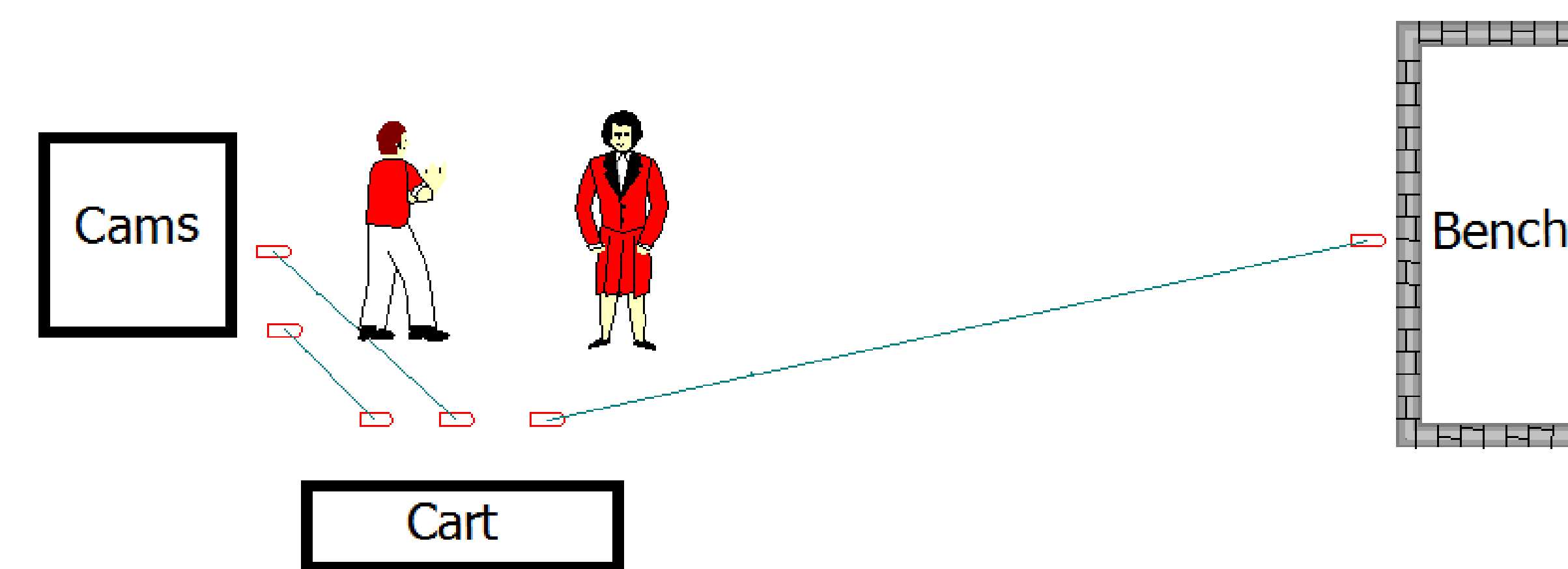
**Methods:**

- Identified Key Business Goals
- Developed list of Important Needs and Metrics
- Simulated current system using ARENA
- Generated and evaluated initial concepts

**Results:**

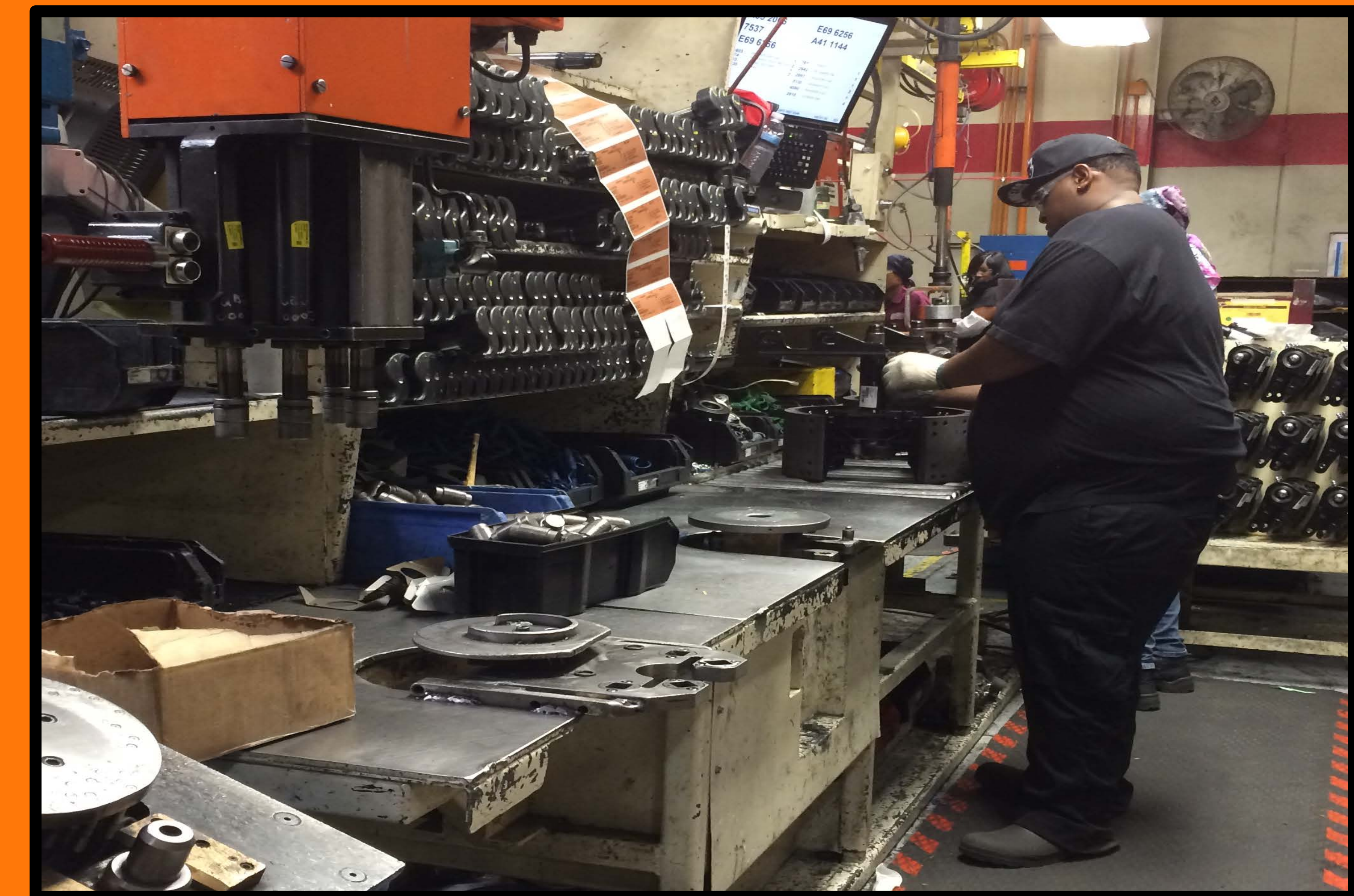
**Results**

Using Arena, a simulation software , we tested one of our concepts seen below. This resulted in a 32% reduction in cam transfer time.



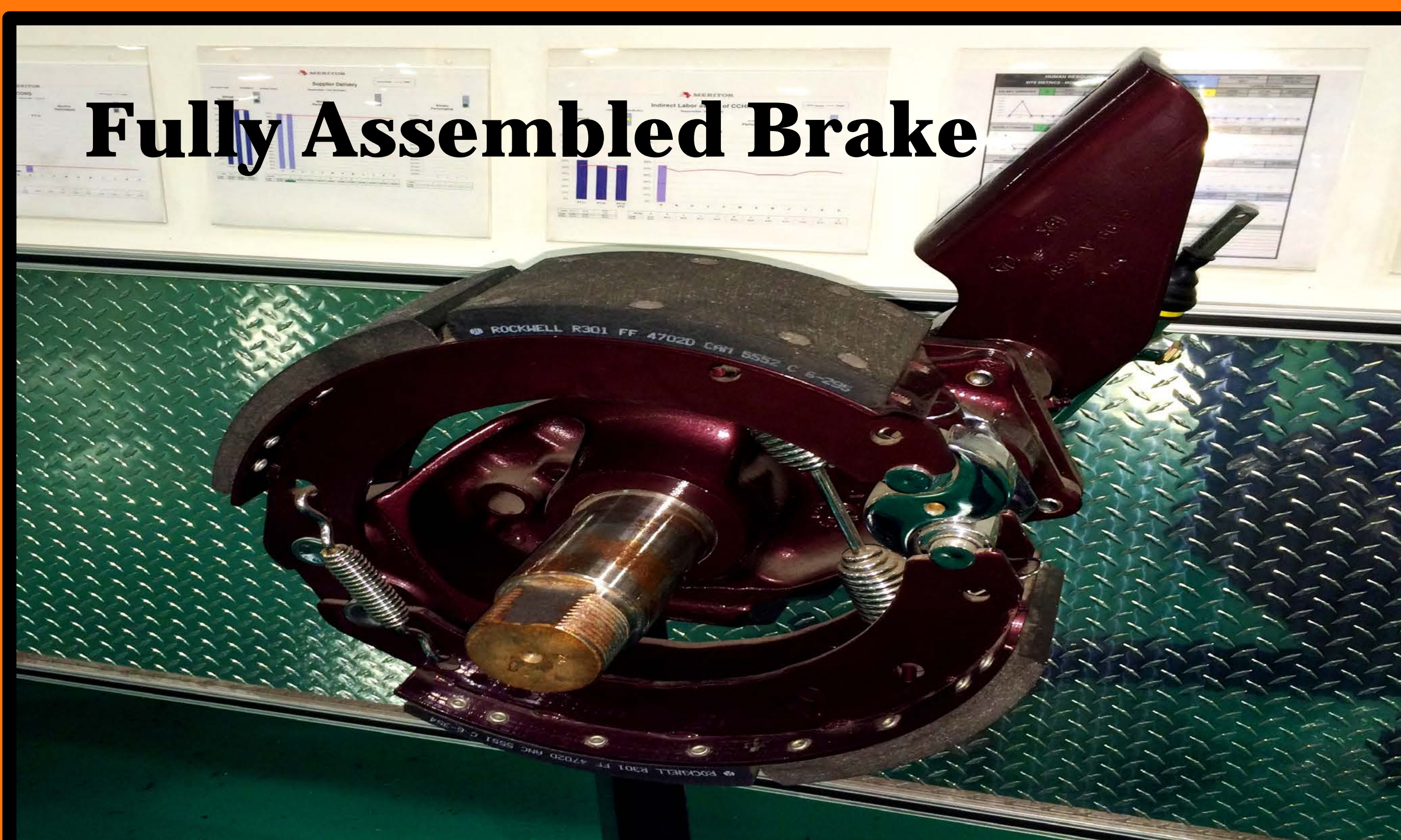
Initial testing results pertaining to a new concept in anchor pin transportation is shown in the table below. The data shows that this new concept being test can have as much as a 17 minute time difference. This will have an impact on overall setup time.

	Total Distance [feet]	Current System: Total Time for round trip [Minutes]	New Concept: Total Time for round trip [Minutes]	Time Difference
From Bench 9 to Station A	116	14.27	6.54	7.73
From Bench 10 to Station A	90	12.25	6.25	6.00
From Bench 11 to Station A	111	13.88	6.48	7.40
From Bench 12 to Station A	75	11.08	6.08	5.00
From Bench 9 to Station B	231	19.95	4.55	15.40
From Bench 10 to Station B	257	21.97	4.84	17.13
From Bench 11 to Station B	126	11.78	3.38	8.40
From Bench 12 to Station B	153	13.88	3.68	10.20



**Conclusions:**

- Although it is not immediately clear which concept will reduce Meritor’s setup time and associated costs, the five concepts that remain have the potential to provide a significant impact.
- They each aim to increase the efficiency of the process in different ways, providing a diverse opportunity for improvement
- The transportation and setup of cams has become the main focus of the team at this point in time because it has been recognized as the least efficient part of the process.
- The team is attempting to change Meritor's method of process setup, possibly drastically, to provide them with cost savings within their 1-1.5 year time frame. The future steps of the team will be to select a final concept and implement it into facility.



**Acknowledgements:**

Our client, Bob Edwards: Site Manager, John Leasure: Quality Engineer, Robert Burnstingle: Manufacturing Engineer, Justin Shorter: Operations Leader and project mentor at Clemson University, Melissa Paul.

**References:**

Ulrich, Karl T., and Steven D. Eppinger. Product design and development. 4th ed. New York: McGraw-Hill/Irwin, 2008.