



Creating and Sustaining a Lean Culture

MIKE McALONEY

**VP Operations
NovAtel Inc**





Is this Presentation for you?

Creating and Sustaining a Lean Culture

- Introduction to NovAtel
- 2003 – Desperate Times
- First Five Years – all about tools
- Next Five Years – measure, improve, extend
- Last Three years – people, culture and leadership
- Lean Culture – Reflecting on our journey





Success has a secret ingredient

We help some of the world's leading companies stay in the lead, so having NovAtel inside is a secret worth keeping.

Industry leader GNSS OEM

- 400 employees
- High Tech, 40+ US patents
- Located in Calgary, Alberta, Canada

Customer Experience

- Perfect Product
- Delivered On time Every time
- Never fails in the field



Our Customers and Products



Geosystems





2003 – Desperate Times



- Late shipments
- Lots of overtime
- So-so quality
- Long lead time for standard products
- Large demand increase on the horizon





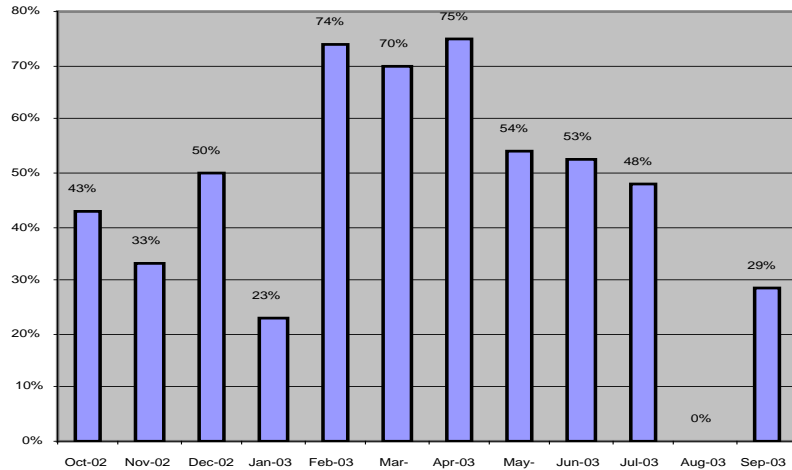
Where We Started



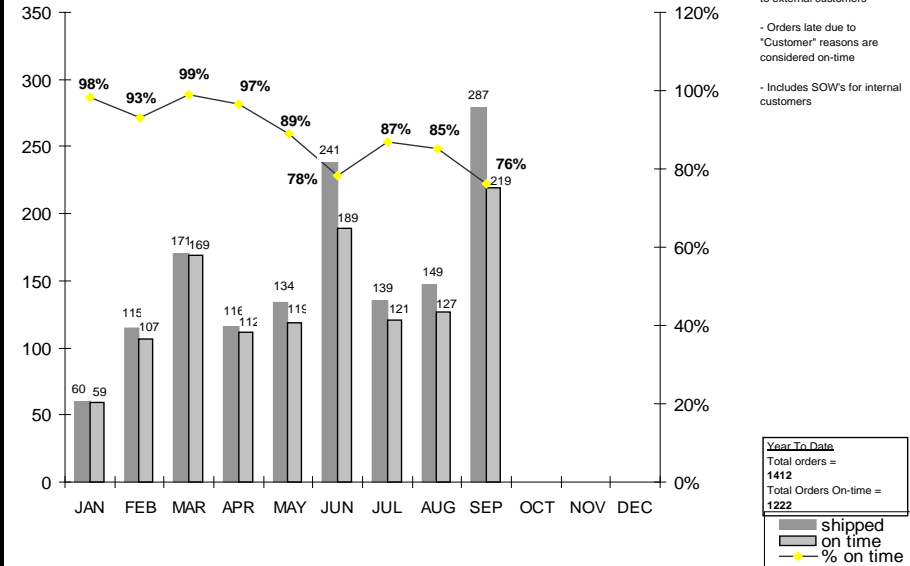


How Bad Was It?

%Of Planned Builds with No Material Shortages

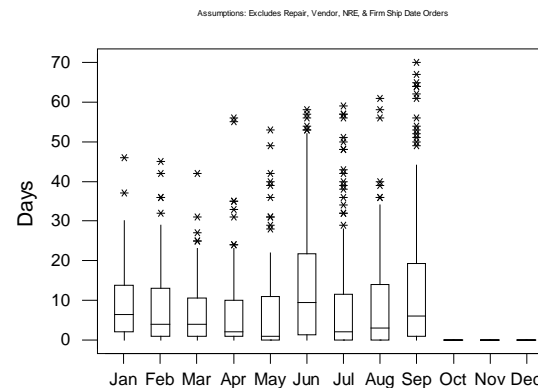


ON TIME DELIVERIES - by OM's PROMISED DATE



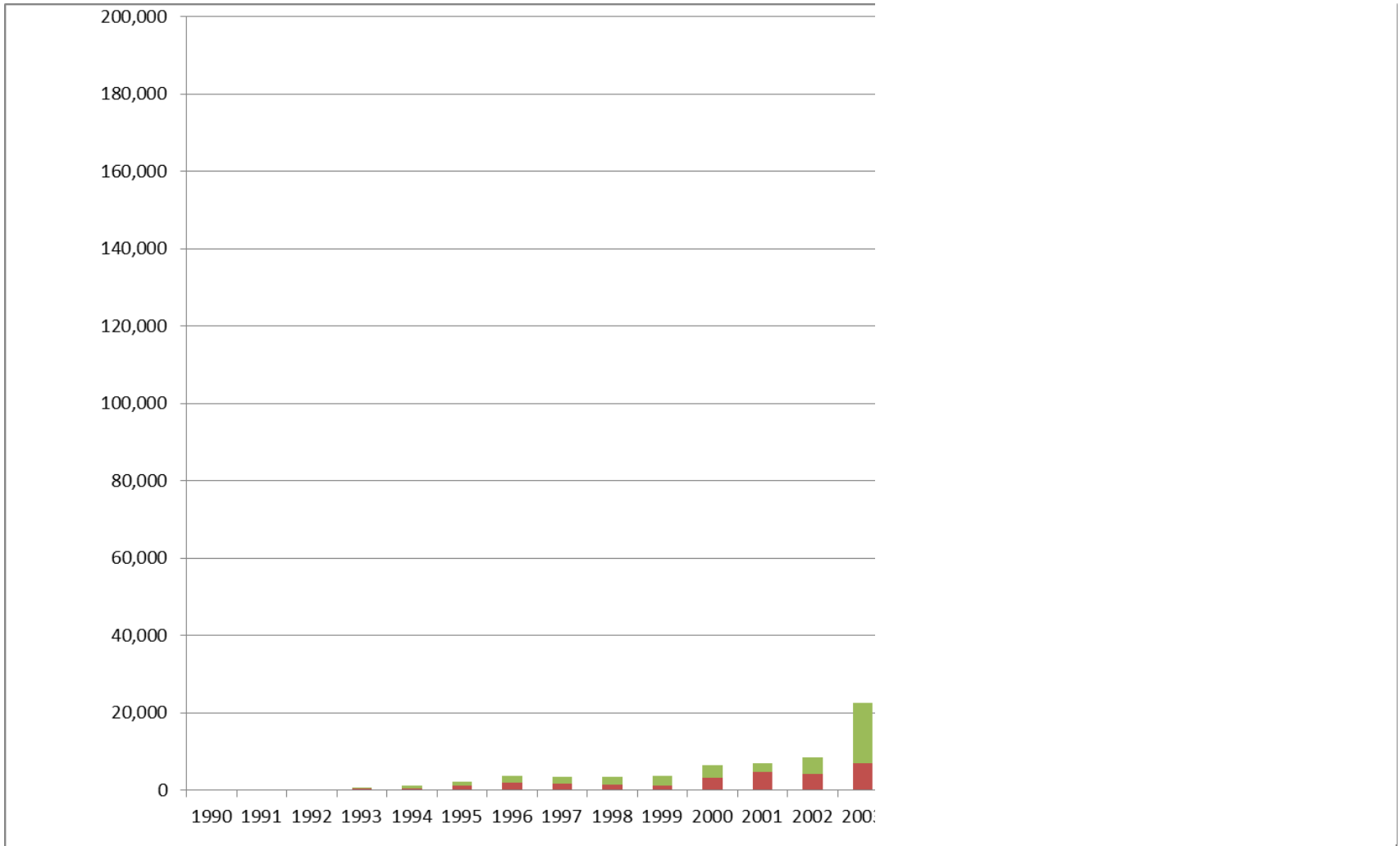
- Unpredictable lead times
- Often missed promised delivery dates
- Most planned builds had material shortages

Product Lead Time





Volume of Product (PSN count)





The problems we couldn't yet see...





3 Stories in One

Our Lean transformation took place in 3 ways

T - Lean Tools

- Kanban
- Point of Use POU material

M - Lean Management Systems

- Policy Deployment
- Gemba walks

C - Lean Culture

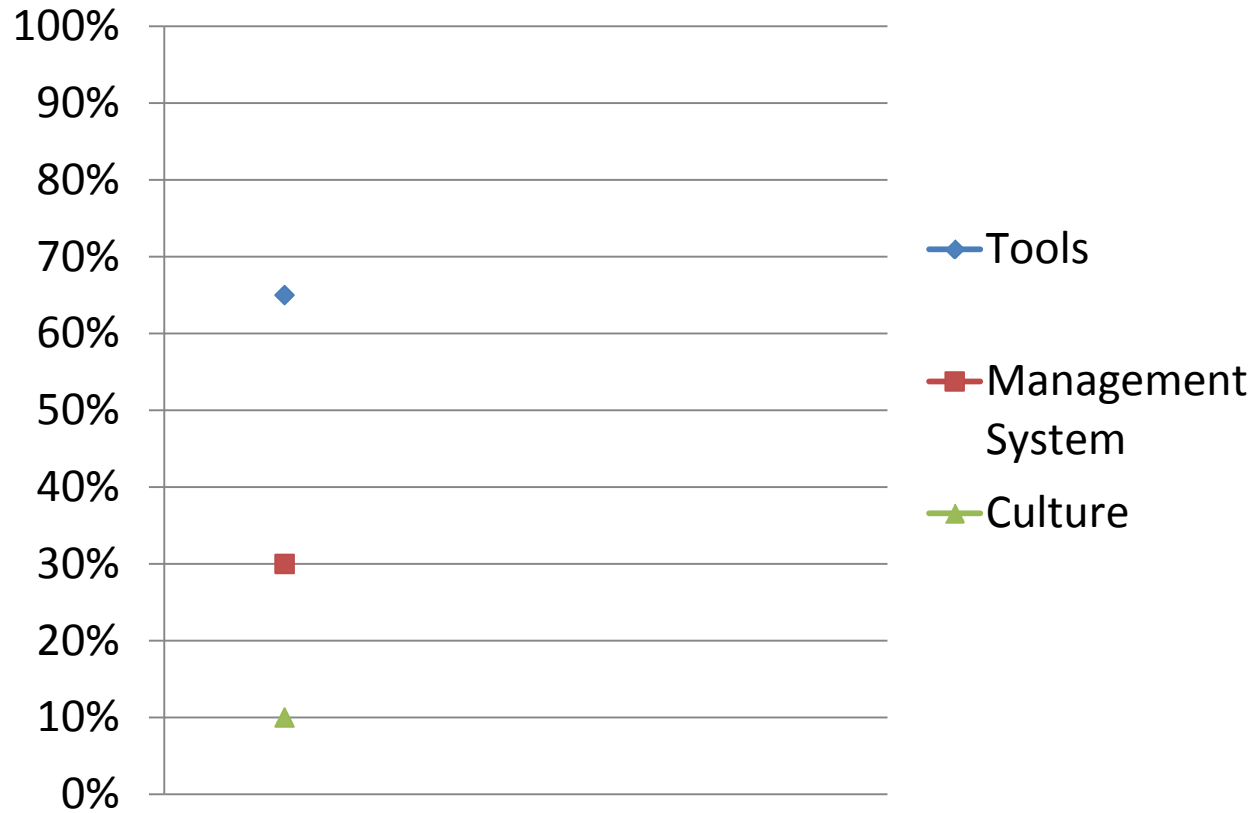
- A3 thinking
- CI as a way of life

And we certainly didn't pick the best route ...





The First Five Years





The First Five Years – “All about tools”

- 2003 - “Discovered” Lean at AME Toronto 2003
- 2004 - “Leaned” our first product line (antennas)
- 2005 - U shaped cells & standard work instructions
- 2006 - Vendor managed inventory
- 2007 - Setup and changeover reduction





Where to Start?

Lean Antenna





Lean Antenna Pilot Project

Reorganized Manufacturing -
Implemented one piece flow for all
GPS Antenna product families
including:

- New Flow Lines – layout and equipment changes
- Assembly Stations with Flat Screen
- One Piece Flow – Standardized Work
- New Processes – Point of Use Inventory, Back Flush
- Point of Use Material – no Parts Kitting
- NovAtel “Finished Goods” Kanban





Antenna Finished Goods Kanban Board

Manual KanBan Board for Finished Goods provided color coded signals for:

- When to start build
- When to stop building
- Which product to give priority to
- Indication of WIP

Product Name	1	2	3	4	5	6	7	8	Lot Size	MAT'L SHORT	Status
AX1202 0101168	●	●	●	●	●	●	●	●	25		EO - 4/8/05. EO - 4/22/05. EO - 4/27/05.
	●	●		+							
AX1201 01017200	X	+							25		
NGS-702 NGS-702	●	●	●	X	+				25		1/15 - 4/29/05 Change to 60 14/05
GPS-702 01017187	●	●		X	+				25		
GPS-701 01017248	●	X	+						25		
GPS-600-LB 01017302		X	+						25		
SK-702 500-G-0006	X	+							25	Bumpers	30 - 4/5/05 50 - 4/19/05
P1-702 500-G-0008											Wait on Wil
SK-600 LB 500-G-0021	+										



Lean Antenna - The Benefits

- No missed shipments to customers
- Lead time is 24 hours versus “several days”
- Fast and flexible product mix – 25 piece lots
- Self managed with finished goods KanBan board
- Unit volume has tripled (3X) with no increase in manufacturing or inventory footprint
- Product quality - 1st pass yield and field reliability has increased





One Day WIP

Achieved by:

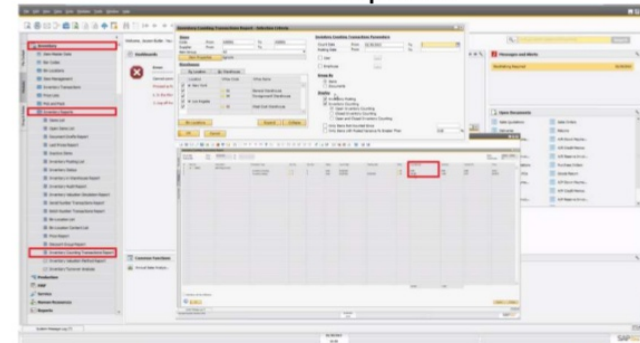
- Eliminating material picking
- Eliminating material transactions (on system)
- Reduced lot sizes (ideal is to build a little of everything every day)
- Point of Use material in Production



Part level inventory transaction eliminated



Inventory Counting Transaction Reports



The Inventory Counting Transactions Report will show all of the changes associated with a specific inventory item in a particular warehouse - Count dates, posting date, variance, and price/inventory cost.



www.vision-33.com

WIP reporting eliminated



The First Five Years

Good Stuff

- Early wins
- Trained everyone (Lean 101)
- Joined a consortium – learned from others
- Practiced and experimented
- Successfully moved from Forecast to true customer Pull

Not so Good Stuff

- Started with Tools
- Measured results rather than processes
- Compliance versus buy in

58

“EVERYONE YOU
WILL EVER MEET
KNOWS SOMETHING
YOU DON’T.”

-BILL NYE-

LAWSOFMODERNWOMAN



The Second Five Years: “Improve and extend”

- 2008 - Take A3s to suppliers
- 2009 – Daily Meetings and 3 tier Visual Display Boards
- 2010 – Accountability Boards
- 2011 – Establish Guiding Principles for Managers
- 2012 – Create Leader Standard Work and Gemba Walks





Guiding Principles for Managers

#2 – Develop People

- Coach people - to develop their own solutions
- Embrace mistakes - as part of the learning process
- Reward/recognize people
- Encourage collaboration
- Maintain accountability
- Develop and promote only those people that support change and CI





Guiding Principles for Managers

#3 – Build a Continuous Improvement Culture

- Master the CI tools – Leader as Teacher
- Standardize work processes
- Train/practice with your people to build CI skills
- Dedicated time for Continuous Improvement
- Build systems that expose problems
- Use the tools to drive rapid change





Realization that we struggle with the same problems as many other companies

“We are drunk on complexity and love to jump to solutions. We have lots of solutions, especially IT tools solutions, looking for problems.”



GEMBA

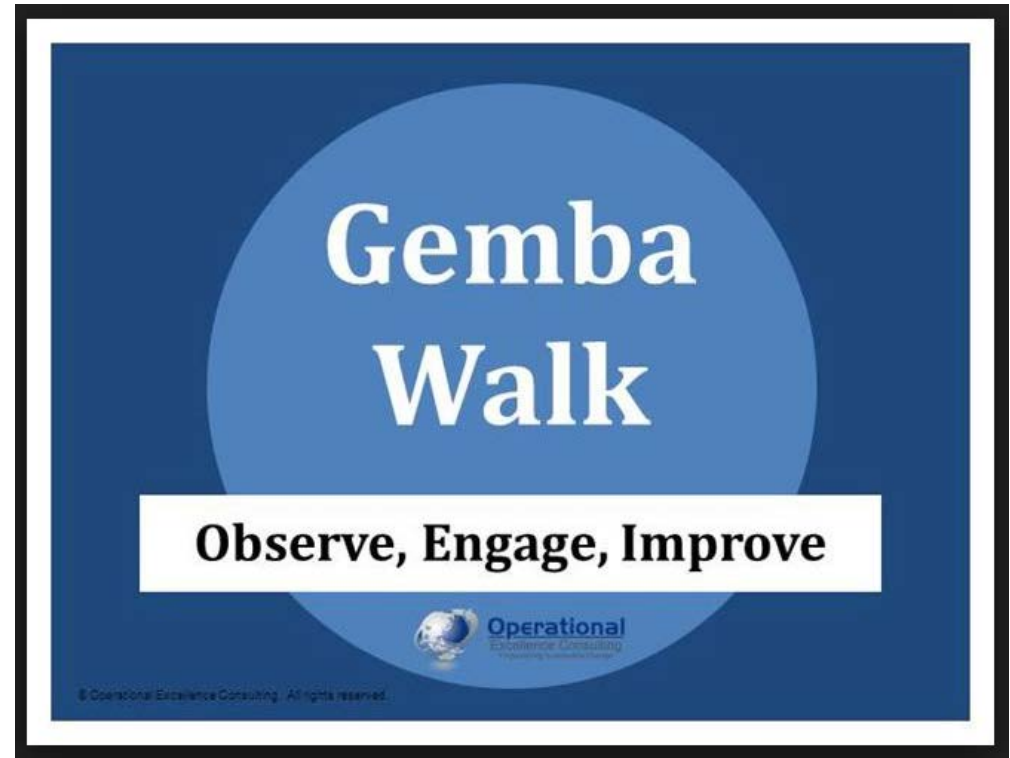
The place where
work is done

GEMBA Walk

Go to the place

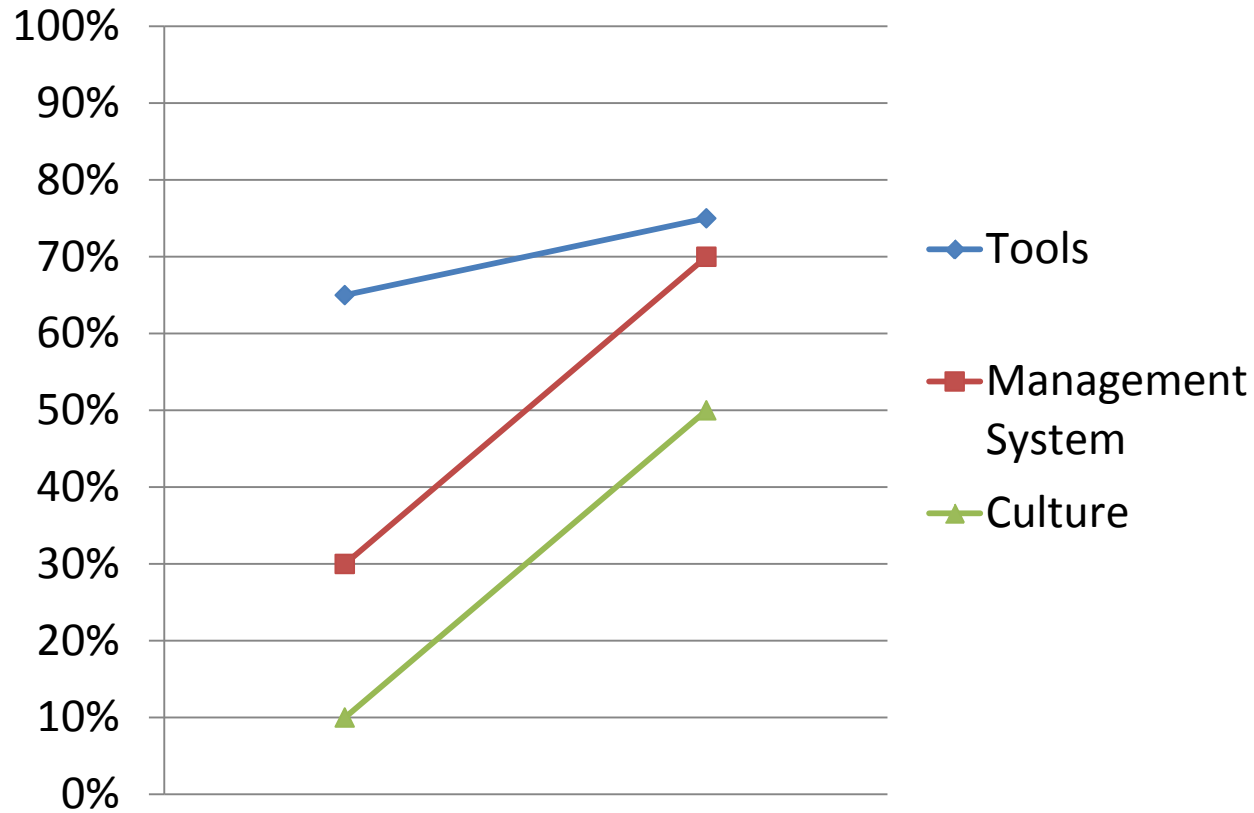
Look at the process

Talk to the people





The Second Five Years





The Second Five Years

Good Stuff

- Lean Management Systems
- Leadership vision established
- Extended Supply Chain
- Increased customer focus
- Gemba walks

Not so Good Stuff

- Over focused on business versus people



The Last Three Years

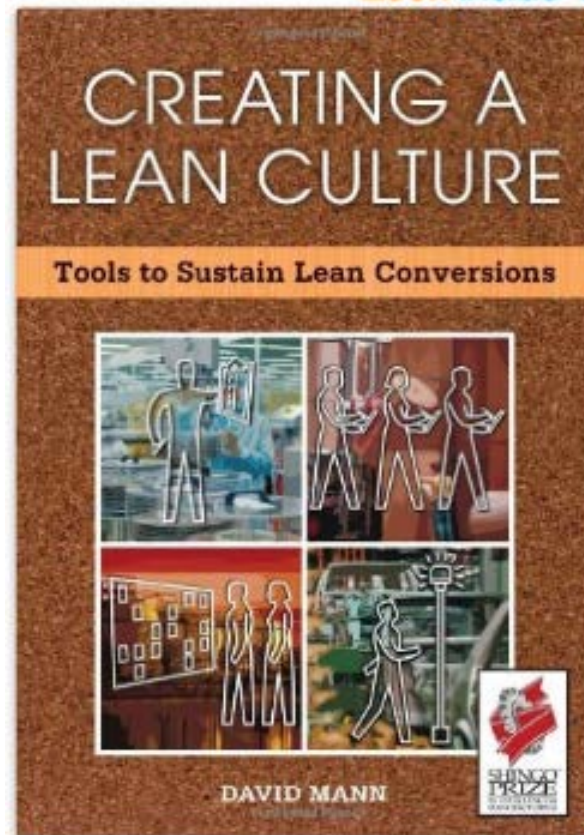
“People, Culture, Leadership”

- 2013 – “Creating a Lean Culture”
Leaders Book Study
- 2014 – Prepare and Apply for AME
Manufacturing Excellence Award
- 2015 – Act on AME feedback – Lean
Bronze, Heijunka, Demand
smoothing...





Creating a Lean Culture – Book Study

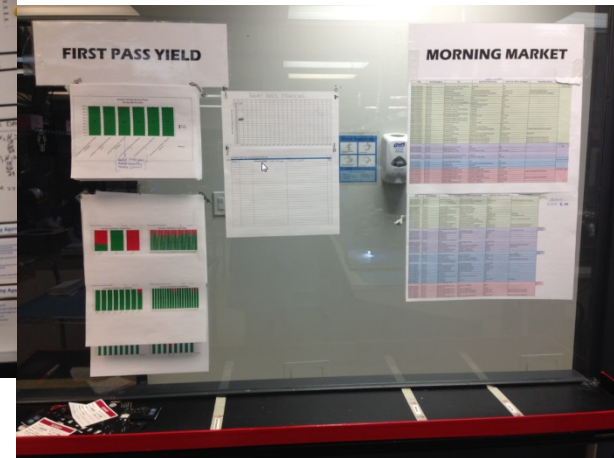
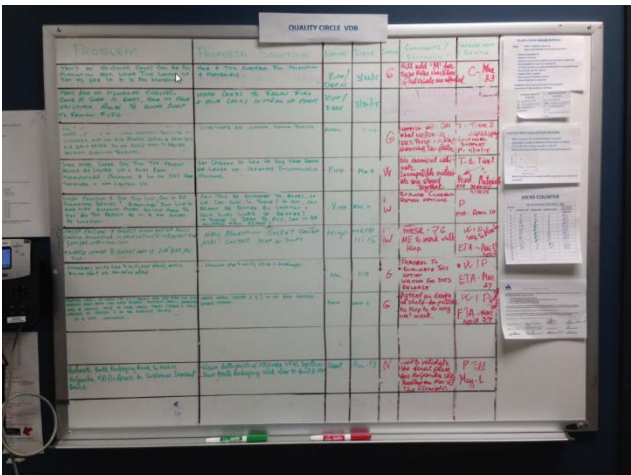


Creating a Lean Culture – David Mann



Continuous Improvement

- Daily Morning Market – review root causes and countermeasures for scrap, First Pass Yield, and failures
- Daily Heijunka – review issues preventing production builds
- Daily Tier 1 Cross Over – review safety, reasons for Day-By-Hour misses
- Weekly Quality Circle – review employee improvement ideas & open CI
- Bi-weekly Tier 2 – review issues from Tier 1 for potential CI opportunities and status of open CI





Lean Methods We Currently Use

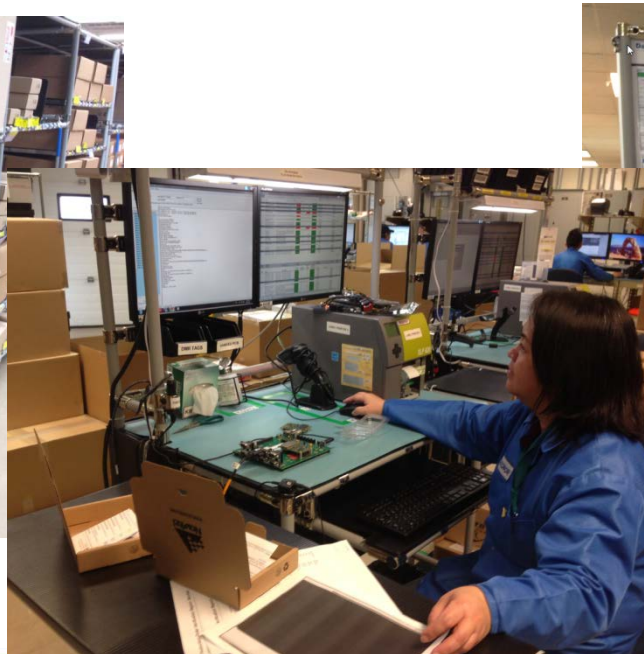
- Customer Focus
- Policy Deployment including Corporate Balanced Scorecard
- Pull – Making Material Flow
- Value Stream Mapping
- Visual Workplace
- Standard Work
- 5S
- One-piece Flow
- KanBan
- Kaizen Blitz
- Mistake-proofing
- Quick Changeover and Setup
- Heijunka
- Demand Smoothing
- Morning Market





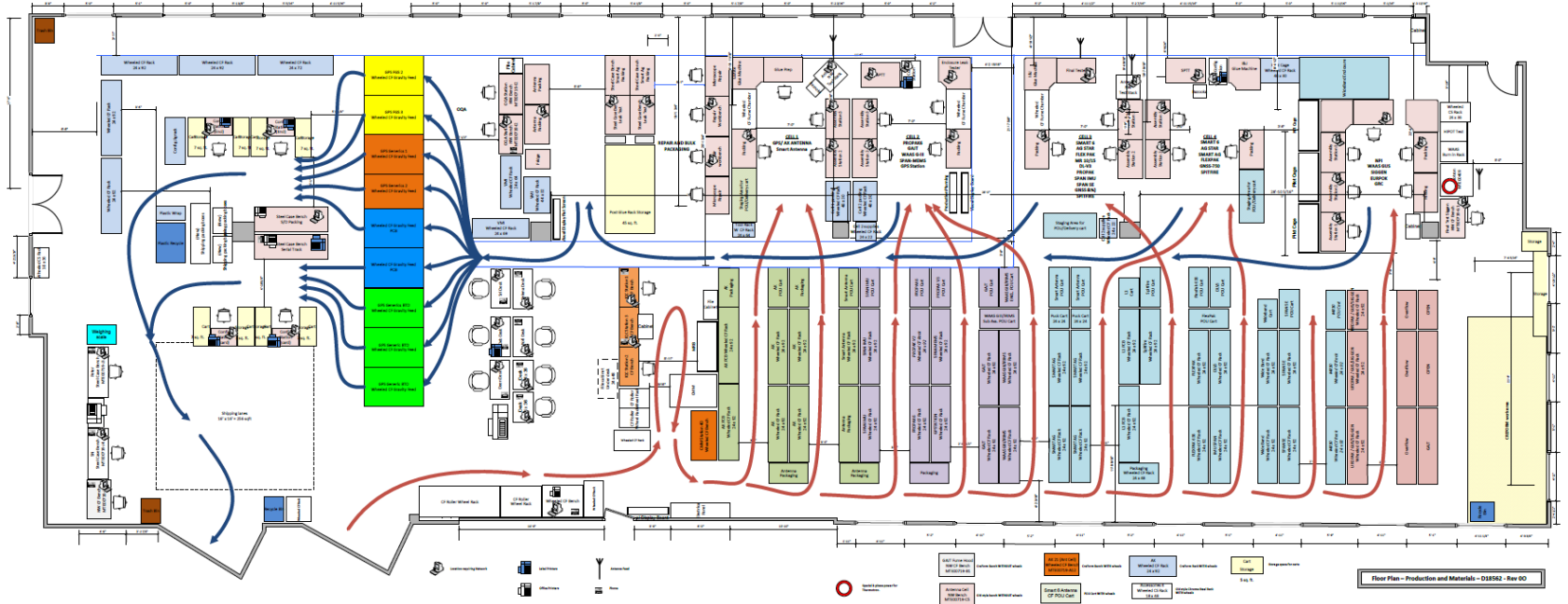
Manufacturing Strategy

- One Day WIP – Dynamic production scheduling with optimized build lot sizes
- POU Materials Setup – 2 lots, standardized (color coded) by stations, assembler self setup
- Standardized Work Instruction (Sequence) – TWI format
- Cellular Manufacturing – One piece flow, flexibility, optimized cell space (12' x 12'), 3 operators, common test equipment
- Finished Goods KANBAN – Monthly KANBAN level review based on previous 3 months actual and forward 3 months demands





Production Floor layout





Guiding Principles

- Let the Customer Pull
- Build a little of everything every day
- Daily Cycle – plan, execute, improve
- Use visuals for planning, communicating, keeping score
- Leadership shows (not just talks) the values
- Ask – Would the customer pay for this?





NovAtel – 2014 Recipient of AME Manufacturing Excellence Award





Award Feedback - Recognized Strengths

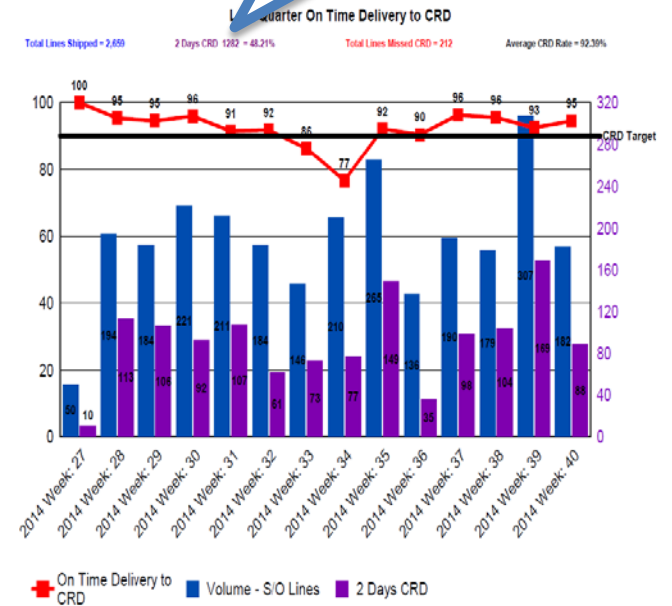


- Visual Workplace
- Tiered Meetings

2 Days CRD 1282 = 48.21%

Customer Satisfaction

- On Time Delivery
- Quality





Award Feedback - Recognized Strengths

Lean Culture

- Improvement Culture
- Collaborative spirit



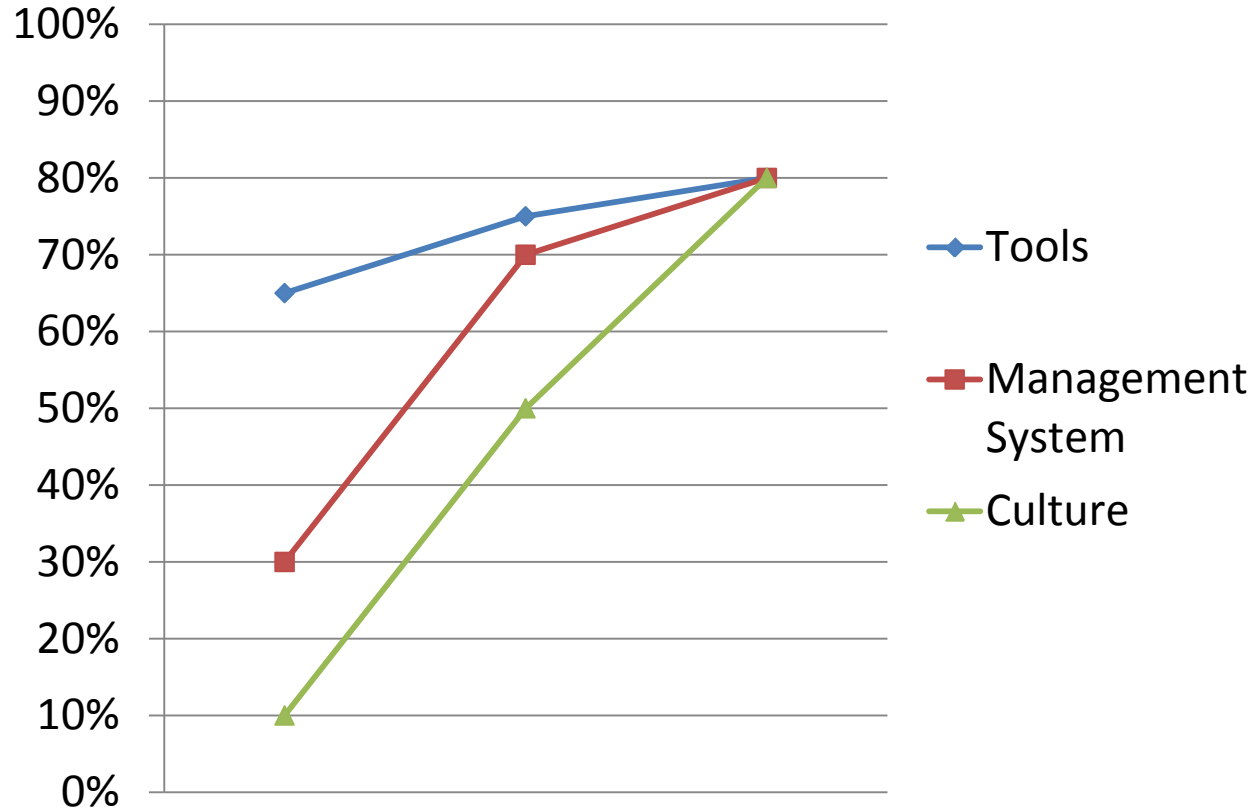
Extended Supply Chain

- Partnering with Suppliers
- Supplier Development
- End to End Pull





The Last Three Years





The Last Three Years

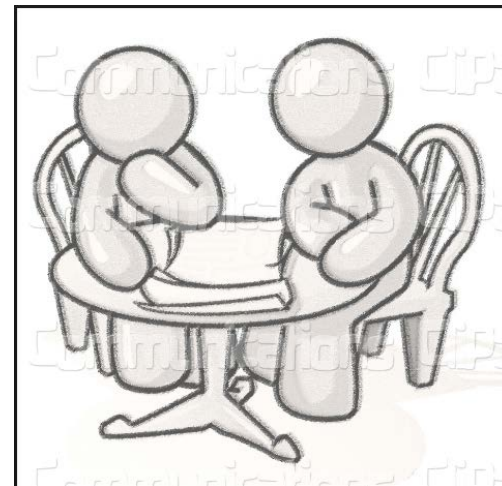
Good Stuff

- Reflecting on our weaknesses
- Third Party assessment
- Re-energized our Lean Efforts
- Increased focus on the people



Not so Good Stuff

- More communication required





Lean Culture – Reflecting on our Journey

Culture

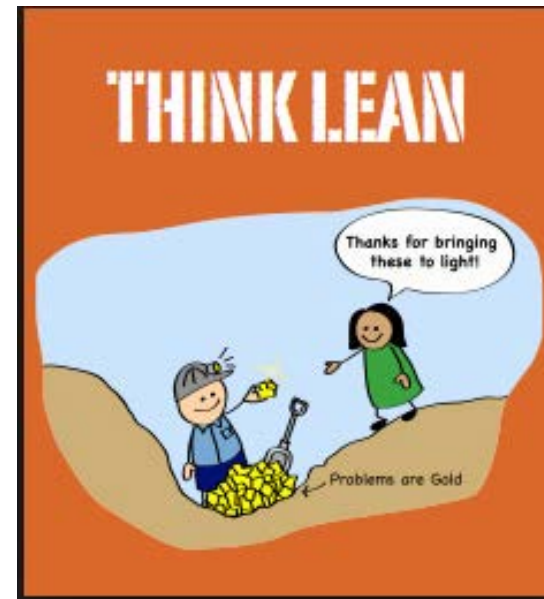
- a way of thinking, behaving, or working that exists in a place or organization

Traditional Business Culture

- Succeed at any cost
- Heroic efforts valued
- “No problems here boss”

Lean Business Culture

- Succeed by improving processes
- Heroics seen as evidence of problems to be fixed
- “No Problem is BIG Problem”





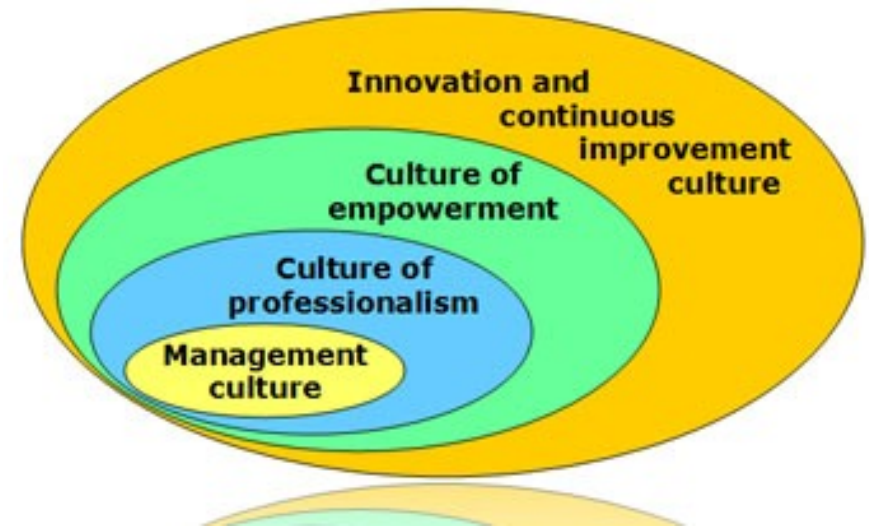
What Enables This Cultural Transformation

Management View of Lean

- Burning Platform – urgent willingness to change
- Prior Knowledge – previous success with Lean

Management Commitment

- Decision to change
- Communication that this is a permanent change
- Committing time and money to make it happen

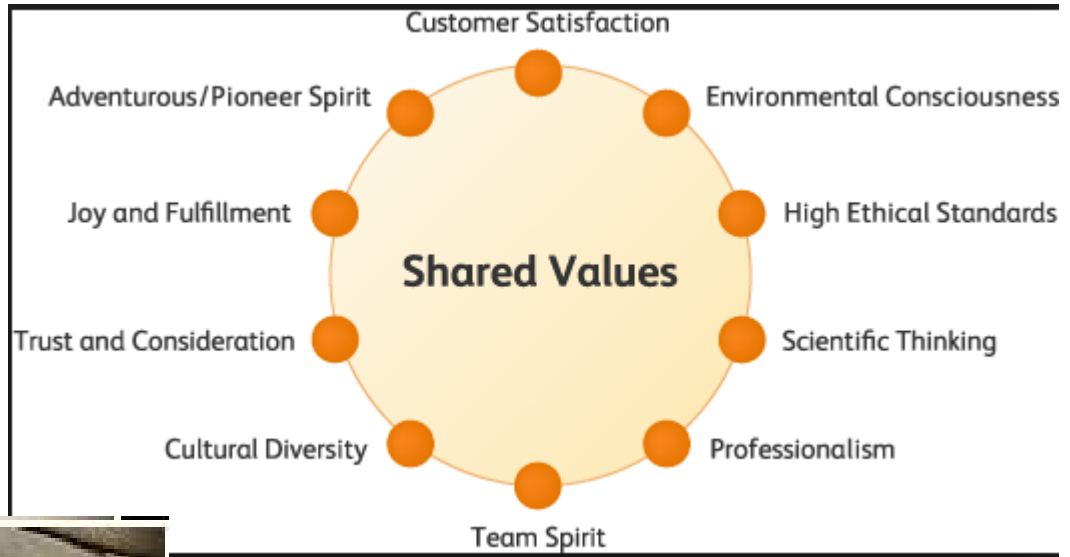




Once You Have Started

It's all about

- Shared values
- Discipline
- Trust





Mistakes along the way...

- Overuse and underuse of Facilitators/Trainers/Sensei
- Training versus Practice
- Plateaus and Fake Lean
- New Managers
- Top down – Bottom Up Balance





Why Lean Transformations Fail:

1. Do not have sustained top management support
2. Lack of understanding / support from adjacent functional parts of the organization (if implemented in one area first)
3. No short term payoff (Home run mentality)
4. Leadership or Lean Champion change
5. Tools only use
6. Not used as a business philosophy
7. Not extended beyond the factory - product development, suppliers, customers

"The term 'transformation' in lean transformation does not refer to changing your operation processes but to change your people dynamics and capabilities to identify, prioritize, solve problems and share improvements continuously which is the source of competitive advantage of a lean organization."

100% Management-Driven Failures!



Management Role

Set the vision

Choose the right measures

Model the desired behaviour

- Gemba walks
- A3 coaching
- Get involved and stay involved

Support the change

- Training
- Dedicated CI time
- Expect great things





Support System

- Lean transformation office – facilitators
- Lean Library (and videos)
- AME conferences
- Lean workshops and training
- Lean Consortium
- Lean Mentors





Lean Culture

Lean - It's like making bread

Certain key ingredients are required every time

- **Flour**
- **Yeast**
- **Salt**



- **Sugar**
- **Water**



- **Vision**
- **Respect for People**
- **Management Support**
- **Lean Training**
- **Employee Engagement**
- **CI With a Scientific Method**



Thank You!

Session: WP/25
Creating and Sustaining a Lean Culture

Mike McAloney
NovAtel Inc
mmcaloney@novatel.com



NovAtel – Positioning Solved - Anytime, Anywhere

Questions
& Answers

