

Manufacturers Alliance Seminar
Make to Order Lean

Practical experiences on how a low volume or high mix operation benefits from Lean.

Welcome



**Kirby Sneen, Vice President
Manufacturers Alliance**

Please silence your phones during the presentations and discussion.

A **Video** of today's Seminar will be available on our website.

Thank you to our sponsor

Josh Kleve
DKS Systems



22ND ANNUAL
MANUFACTURER
OF THE YEAR AWARDS

Three manufacturers will be awarded, celebrated and recognized based on their demonstration of sharing information and improvement experiences with fellow manufacturers in a cooperative fashion.

Nominations due by Monday January 22nd

Updated - **Lean Leader Certification**



Develop the systems, behavior, and discipline to create a culture of improvement.

Starts January 9th 2018

Moderator



**Steve McClintick, Co-Owner
Flexmation, Inc.**

Carl Zeiss

Larry Arguello
Production Manager

ACCURA II Project Breakdown



Larry Arguello
IMT Production
Maple Grove, MN, 2017

Make To Order



Carl Zeiss IMT, LLC, Larry Arguello

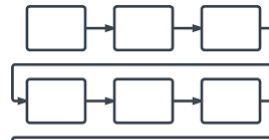
2017-02-09

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Problem Statement



Increase sales of ACCURA's for FY 2016/2017 by 20%. Production has not met the build demand of the increase in six months due to capacity, process/flow of the build, part shortages or delays, technical issues and NSP's.



Carl Zeiss IMT, LLC, Larry Arguello

2017-02-09

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Constraints



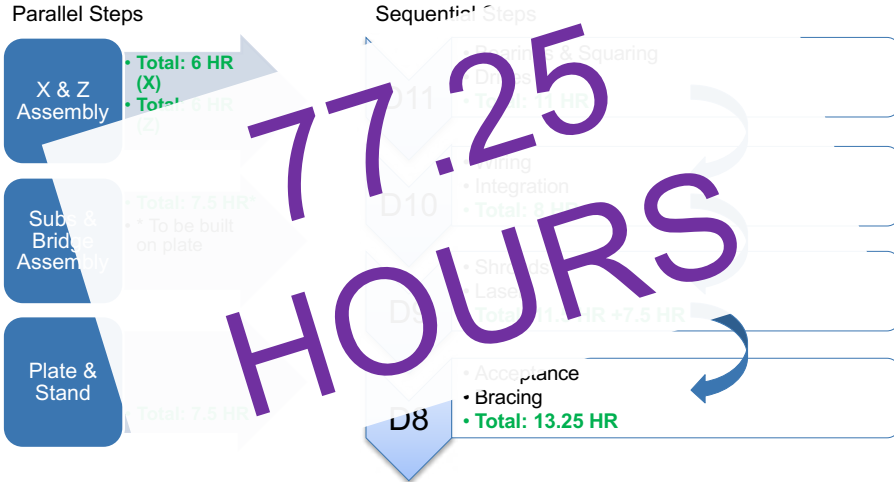
- Missing parts
 - GM orders
 - Revo machines
 - Enclosure machines
 - Customization
 - NSP's
 - Multiple sensors
 - Bellows
 - Rotary table
 - High dynamic
 - Low dynamic
 - Sick sensors
 - Capacity
 - Acceptance
 - Bracing
 - Carts
 - Tools
 - Fixtures
 - Linestock
 - Space
- New controller
 - SC2020 (lack of training)
 - No time for training
 - Too many systems
 - Production work orders
 - First Pass Yield
 - Error Code
 - Red Tags
 - Production Board
 - Final checklist
 - NSP's
 - Sales orders
 - Acceptance paperwork
 - Crane
 - Meetings
 - Sale order changes
 - Releasing machines w/ missing parts
 - Non-conforming parts
 - Granite
 - Miss picks

Solutions



- Missing Parts
 - X & Z assemblies supermarket
 - Assembled bridges supermarket
- Capacity
 - Allan Tinoco (Bracing)
 - Joseph Perrin (Sub Assembly)
- Carts
 - Separate the team
 - PRISMO/ULTRA
 - ACCURA II/CONTURA G3
 - Individual carts for each machine build
 - Supermarket for fixtures
- Space
 - D1 – D3 PRISMO's
 - D4 – D5 ACCURA II's
 - D6 & D7 Large machines
 - D8 - D11 GM ACCURA II's
 - C1 - C5 CONTURA's
- Too many systems
 - Pro Board GO
- Acceptance paperwork
 - Computer Cell
- Machines are not released with missing parts
- Sales orders are being verified before, during, & after

Plan



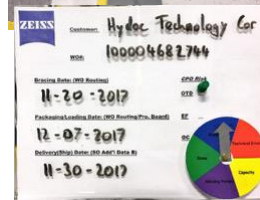
Lean Tools



- KPIs
- Andon
- Continuous Flow
- Kaizen
- Kanban
- 6S
- PDCA
- Poka-Yoke
- Standardized Work
- Takt Time
- Value Stream Mapping



Lean Tools

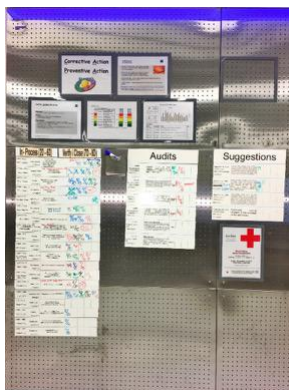


Carl Zeiss IMT, LLC, Larry Arguello

2017-02-09

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Lean Tools



Carl Zeiss IMT, LLC, Larry Arguello

2017-02-09

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Lessons Learned



- Create buy-in by sharing the Why and the benefits
- Include line employees in every step of the way
- Have regular Q & A sessions
- Share what's working and what's not
- Use the data to calm emotions
- Create visibility
- When a problem arises, attack the problem not the technician(s)
- Celebrate success



Loram

Josh Flatla

CI Manager

Loram Maintenance of Way

The Lean Six Sigma Journey



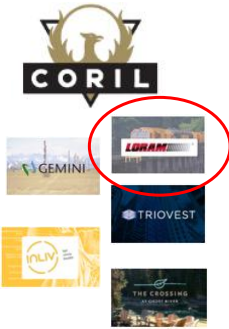
Joshua Flatla

Continuous Improvement Manager

LSS Black Belt



“So... you guys, like, build trains, or something?”



Privately held business in the Coril Holding's portfolio of businesses

Small cap revenue

Headquartered in Hamel, MN

1000+ employees and operating 100+ machines

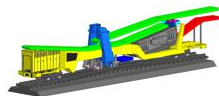
Global footprint with machine sales in 25+ countries

Produce 5-10 machines per year

Check out our new YouTube channel!



Loram Value Proposition



DESIGN



BUILD



OPERATE/SELL/LEASE



MAINTAIN



Technology Platforms



Mainline Rail Grinders & Transit Rail Grinders



Ballast Services



Ditching & Excavating



Rail Handling



Track Quality & Machine Diagnostics



Friction Management Systems

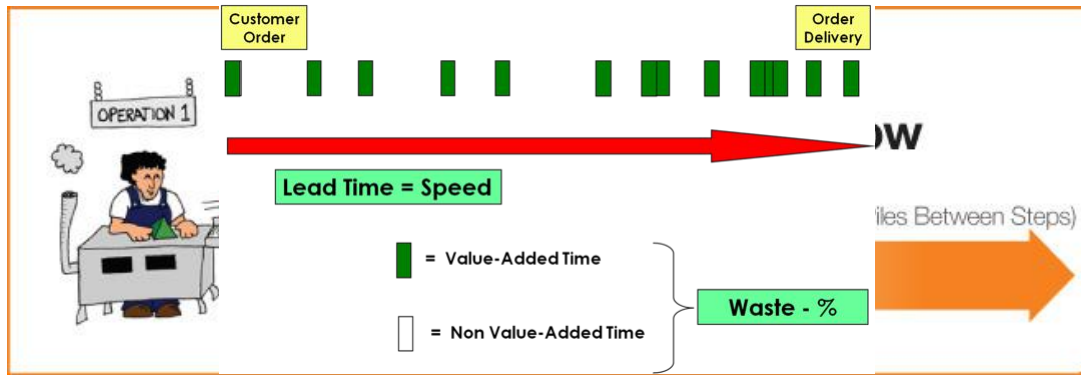


Serving Freight & Passenger Systems Worldwide

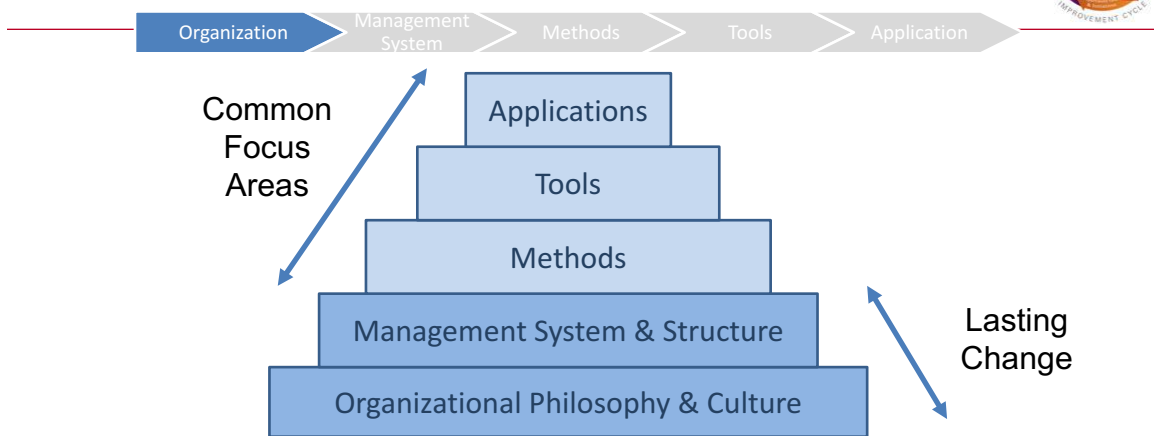




Why Make to Order Lean?



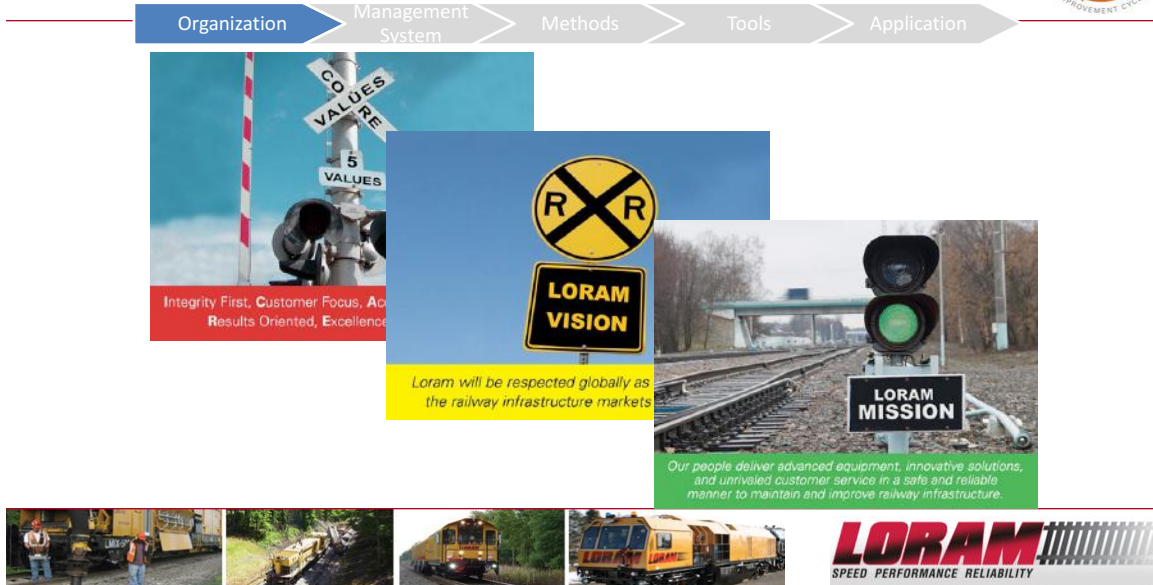
Birthday Cake Model



Based on the work of Dr. Mark P. Finster
Strategic Improvement Systems, LLC



Values-Vision-Mission



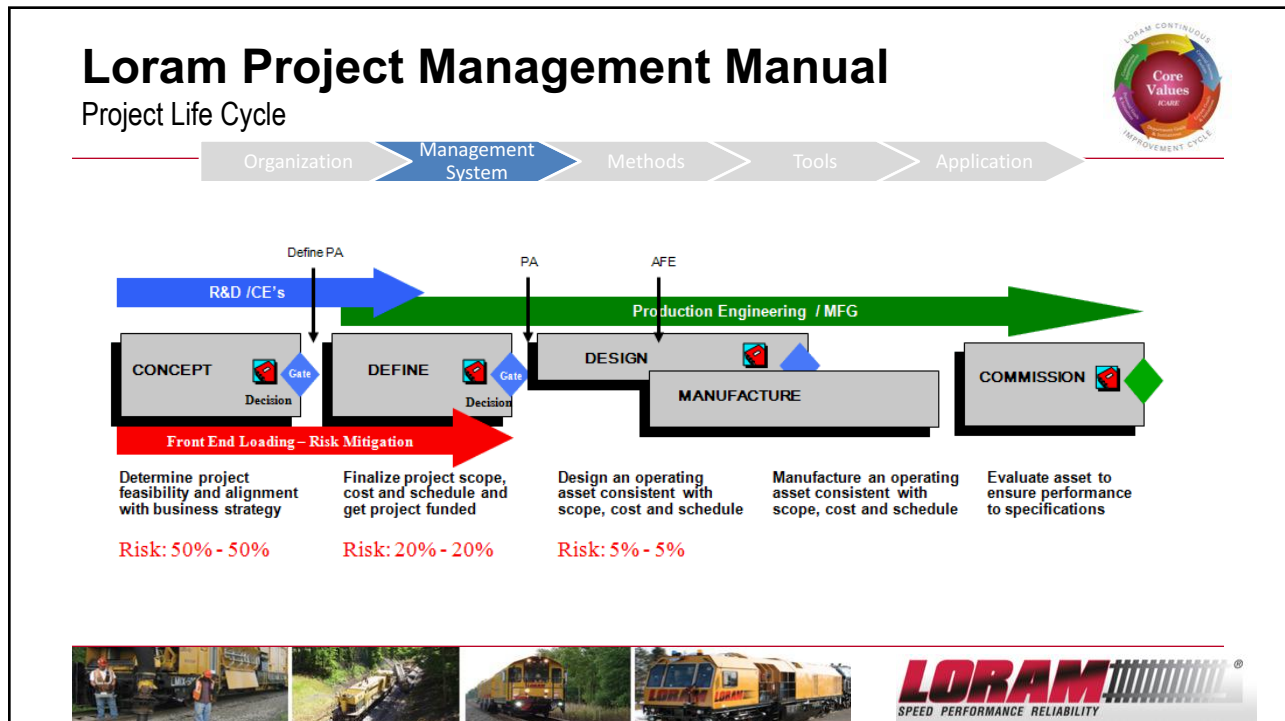
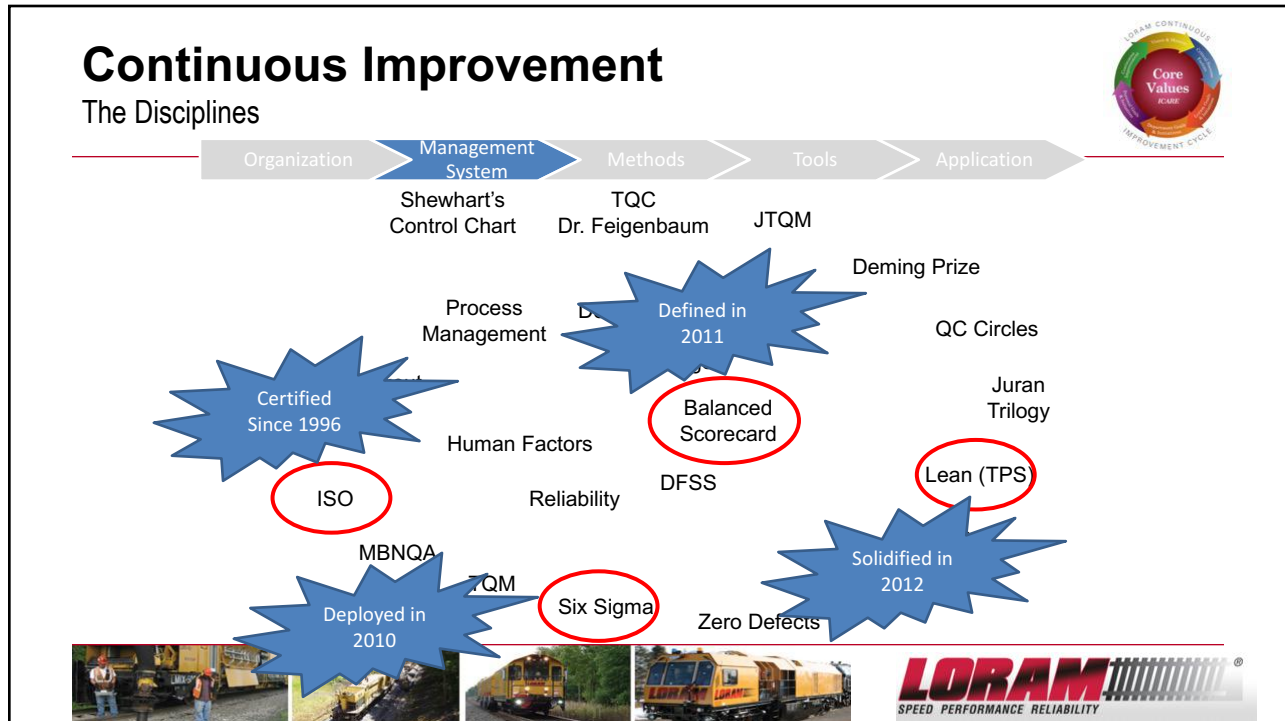
Loram Quality Policy



Organization Management System Methods Tools Application


Guided by the company's values, vision and mission, Loram's policy is to exceed our customers quality expectations in the products and services we offer through an unwavering commitment to best in class business processes and a culture of continuous improvement.

Strictly Confidential 2



Continuous Improvement

The Journey: 2010 to Present





Organization → Management System → **Methods** → Tools → Application

Learning to See → **Methodology** → **Capability Building** → **Idea Generation** → **Leadership Support**


- Learning to See**
 - Vision
 - Goals
 - Initiatives
 - KPI trends
 - KPI targets
 - Daily/Weekly/Monthly
- Methodology**
 - ISO
 - 6 Sigma training
 - PDCA
 - Process excellence
 - Lean Deployment
- Capability Building**
 - 6 Sigma training
 - Leaders as teachers
 - Project execution
 - Project coaching
- Idea Generation**
 - Improve your area
 - Small ideas-PDCA
 - Big ideas-Six Sigma
- Leadership Support**
 - Recognition
 - Reinforcement
 - Improvement Dialogue
 - Decisive decisions
 - Go see it
 - Embrace experimentation

Variation **Waste** **Complexity**

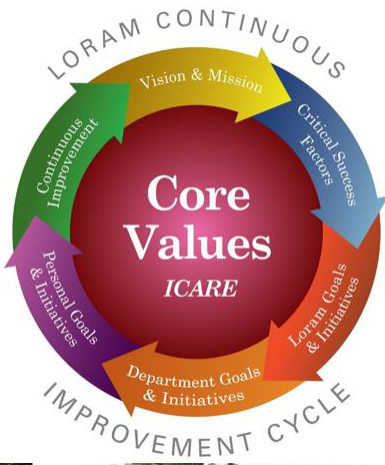





Continuous Improvement

The Cycle



Organization → Management System → **Methods** → Tools → Application

Continuous Improvement

Balanced Scorecard

Organization → Management System → Methods → **Tools** → Application

What's - Targets, Resources (Left side of triangle)
Problem Definitions - Hows - Results (Right side of triangle)

Act Plan Check Do (PDCA cycles in triangle)

- Purpose
- Strategies
- Growth
- Financial Performance
- Segment Performance
- Budgets
- Operations
- Schedules
- Projects
- Assignments
- Rates
- Quality

Continuous Improvement

Capability Building

Organization → Management System → Methods → **Tools** → Application

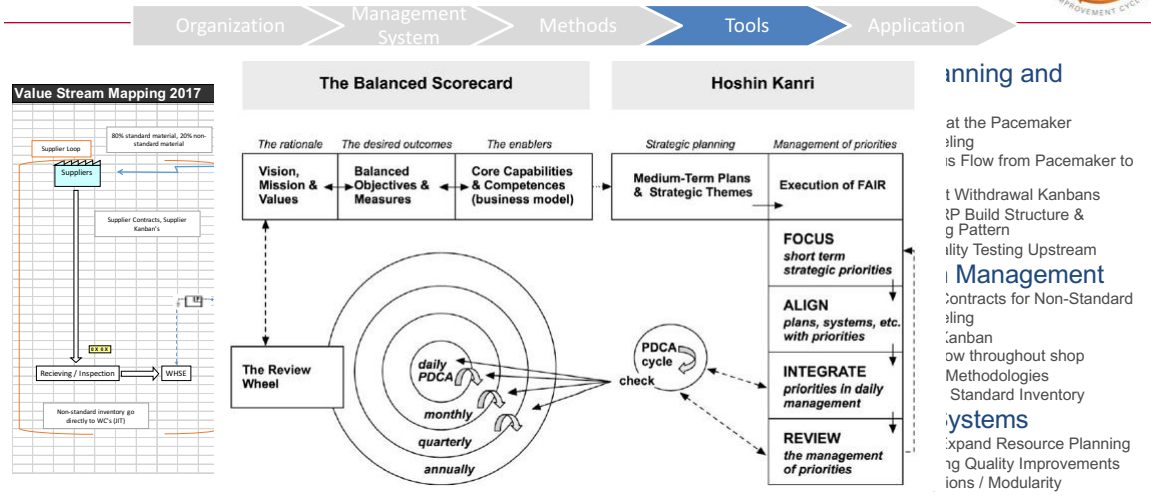
Training	Target	October
Former BB / MBB	-	1
Active BB	2-4	2
Lean Practioners	>15	24
GB or higher	>15%	10%
YB or higher	>90%	66%

Total Employees	528
Need Training	177
Active BB	2
GB	48
YB	300
Former BB	1

- Yellow Belt classes:
 - 2017: 31 Trained @ Loram UK; 14 Scheduled for Tomorrow
 - 2018: Jan 17th, Apr 4th, July 18th, Oct 17th
- Six Sigma Green Belt
 - Cassandra S***** starting training this month

Continuous Improvement

Strategic Processes



Loram Fastrack Projects



Project Title	Metric / KPI	KPI Tier Level	Start Date	Estimated End Date	Duration (Months)	Charts	Progress %	Phase
17 Production/SO Scheduling: TBD by VSM	On-Time Delivery of Finished Machines	1		31-Dec-2017	4.6	No	5%	Define
44 Supplier On-Time Delivery	Supplier On-Time Delivery %	1	#####	31-Dec-2017	4.6	Yes	5%	Define
5 Upstream Quality Testing	On-Time Delivery of Finished Machines	1	1-Sep-2017	31-Dec-2017	4.0	Yes	10%	Define
53 Engineering As-Built Improvement	Part Pct As-Built All Projects	1	18-Sep-2017	31-Mar-2018	6.5	No	15%	Define
45 Risk Assessment in Loram Mgmt Systems	Revenue - Actual Pct of Budget	1	1-Apr-2017	31-Dec-2017	9.1	Yes	20%	Measure
37 Supplier Weldments Defect Reduction	Receiving Inspection First Pass Yield Pct	1	20-Mar-2017	31-Dec-2017	9.5	Yes	41%	Analyse
30 Electrical Safety	12 Month Recordable Injury Rate	1	1-Feb-2017	1-Sep-2017	7.1	Yes	65%	Improve
7 Value Stream Mapping of Rail Grinders	On-Time Delivery of Finished Machines	1	21-Nov-2016	1-Jan-2018	13.5	Yes	75%	Analyse
27 LOTO Improvement	12 Month Recordable Injury Rate	1	1-Jan-2017	31-Dec-2017	12.1	Yes	75%	Improve
1 Reduce Track Authority Violations	Out of Limits Incidents	1	23-Sep-2016	1-Jun-2017	8.4	Yes	80%	Improve
26 Because...ICARE	People & Safety	1	31-Jan-2017	30-Apr-2017	3.0	Yes	80%	Improve
32 Paint Improvement	Receiving Inspection First Pass Yield Pct	1				Yes	85%	Improve
29 Hand Safety	12 Month Recordable Injury Rate	1	20-Jan-2017	1-Dec-2017	10.5	Yes	95%	Control



Act

Engage...Prioritize...Learn

Organization Management System Methods Tools Application

Visual Controls

Leader Standard Work

Idea System

5S

Assessment Process

Electrical Room Transformation

09/14/13

LORAM
SPEED PERFORMANCE RELIABILITY

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Assembly

Organization Management System Methods Tools Application

BEFORE

AFTER

09/14/13

LORAM
SPEED PERFORMANCE RELIABILITY

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Warehouse



Organization

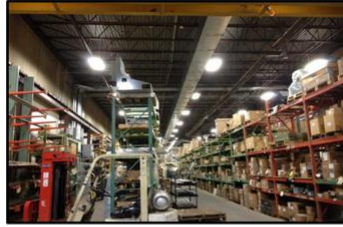
Management System

Methods

Tools

Application

BEFORE



AFTER



Networking Break

10:00

Networking Break

10:00

Hypertherm

Jimmy Osborne
Operations Manager

Hypertherm's Origins

Founded in 1968 in a two-car garage in Hanover, New Hampshire



Dick Couch



Barbara Couch

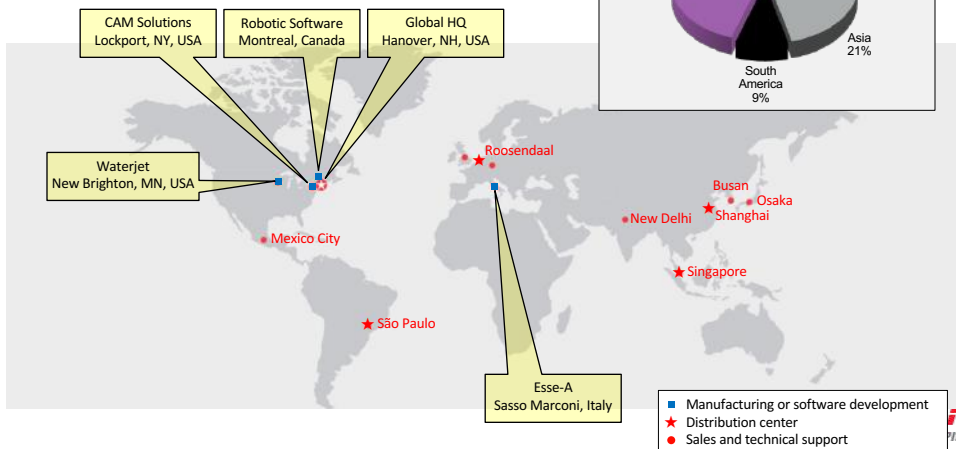
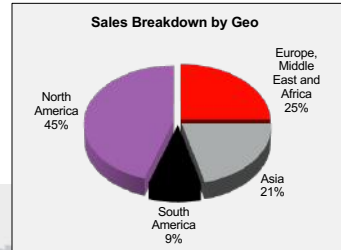


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Growing global footprint

- Hypertherm has approximately 250 Associates outside the US in sales, service and distribution functions
- Channel partners in 93 countries

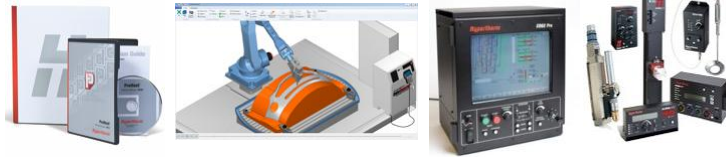


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Industrial Cutting Products

2D & Robotic
Control Software
+ Hardware



Systems



Consumables



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Hypertherm Waterjet product line today

Pumps



Consumables



Peripherals



Abrasive Mgmt



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World-Class Manufacturing

- Hypertherm incorporates world-class manufacturing methodologies to ensure maximum productivity while maintaining strict quality and safety standards
 - Continuous improvement teams
 - Lean manufacturing
 - 100+ greenbelts
 - 5S/visual factory
 - ISO 9001:2000 certified
 - OSHA star voluntary protection program



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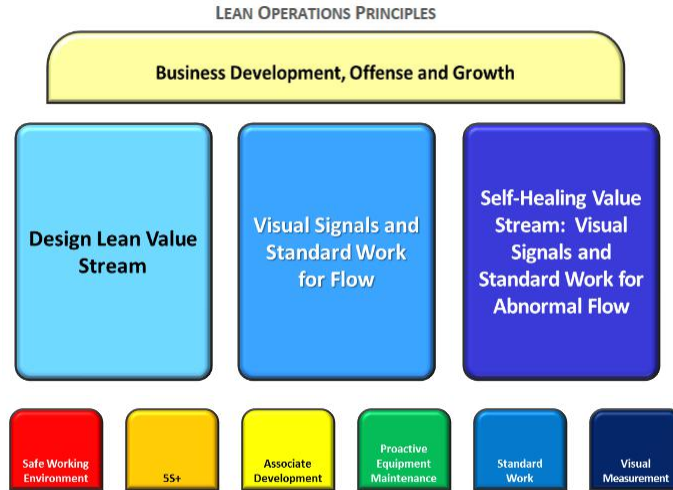
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MTO Lean – A Real World Project Example

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HyPerformance Practices – Our Standard of Excellence



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WaterJet Systems Kaizen Project

- Challenge: How to increase customer satisfaction thru lead time reduction for 80+ MTO system configurations
- Current state: Reactionary planning, no FG inventory, craft build
- Future state: Proactive planning, FG strategy, one-piece flow



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Systems 3P Kaizen Charter

6/26/17 – 6/30/17, 8:00 – 3:30

TEAM: Leo, Eric S, Dan, Paul, Andy, Ashley, Curtis, Steve, Nick, Tom
SME: Jeannie, Seth, Pump Builders
SPONSOR: Sara

Event Objectives

Objectives:

1. Develop a process layout and implementation plan that improves output by a minimum of 30%
2. Develop an implementation plan for effective inventory presentation and management that supports the new layout
3. Develop standard work to include visual management and staffing plans
4. Repurpose minimum of 25% of current floor space; minimize WIP
5. Develop an implementation plan for an auditable 5S system

Problem / Scope

Problem Statement:
 Current processes for pump build are not sufficient to meet future business needs. Inventory levels not optimal, inventory organization / marking / presentation is inconsistent. Standard work is not in place including a method to process non-conforming product. Space utilization is may not be optimal for current use.


Scope:

In Scope	Out of Scope
<ul style="list-style-type: none"> Boundaries as defined by layout Priority 1 brainstorm ideas Pump Production Run In & Warehousing Areas 	<ul style="list-style-type: none"> Parking lot items Other Zones' layouts

Measurable Outcomes

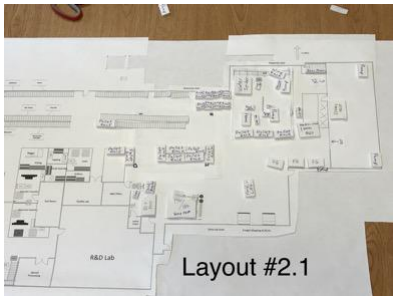
Metric	Current	Target	% Improvement
Capacity	5-6 / week	6-8 / week	30%
Inventory Plan	Not Optimal	Plan Developed	100%
Standard Work	Not Defined	Plan Developed	100%
Systems SF	~4300 SF	~3200 SF	25%
5S Implement Plan	None	Plan Developed	100%

Current State (Data/Visual)



- Some weeks are a struggle to make plan
- Unorganized work stations and materials
- No clear schedule for production
- Items in racking unlabeled. Several unneeded items in racks, clutter in aisles
- Tools & Equipment not always at hand
- Machine movement is a struggle at times

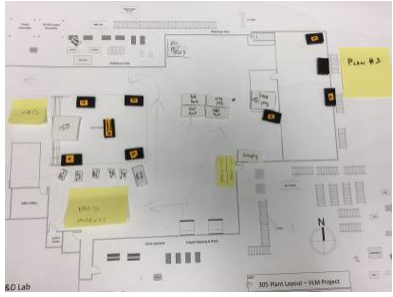
3P Kaizen – Develop Alternatives




Layout #2.1

- Discussion on materials handling methods
- Heavy emphasis on kitting

- Teams gravitated to the NE corner (near run in room)
- Lots of make vs. buy discussions
- Focus was on eliminating NVA



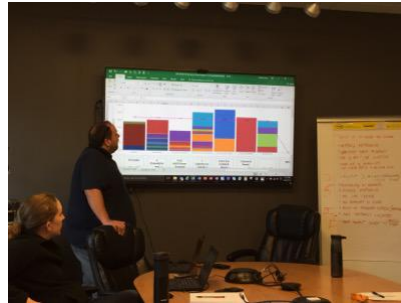


3P Kaizen – Develop 7th Alternative



- All plans had good ideas
- Also, all plans had some challenges

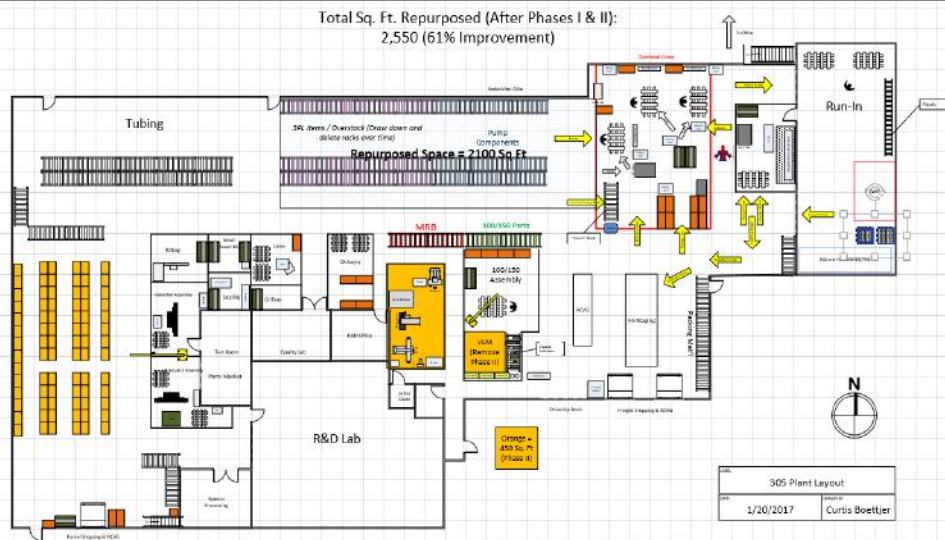
- Considered # of operators
- Considered Brainstorming List
- Considered Level of Effort / Cost to Implement



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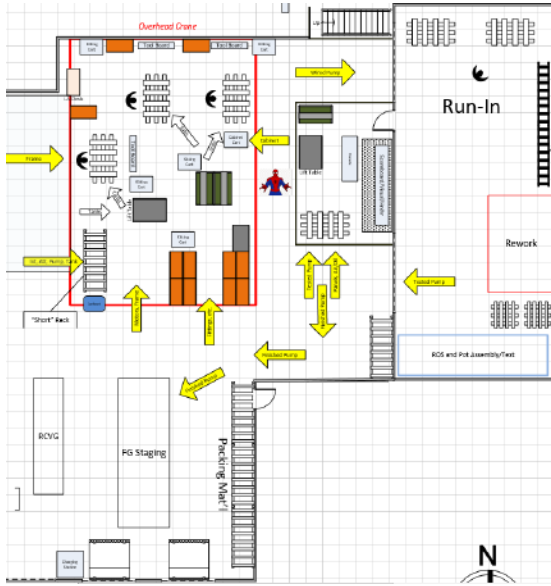
3P Kaizen – Develop 7th Alternative



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3P Kaizen– Develop 7th Alternative

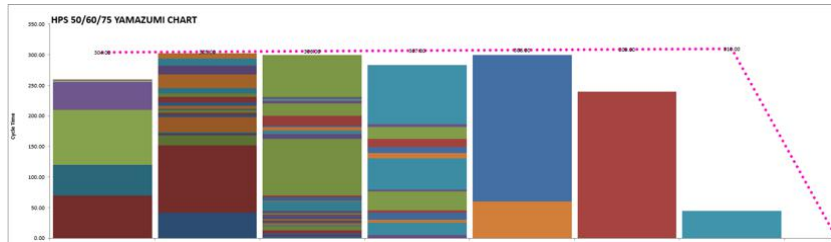


- Improved safety due to no forklift use in line
- One piece flow
- Short spaghetti lines due to parts and materials at point of use
- Pots and RO build relocated to run in room

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3P Kaizen – Develop 7th Alternative

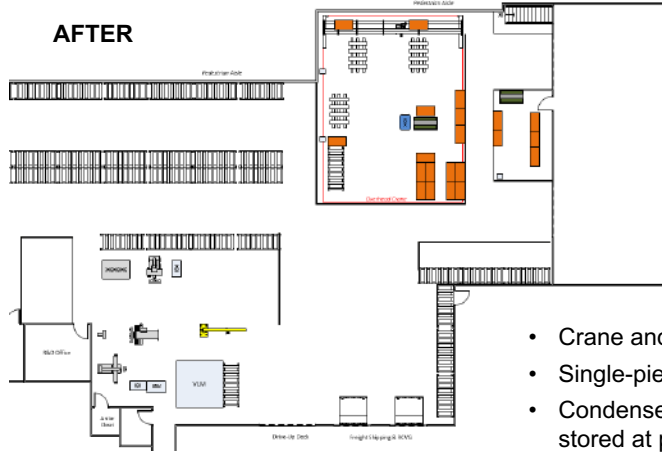


- Line well balanced
- Packaging performed by shipping personnel
- Pick time reduced by 50%
- Pre-test reduced by 33% using standard work

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Cell Layout



- Crane and assembly area next to Run-In Room
- Single-piece flow
- Condensed parts market; many components stored at point of use
- Additional racking added for palletized items

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Assembly Area Layout Implementation

BEFORE



Crane moved over weekend before kaizen event

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Assembly Area Layout Implementation

AFTER



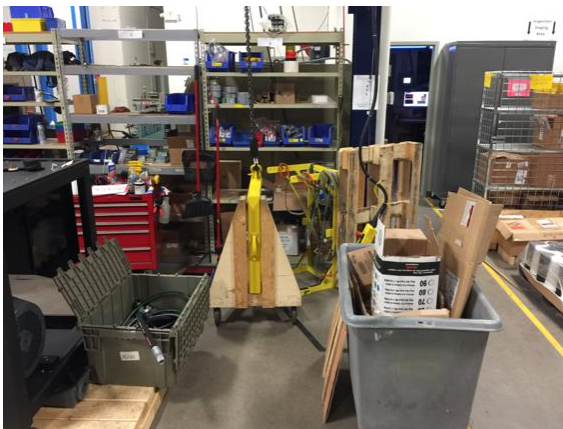
- Constructed VMI stocking locations (clear bins)
- Built small "parts market"
- Created 3 workstations under the crane

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5S – Workstation

BEFORE

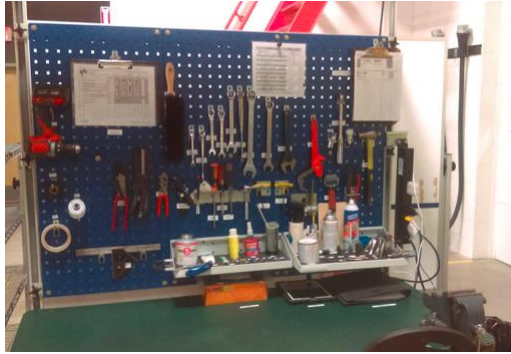


- Personalized Toolboxes
- Tools and fixtures unlabeled / disorganized
- MRO items comingled with inventory
- Not all items needed for build at point of use.

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5S – Workstation



- Only tools and materials required to perform standard work are in work stations
- Floor markings indicate where items belong
- MRO segregated from inventory

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AFTER

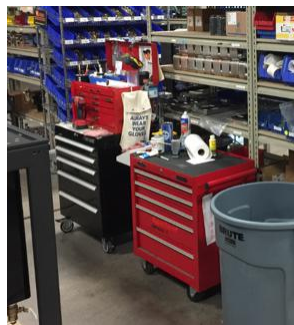


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5S – Toolboards



BEFORE



- Personalized Toolboxes
- Contents inconsistent; extra and unneeded tools
- Time wasted looking for tools
- Difficult to tell if tools are missing

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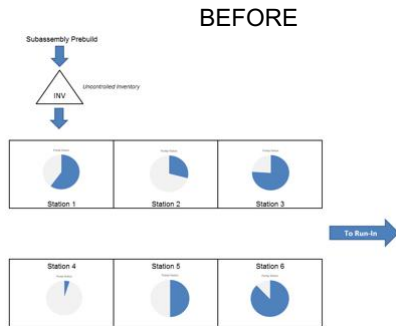
AFTER



- Only tools required to perform standard work
- Mobile tool boards; Assemblers can move tools to the point of use
- All tools are labeled and shadowed

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Standard Work / One-Piece Flow



- “Stall builds”; several pumps in WIP simultaneously at various stages
- Easy to work around stockouts and other problems
- Subassembly inventory uncontrolled
- Order of operations varied by Operator
- Poor visibility of build status

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- Work balanced to TAKT time of 5 hours per system
- Station 0 builds subassemblies and kits parts. Stations 1-3 use one-piece flow.
- All Assemblers follow standard work
- Readily apparent if there are issues

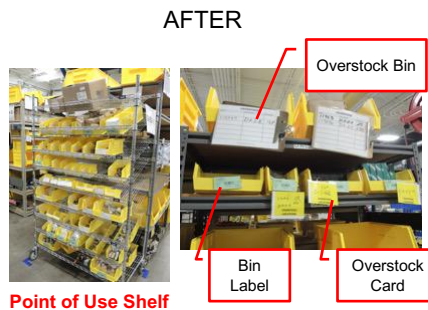
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Inventory – Point of Use and Smaller Items



- Many items unlabeled
- Locations not setup in Oracle
- No process for identifying overstock
- Parts might not be presented where they are used
- No plan for parts kept in “satellite” locations

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Point of Use Shelf

- Items are labeled with locators maintained in Oracle
- Overstock process followed
- Satellite locations “point” to home location
- Parts divided based on standard work

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Standard Work / Visual Management

Standard Work

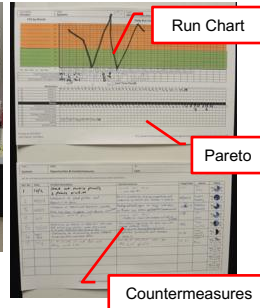
Process steps and timing are documented and posted at each station

Hour by Hour Board

Workstation performance vs. standard is checked every hour. Downtime is recorded.

SQDC Board

Information from hour-by-hour board, including performance trends and top issues are recorded, and used to drive countermeasures.



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Similarities and Differences

- Hypertherm applies HyPerformance processes universally
 - Application is equal, regardless of types of products made
 - Provides a framework that can leverage gains across all mfg. lines
- Kaizen is a powerful tool that works well if deployed well
 - It's a mentality that helps to build cultural change
 - Not a "one and done" fix
- Forecasting can be challenging despite a robust S&OP process
 - As a result, planning & supply chain decisions are not necessarily universal
- Employee engagement and buy-in are critical to success, regardless of product velocity
 - Intense Focus on Associate Development pays dividends
 - Done well, provides a leadership farm system and resulting bench strength

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Q & A

Loram
Josh Flatla

Hypertherm
Jimmy Osborne

Carl Zeiss
Larry Arguello

Flexmation
Steve McClintick

How did we do?

Please fill out your **feedback sheet** for today's seminar.

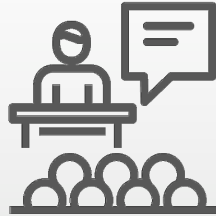
Thank you members

Aaguard	Independent Packing Services
Activar, Inc.	MacDermid Enthone America
Ametek	Midwest Rubber Service & Supply
Aqseptence Group	Mikros Engineering
Artistic Finishes	Milestone AV
Banner Engineering	Minco
Clothier Design Source	Nystrom
Decimet Sales	Prima Power Laserdyne
Dedicated Networks	QTS
Emerson	Shippers Supply
Emerson Process Mgmt.	Talon Innovations
Exlar Corp.	Trendex
Force America	Unison Comfort Technologies
General Dynamics	Wagner Spray Tech.

Member companies may send employees to Educational Seminars at no cost

Educational Seminars

Leverage the best practices and lessons learned from a diverse panel of industry peers.



Resolving Conflict at Work

January 11 at Wurth Adams

Standardize & Sustain 5S

February 8 at Hennepin Technical College – Brooklyn Park

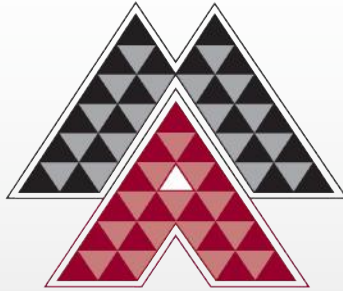
Peer Group Membership

Would you like feedback on your challenges? Leverage a group of your peers as your own board of advisors.



- **New** – CI Practitioner
- Lean Enterprise
- Advanced Lean Enterprise

See you soon!



Manufacturers Alliance

www.mfrall.com