



Lean Principles in Facility Management

Presented to GAPPA 2013

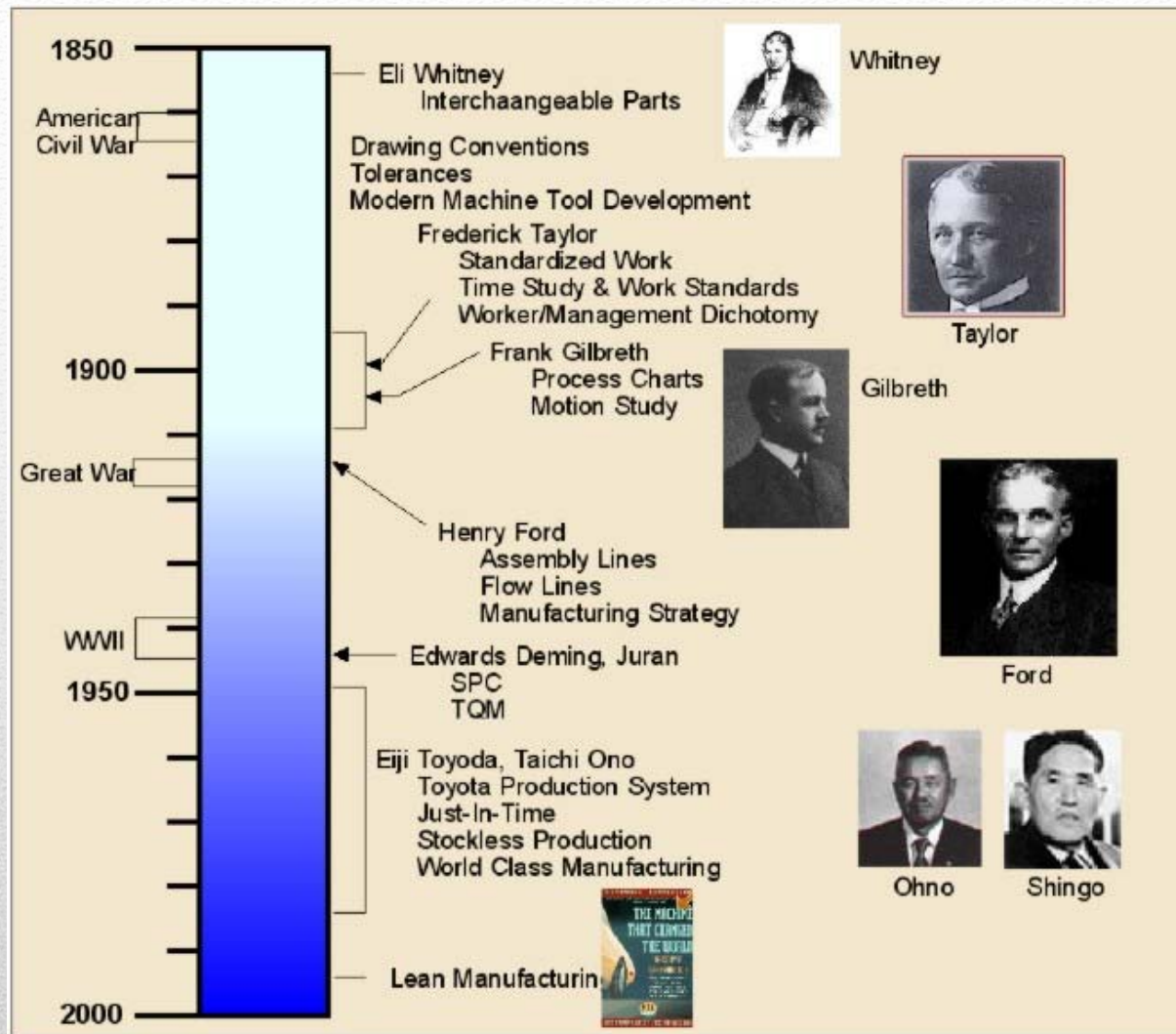
Mark Duclos
Director of Operations & Maintenance
The University of Georgia

What is Lean?

- The term “Lean” was coined by Jim Womack of MIT to describe Toyota’s business philosophy
 - Lean focuses on flow, the value stream and eliminating *muda*, the Japanese word for waste
 - Lean manufacturing is the production of goods using **less** of everything compared to traditional mass production: less waste, human effort, manufacturing space, investment in tools, inventory, and engineering time to develop a new product
-

What is Lean?

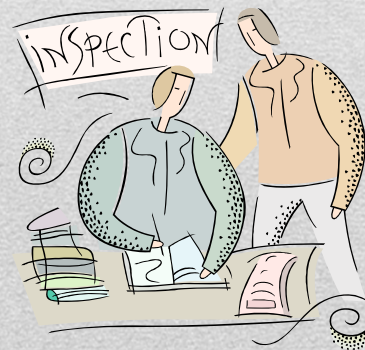
- Lean Principles rely heavily on employee involvement and a team structured organization
 - Lean consists of a set of tools used to identify value and eliminate waste
 - Lean is a way of thinking and acting for an entire organization and it applies to all industries including Facilities Management
-



Timeline

What is Waste?

- Waste is anything that happens to a product or process that does not add value from the customer's perspective
- Materials being stored, transported, inspected or delayed, material waiting in queues, and defective products do not add value



Seven Wastes

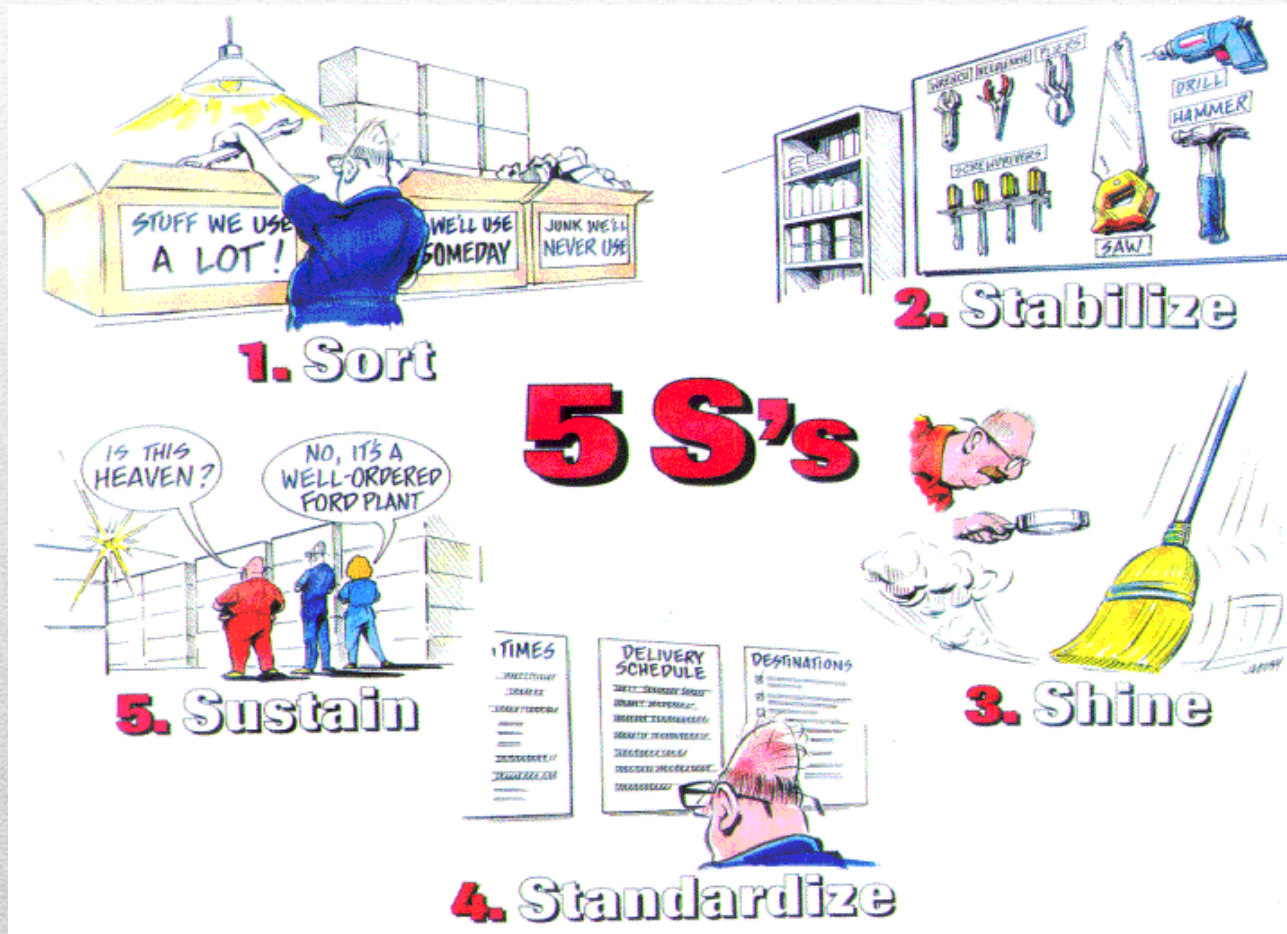
- Overproduction – producing more than the customer orders or producing early. Inventory of any kind is usually waste.
 - Queues – idle time, storage, and waiting are wastes
 - Transportation – moving material between plants, between work centers, and handling more than once is waste
 - Inventory – unnecessary raw material, work-in-process (WIP), finished goods, and excess operating supplies
 - Motion – movement of equipment or people
 - Overprocessing – work performed on product that adds no value
 - Defective product – returns, warranty claims, rework and scrap
-

Lean Principles & Tools

- 5S
 - Setup Time Reduction – SMED
 - Point-of-Use Storage & Kanban
 - Kaizen Events
 - Lean Maintenance
-

5S

Strategy for creating a well organized, smoothly flowing process

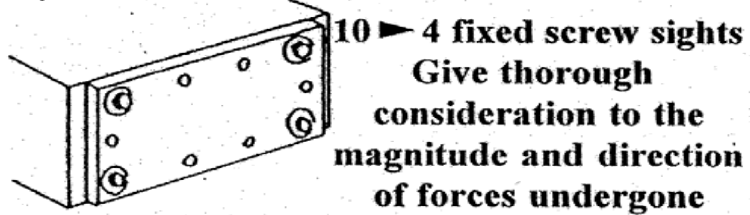


Benefits of 5S

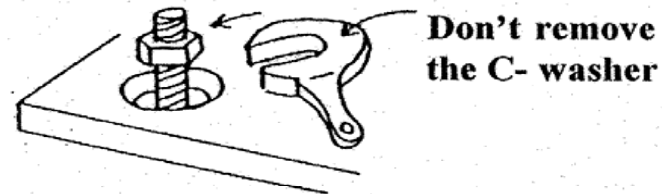
- Increases organization and efficiency
 - Avoids wasted motion
 - Increases safety
 - Eliminates unnecessary inventory
 - Offers improvements at an inexpensive cost
-

Setup Reduction - SMED Examples

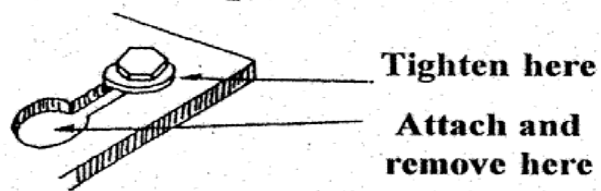
1) Reduce # of screws



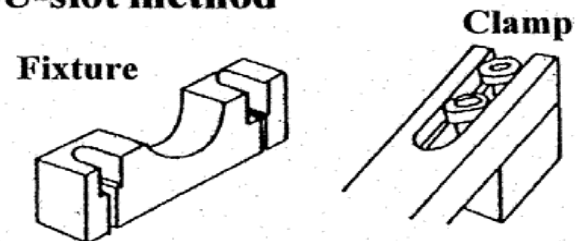
2) C-washer method



3) Pear-shaped hole method



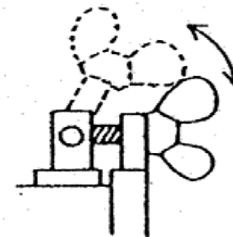
4) U-slot method



5) Variation of pear-shaped hole method



6) Wing nut method



Kanban

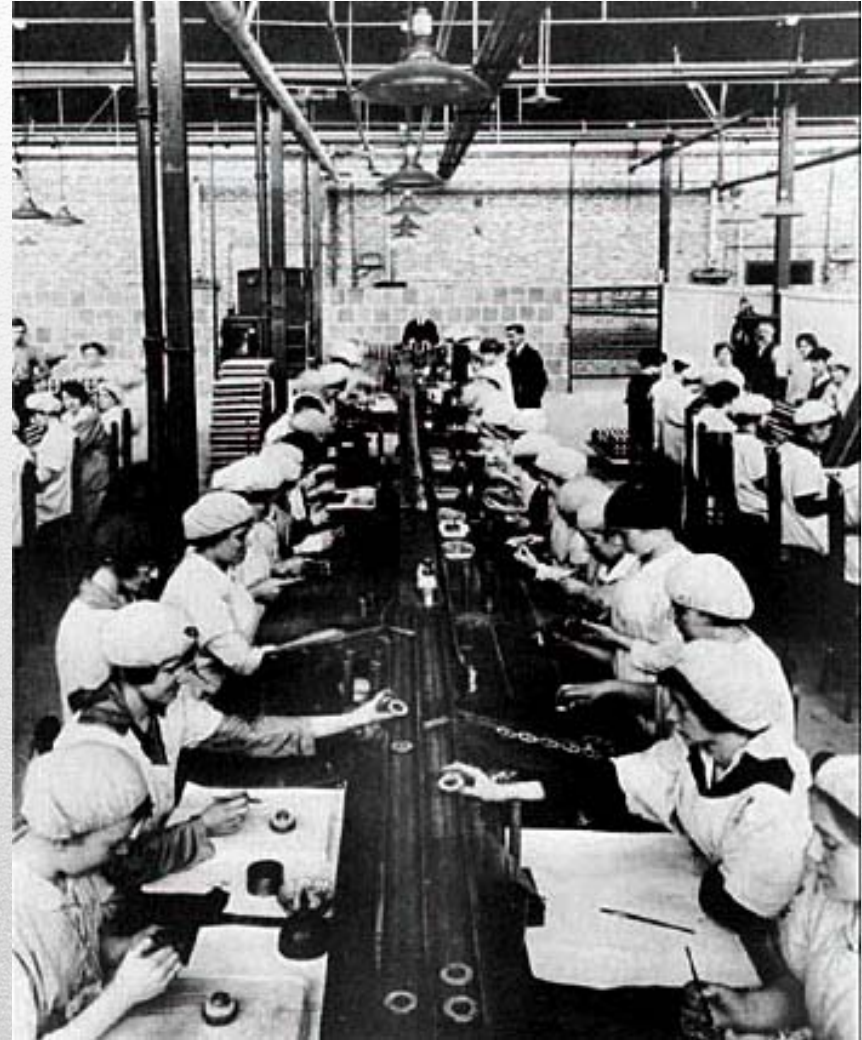
- A system that uses replenishment signals to simplify inventory management
 - Signals (usually cards) hold product details
 - What to make, when to make it, how much to make, and where to send it
 - Cards stay attached to a bin that holds the product
 - When bin is empty, it is returned to the start of the assembly line for replenishment
 - Full bins are returned to the customer, and the cycle continues
-

Benefits of Kanban

- Highly visible systems
 - Simple, effective, and inexpensive
 - Reduces inventory and eliminates stock-outs
 - Improves the quality of service
 - Improves lead times
-

People

- Transition to Lean is difficult since a company must build a culture where learning and continuous improvement are the norm.
- Success of lean requires the full commitment and involvement of all employees and of the company's suppliers.



How People Benefit from Lean

Element	Traditional	Lean	Improvement
Communication	Slow & Uncertain	Fast & Positive	Quality & Coordination
Teamwork	Inhibited	Enhanced	Effective Teams
Motivation	Negative, Extrinsic	Positive, Intrinsic	Strong Motivation
Skill Range	Narrow	Broad	Job Enrichment
Supervision	Difficult and Fragmented	Easy & Localized	Fewer Supervisors

Lean Journey at UGA

- UGA began implementing Lean in the Facilities Management Division in 2009
 - Partnered with Georgia Tech's Enterprise Innovation Institute
 - Started with a one day Lean overview with the senior staff to learn the basics of Lean
 - First Kaizen "Rapid Process Improvement" events were conducted in the Welding Shop & Structural Shop
 - Developed In-house Lean experts
-

Lean Projects at UGA

- Pump Rebuild
 - Classroom/Lab Remodel
 - Preventive Maintenance Material
-

Introduction to the Team



Pump Rebuild Shop

Chris Bennett
KC Chester
Kurt Reifeis

Classroom/Lab Remodel

Lynn Hix
Terry McCollum
Frankie Smith

Lean Champions:

Tyler Chapman
Doug Dauler



The University of Georgia

Physical Plant Division

Rapid Process Improvement (RPI)

Agenda for the week

1. Train on lean principles
2. Observe process, data collection and analysis
3. Brainstorm and prioritize ideas
4. Leadership update meeting
5. Implementation
6. Report out
7. Follow-up / Adjust procedure if necessary, and measure impact of new process

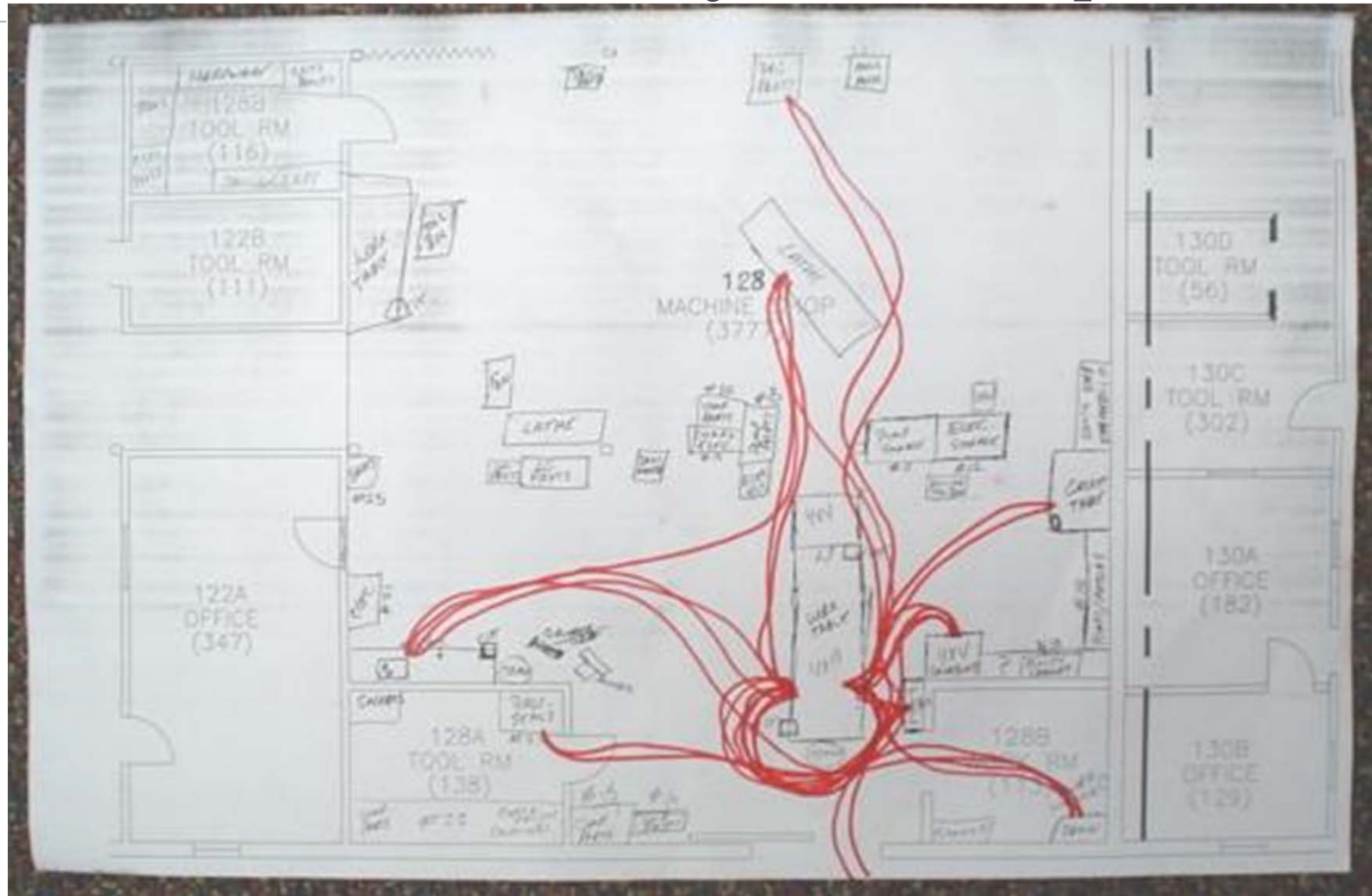
Have Fun!!!



The University of Georgia

Physical Plant Division

Data Collection & Analysis – Pump Rebuild



The University of Georgia

Physical Plant Division

Observations – Pump Rebuild

- Lack of housekeeping
- No set location for pumps in process
- Workspace layout is too spread out



The University of Georgia

Physical Plant Division

Brainstorming – Pump Rebuild

- 21 Ideas
- Collected ideas from each person on post-it notes
- Classified the ideas based on impact and feasibility (cost/time) to implement
 - 5S the shop
 - Work Requests
 - 5S the Trucks



The University of Georgia

Physical Plant Division

Pump Rebuild Implementation

5S the Shop

- | | |
|-----------------|----------------------------------|
| ▶ Sort | Clean & Organize |
| ▶ Set in Order | A place for everything |
| ▶ Scrub & Shine | Back to original “new” condition |
| ▶ Standardize | Make it the same for all |
| ▶ Sustain | Make it continuous |



The University of Georgia

Physical Plant Division

BEFORE



AFTER



BEFORE

Hmm... Who
knew this
was here!

Hey Kurt! Hand
me that
compressor
head...



AFTER

Hey, I could
get used to
this!



**SET IN ORDER
A PLACE FOR EVERYTHING...**



...AND EVERYTHING IN ITS PLACE.

Class/Lab Renovation Implementation

5S and Stocking of Trucks

- ▶ Stocking trucks with basic materials
- ▶ Organizing the materials on the truck
- ▶ Reducing number of trips
- ▶ Reducing time to acquire materials



The University of Georgia

Physical Plant Division

BEFORE



AFTER





UGA PHYSICAL PLANT PM SHOP MATERIALS TO AND FROM THE WORK SITE

Rapid Process Improvement Report Out
O&M, WAREHOUSE AND I.T.

August 17 - 21, 2009



The University of Georgia
Physical Plant Division

















Brainstorming

- 40+ Observations
- 6 - 8 Ideas per person
- Used 4 Quadrants based on
 - Impact
 - Feasibility
- Quadrant 2 – Future Items:
 - More trash compactors
 - More disposal sites
 - Better filter storage



Action Items:

1. Standard Size Filter Specification
2. Truck
 1. Better Truck
 2. Quick items on truck
 3. Hallway space and loading space
3. Pick Ticket
 1. Usable pick ticket
 2. Cheat sheet/easy reference
4. Communications
 1. Radios
 2. Between WH and PM Shop
 3. Suggestion Box
5. Tools at Job Site
 1. Tools that don't walk away
 2. Portable pulley



Vehicle Before



Vehicle After



Quick Items on Truck



Quick Items on Truck



Staging Space, with early access...



Loading Space



Summary of results



Total Distance/order Before = 1200 ft.
Total Distance/order After = about 200 ft.
Time Before = 29 minutes
Time After = < 10 minutes
Trips reduced from 5 to 6 down to 1



Summary of Improvements:

- ▶ Actually eliminated steps:
 - ▶ PM Shop filling out ticket at Warehouse
 - ▶ Warehouse having to enter the order into system
- ▶ Streamlined the process of handling order information
 - ▶ Less typos/defects/questions/etc.
- ▶ WH staff can fill order when time is free, and also see directly when last stock is pulled
- ▶ Harold has more time/week for value-added work
 - ▶ Not waiting in WH, not driving as much
- ▶ Conservative Estimate Cost Saved = \$7,000 to \$10,000 per year, just on time alone



30-Day Follow Up

	Action item	Responsible	Due
1	Finish parking setup	Don Jennings	8/28
2	Evaluate current filter inventory	Al Jeffers, Tim Savage	8/31
3	Evaluate recycling containers for disposal; Pick up by Harold in truck	Rod Platt, Tyler Chapman	8/28
4	Finalize storage	Champions; D. Fisher	8/31
5	Portable Pulley	D. Jennings, Mike Baxter, D. Dauler, Welding	8/31





Questions?

Contact Info:

Mark Duclos

Director of Operations & Maintenance

Facilities Management Division

The University of Georgia

mduclos@uga.edu

706-542-7453

Thanks for your attendance
