



Lean Process & Employee Involvement: Core of Innovative Manufacturing

Dave Tumbusch

Kim Leopold

Director of Manufacturing

Sr. AME Operational Excellence

Crown Equipment Corporation





Introduction to Crown



5 regional headquarters



2.4 Billion USD FY2013



10,700 employees



17 manufacturing plants in 11 locations worldwide



Over 500 retail locations across 84 countries



Leader in material handling innovation and technology



Global line of trucks designed to local work practices



Innovative fleet management solutions



Family owned and managed industry leader since 1945

One of the World's Largest Lift Truck Manufacturers



Global Line of Lift Trucks



Designed to meet local standards and operator preferences



Global Manufacturing



17 Manufacturing Plants in 11 Different Locations



North American Manufacturing

**New Bremen, Ohio
(Corporate)**

Troy, OH

Greencastle, IN

New Castle, IN

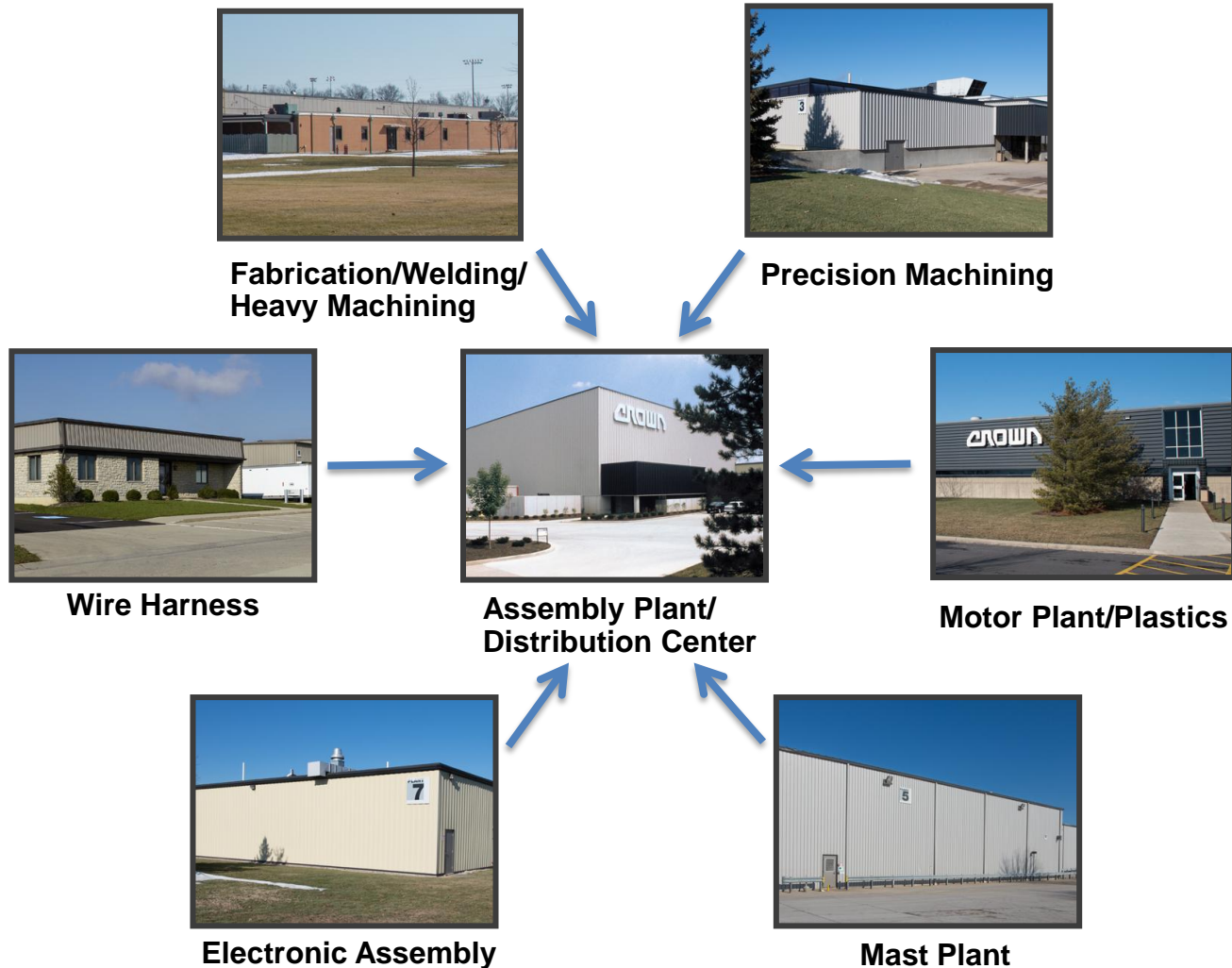
Kinston, NC

Queretaro, Mexico





New Bremen Manufacturing





Crown Company Policy:

*“We are committed to leading the industry as manufacturer of choice by providing our customers with preferred products, parts and services that will support their success as well as our own. To that end, we are dedicated to the improvement of our **people**, product and processes.”*



Crown Principles, Approach & Tools



Crown Principles



Jim Dicke, Sr.

“Bricks, mortar, and technology mean nothing without **good people.**”



Crown Lean Approach

- Leadership read *Lean Culture* by David Mann
- Developed a Plan
 - Identified Modules
 - Identified Sites
 - Identified leads to deploy modules
- Executed a Structured Approach
 - Module Development
 - Subject Matter Expert Certification
 - Annual Assessments
 - Training for 100% of Leadership & Employees



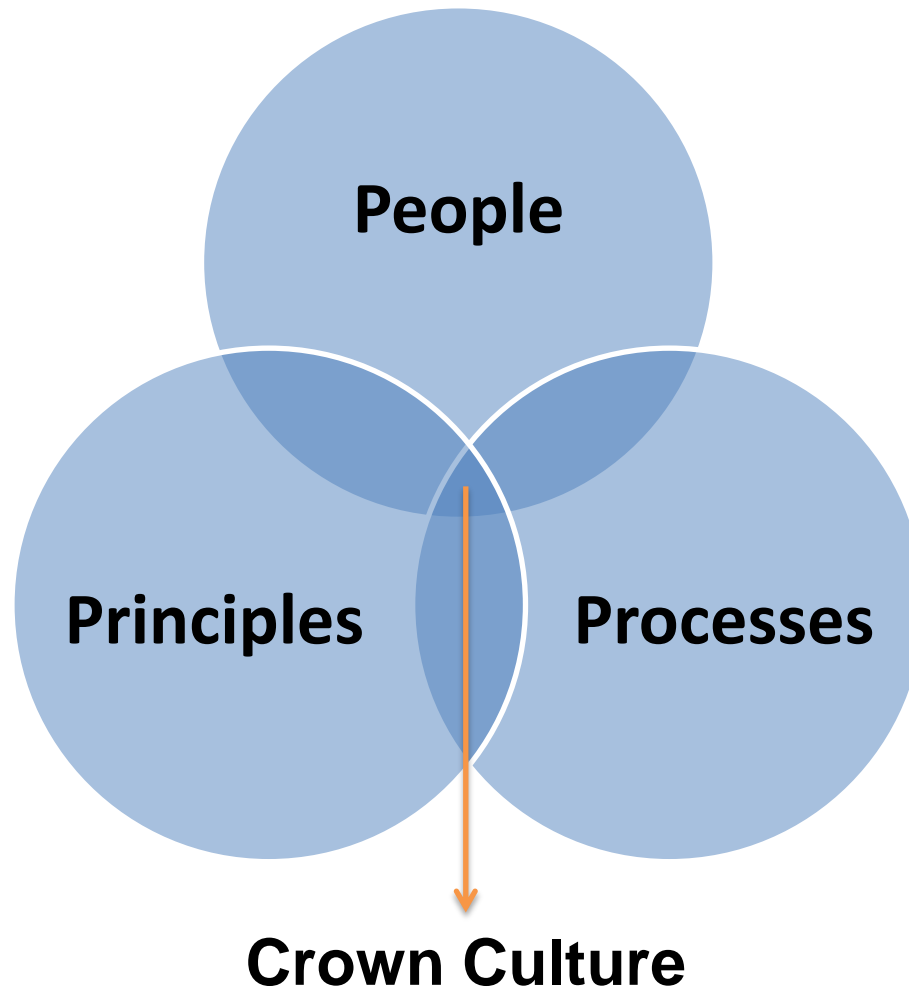
Core Lean Tools

- 5S
- Standard Work
- Kaizen
- Value Stream Mapping
- Rapid Kaizen





Continuous Improvement Culture





Support Structure

Corporate
Operational
Excellence
Team*
(7 People)

*Supports all
of Crown

Plant Leadership Staff
(Lean Management System & Subject
Matter Expert Coaches)
(9 people)

Subject Matter
Experts
(13% of support
staff with at least 1
certification)

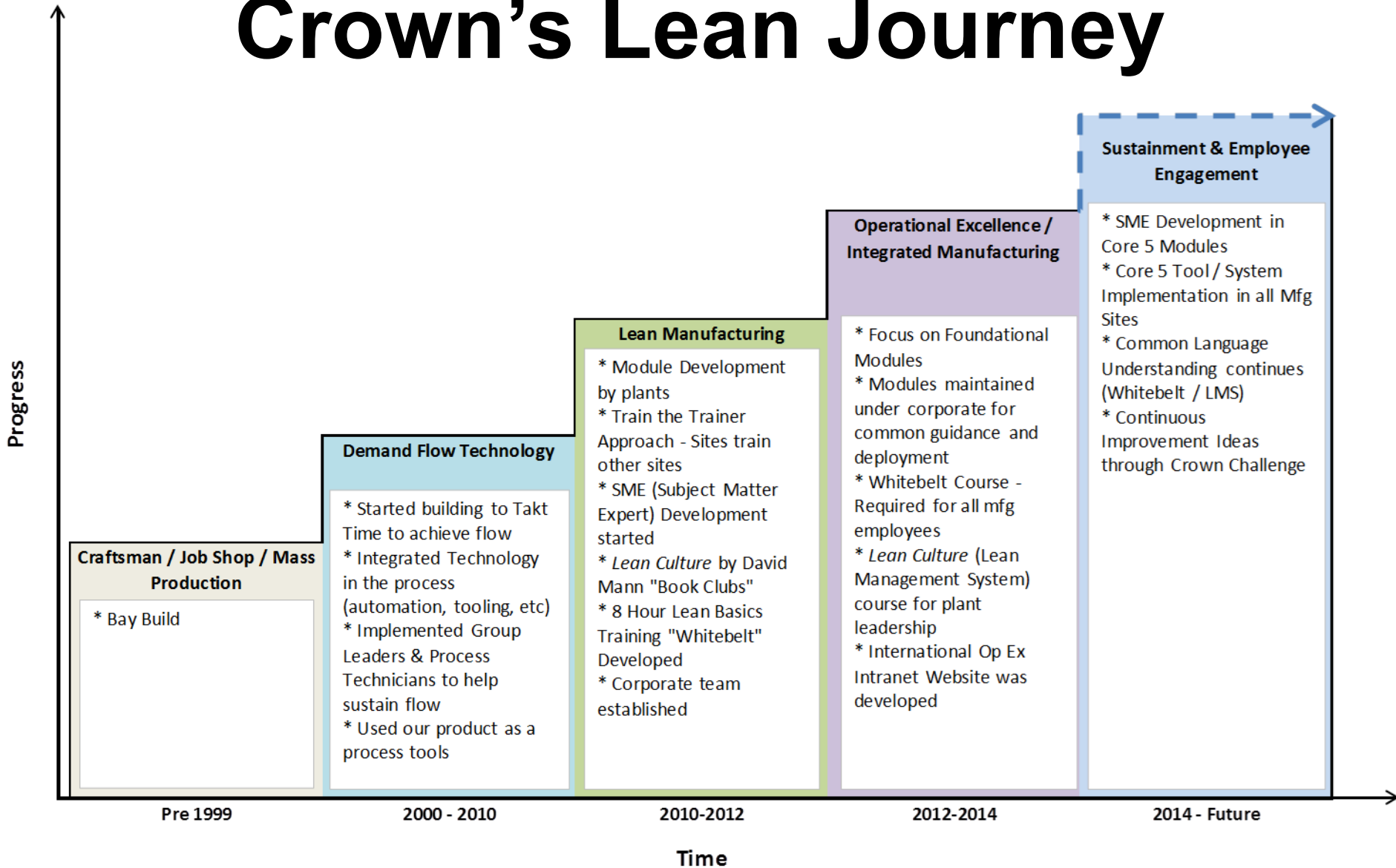
White Belts
(All Employees)
(80% Trained)



Crown's Lean Journey



Crown's Lean Journey



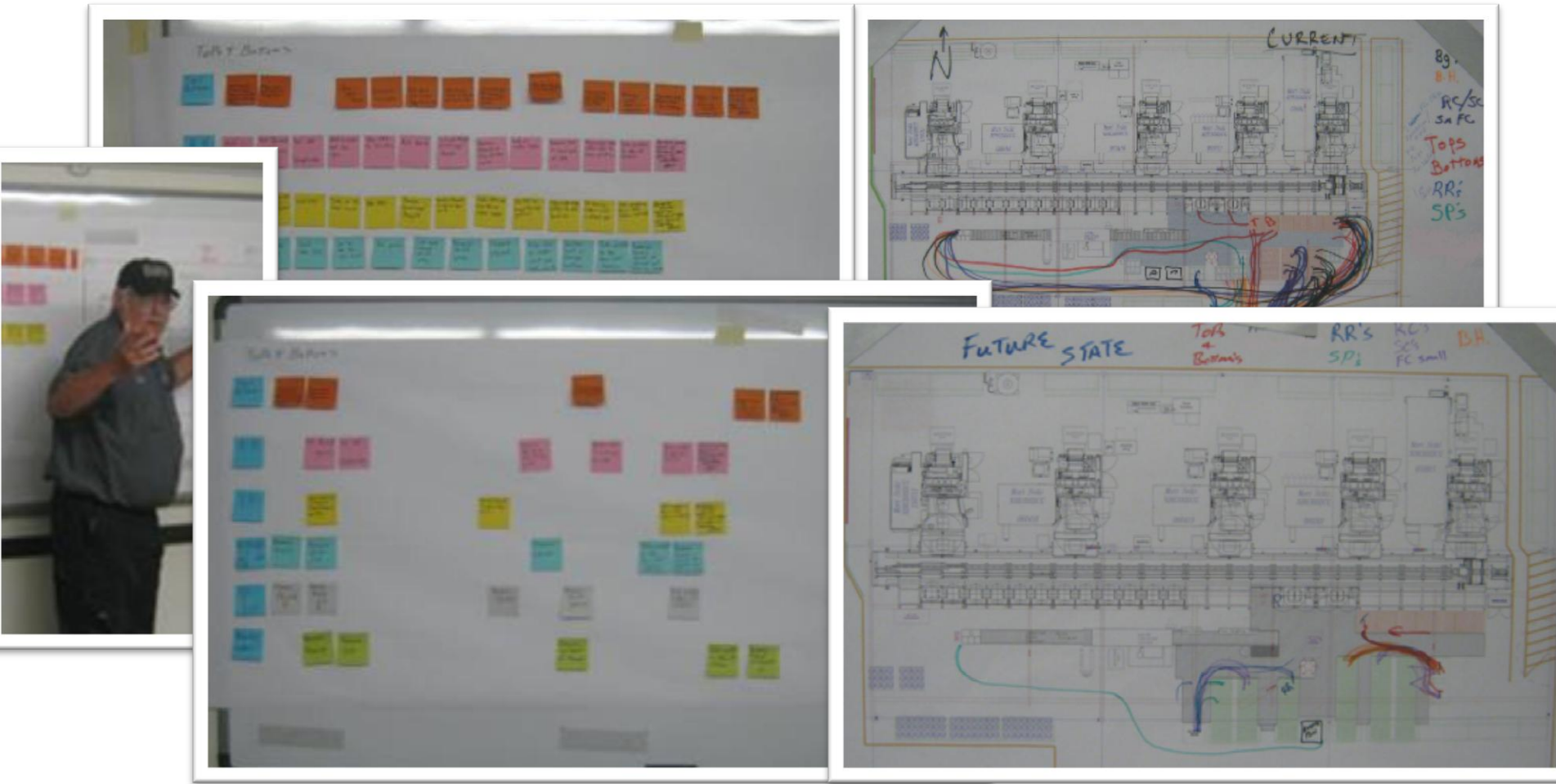


Lessons Learned

- Lean Project Managers are much different than Lean Coaches
 - Focus needs to be on Developing People
- Establish standards to demonstrate desired lean behaviors to spread across the enterprise
 - Examples:
 - Lean Management System
 - Modules
 - Whitebelt

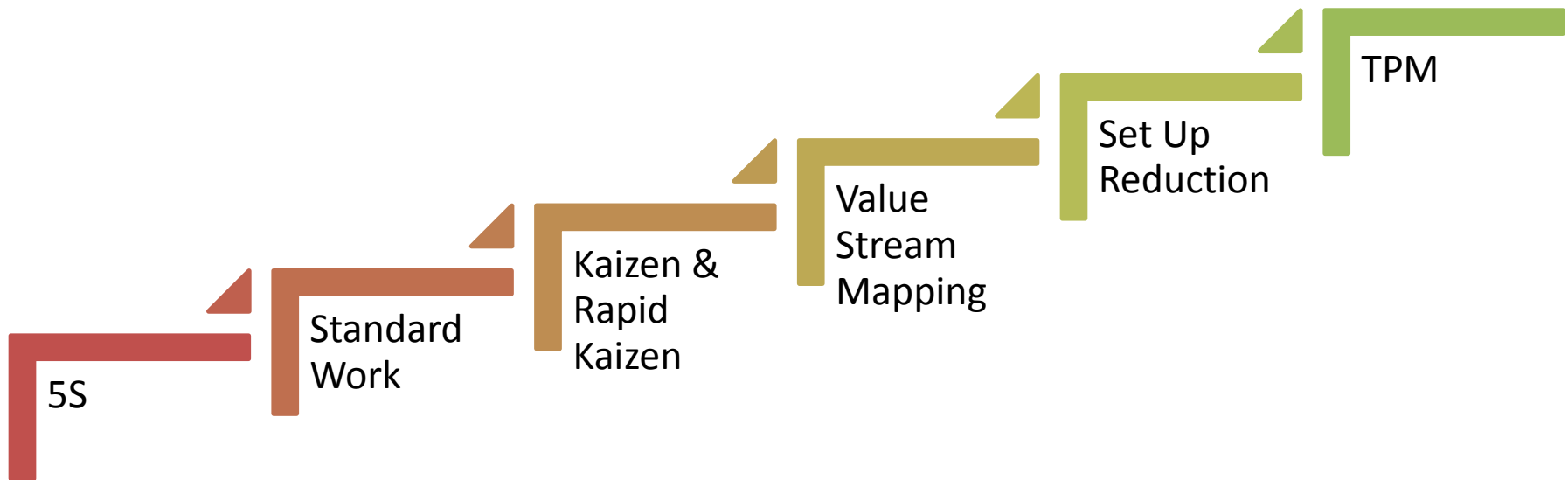


Employee Involvement is Key





Focus on foundational tools that create sustainable habits



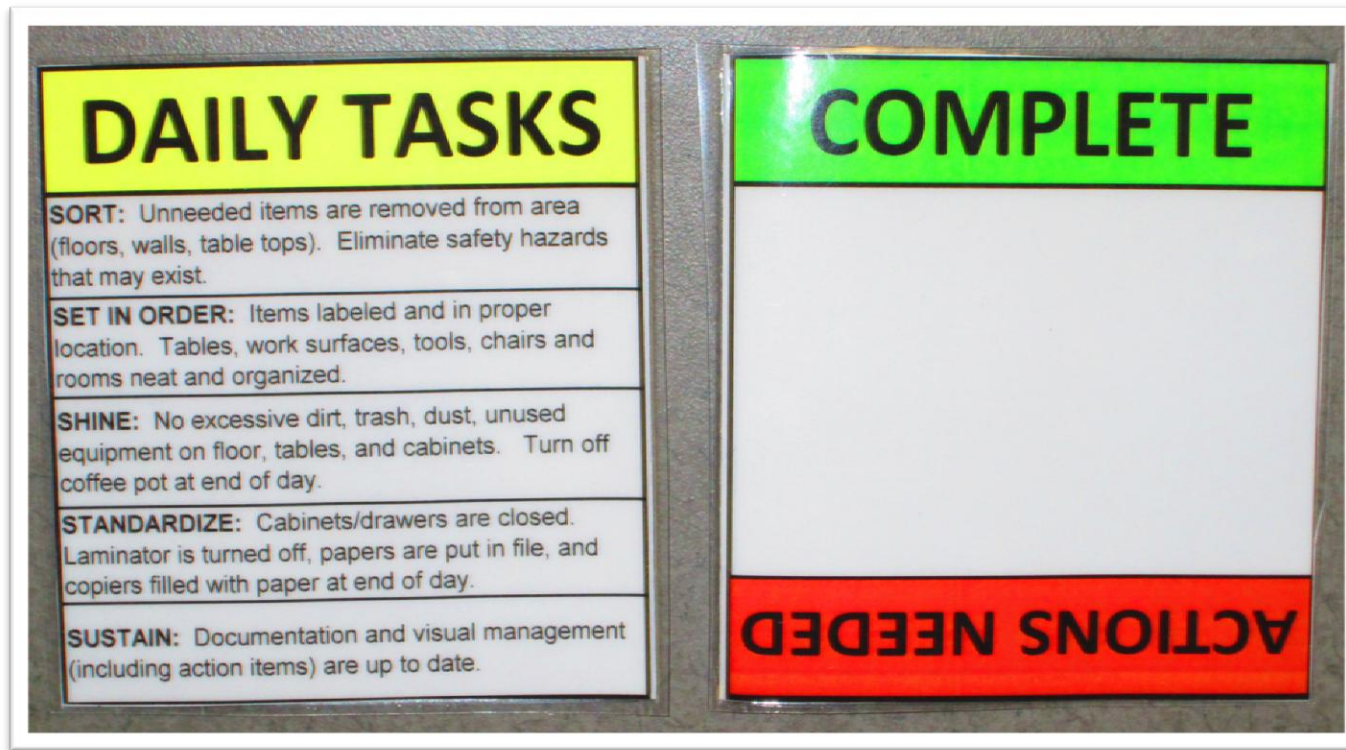


Continuous Improvement Tools & Training



5S

- Indicates change is happening
- Applicable to both office and manufacturing areas





Operator Standard Work

- Baseline for improvements
- Difference between Standard Work (What) & Work Instructions (How)

Work Content by Station				Training Level:
Station # WI- 118-AC03				
Work Sequence	Reference Document(s)	Tool / Fixture / Gage	M/A	
A1	Insert end head/rotor asm. and attach to terminal block			<p>Terminal Block to be even with machined surface</p>
A2	Wire Deutsch connector, Brown in position 1, White with Brn. Stripe in position 2			
A3	Use ref. gage to verify length of sensor brg wire (All motors with internal sensor bearing)	Plastic Dowel rod		
A4	Add fan to rotor (As Required)	WI-118-AC03c, WI-118-AC03d PG-A632		
A5	Add opposing end head (Gage 021268 Dr. End)			
A6	Add tie bolts / washers (As Required, See Matrix)			
B1	Insert end head/ rotor and attach to terminal block			<p>Brown in 1 White/Brown Stripe in 2</p>
B2	Wire Deutsch connector, Brown in position 1, White with Brn. Stripe in position 2			
B3	Add fan to rotor			
B4	Add opposing End Head			
C1	Insert rotor end asm.			<p>Nut and Washer</p> <p>Bolt Head and Washer</p>
C2	Add wavy washer, opposing end head			
C3	Add tie bolts / washers (As Required, See Matrix)			

“Where there is no standard, there can be no kaizen”

– Taiichi Ohno



Kaizen Events

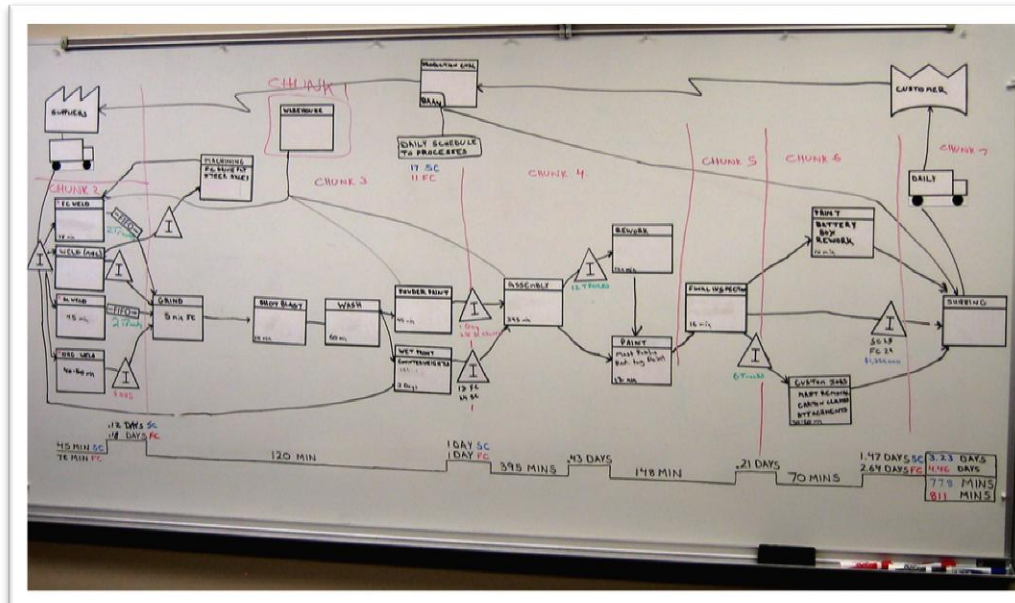
- Engage people in implementing ideas
- Teamwork (cross functional roles)
- Quick wins
- Build Momentum





Value Stream Mapping

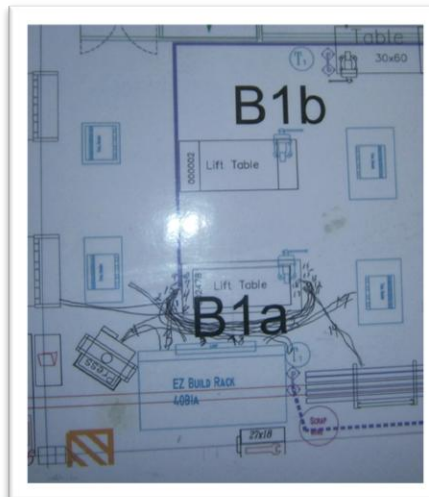
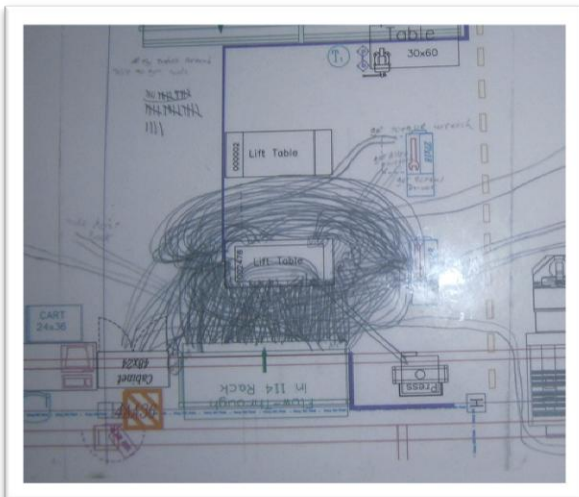
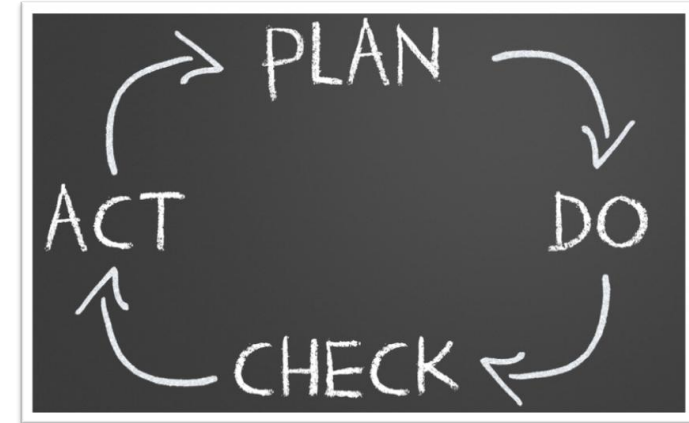
- Organize change efforts and resources
- Connect improvements to corporate strategy
- Connect value streams across the business





Rapid Kaizen Events

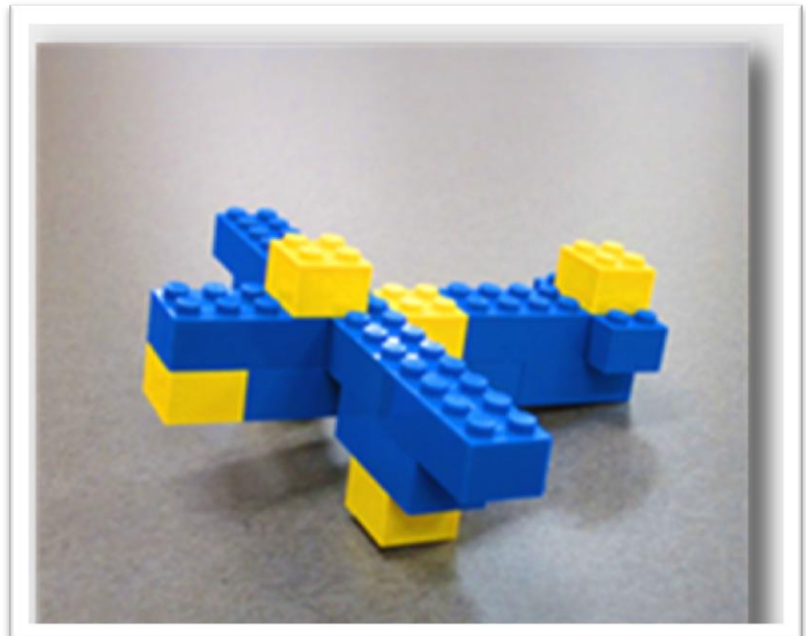
- Point Improvements
- Achieve Target Conditions
- Use tools such as
 - Gemba Walks
 - Spaghetti Charts
 - PDCA Cycles





Whitebelt

- “Lean Fundamentals”
- Creates a common language
- Hands on application of lean tools
- Generates excitement for lean application in their work areas



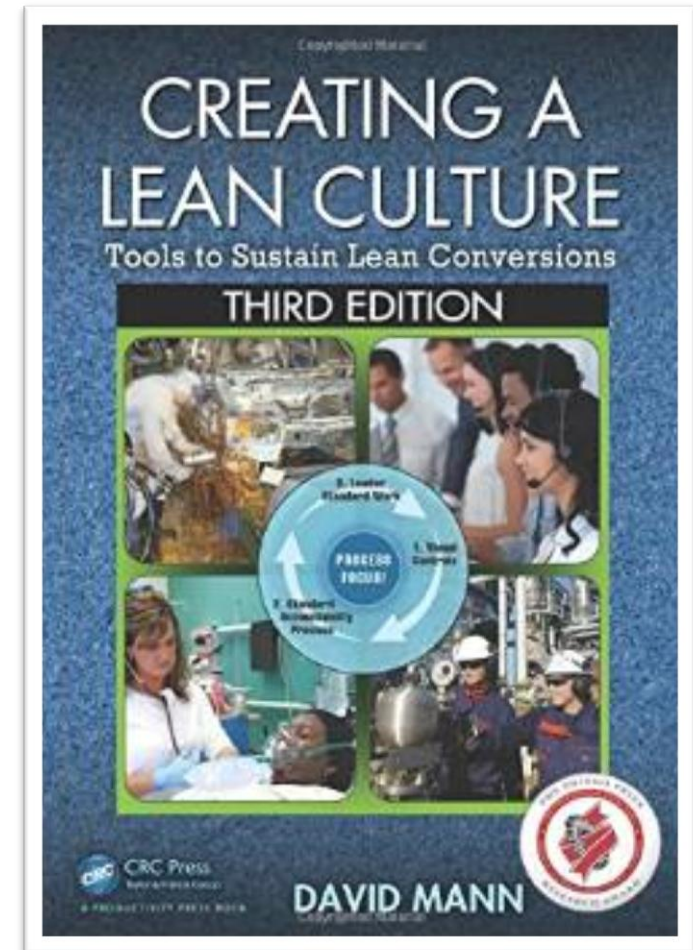


Lean Management System

Leaders responsibility:

- Is the process running as designed?
- How can we improve the process?

**We focus on the
Respect for People!**





4 principle elements of LMS

- Leader Standard Work
- Visual Controls
- Daily Accountability
- Leader Discipline



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Standard Work Instructions
Unit Mgr

Plant Mgr

Prod Mgr

Mfg Supv

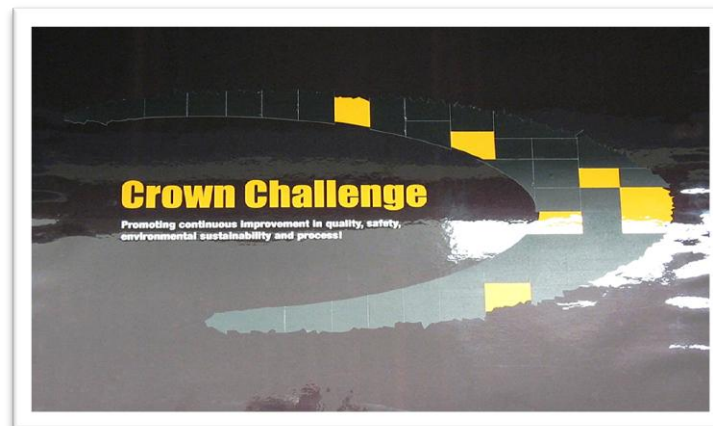
Group Ldr

Step #	Description Of Work Content	Docum	ce	Frequ	ncy	M	T	W	T	F	S	SAFER STANDARDS	OTHER CONTROLS
1	Attend Daily Start Up Meeting with Management: 6-35am	NA	D	Daily		X							DAILY ACCOUNTABILITY LEADER RESPONSE
2	Lead Cellular Start meeting 6:45	OSM	A	Daily		X							
3	Review/Adjust Labor Plan: 6:50am	NA	A	Daily		X							
4	Attend Tier 2 Meeting and maintain "Newsear": 10 min	NA	A	Daily		X							
5	Update Cellular KPI Board (15 min)	NA	A	Daily		X						W T W TH F	
6	Perform Standard Work Audit (30 min)	NA	A	Daily		X							W T W TH F
7	Perform Top 15 Quality Audit (30 min)	NA	A	Daily		X							W T W TH F
8	Cellular Support: coordinate training activities, coordinate process	NA	A	Daily		X							W T W TH F
9	Cellular Support: assist with	NA	A	Daily		X							W T W TH F
10	Perform Gemba walk (15 min)	NA	A	Daily		X							W T W TH F
11	Perform Manpower Planning for the next days' load (15 min)	NA	A	Daily		X							W T W TH F
12	Perform SS Assessments (10 min)	NA	A	Daily		X							W T W TH F
13	Torque wrench calibration	NA	A	Weekly									W T W TH F
14	Training matrix updated	NA	A	Weekly									W T W TH F
15	Daily group leader meeting 2:30	NA	A	Daily		X							W T W TH F
16	Discussion with employees on standard work improvements	NA	A	Weekly									W T W TH F
17	Monitor daily NC entry	NA	A	Daily		X							W T W TH F
18	Check counterweight fixture bolts	NA	A	Weekly									W T W TH F



Crown Challenge

- Engages and rewards employees
- Improves communication and teamwork
- Supports business goals and objectives
 - Safety, Quality, Delivery, Cost, and Operational Excellence
- Creates a standard recognition process for achievements





Our Next Steps



Our Strategy for Manufacturing

- Focus on implementing and developing Subject Matter Experts in the Foundational Modules at each site
 - 5S
 - Standard Work
 - Kaizen
 - Value Stream Mapping
 - Rapid Kaizen
- Leadership continues Lean Management System training and developing themselves as Lean Coaches
- Annual Progress Assessment



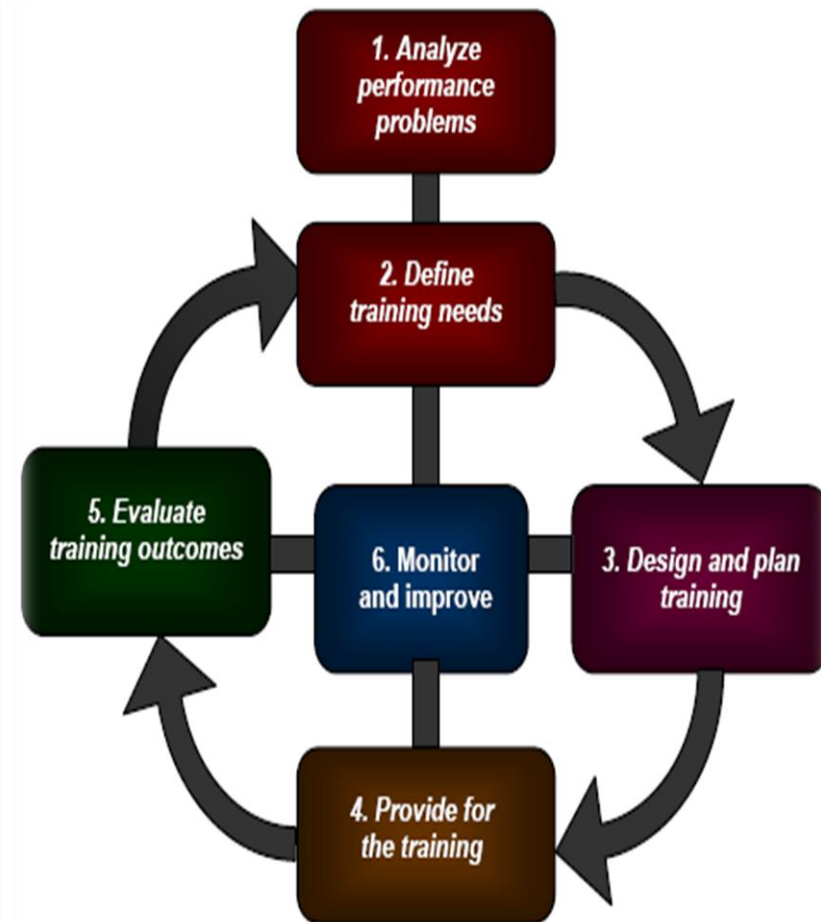
As we grow...

- Our intent is that our:
 - Org structure will change as sites become less dependent on the corporate team
- New areas will be developed similar to manufacturing
 - Developing Subject Matter Experts in Core 5 Tools
 - Advanced Lean Experts will increase and become coaches to new Subject Matter Experts
 - Leadership will be trained and help deliver training to new leaders (“Walk the Talk”)



Future Training & Modules

- Advanced Lean course for Subject Matter Experts
- Facilitation Training for Subject Matter Experts
- Transactional Lean Application Training and/or Modules
- 3P (Production Preparation Process) Module





For your consideration...



For your consideration...

- Put together a plan
- Focus your efforts
 - Conceptual Training / Common Language
 - Use proper tools to address problems
 - Create an environment for involvement
 - Determine your method to drive sustainment
 - Leadership involvement



Thank You!

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Session: TP/07

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David.Tumbusch@crowncorp.com

Kim.Leopold@crowncorp.com