

# Beyond the lean tool basics: Creating and sustaining a global lean culture

**Matt Swain**

Global Director, Enterprise Lean Six Sigma  
**Littelfuse, Inc.**



Expertise Applied | Answers Delivered

# Protect | Control | Sense — A Global Approach

- Founded in 1927
- Introduced many innovative, industry-first technologies
- Today
  - 10,000+ employees worldwide
  - \$1.1 Billion in 2016 net sales
  - Publicly held: LFUS (NASDAQ)
  - More than 40 locations worldwide:
    - Americas
    - Europe
    - Asia

Lean starts here... 2011 in earnest...

## Protect

- Today's sophisticated electronics require greater protection from ESD, power surges and other occurrences
- Handle more power in smaller products
- Innovative circuit protection solutions



## Control

- Safely and efficiently control power in even the harshest environments
- Limit equipment damage and minimize electrical hazards
- Improve productivity and reduce costs

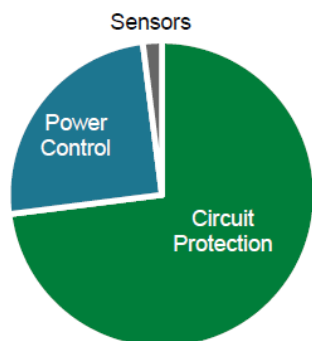


## Sense

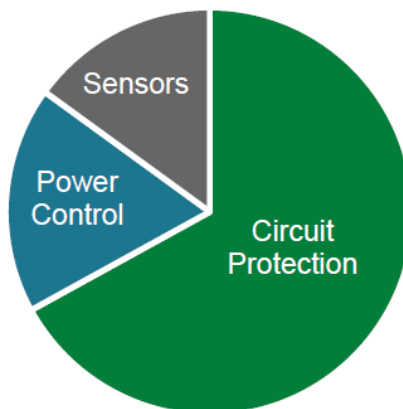
- Sensing technologies are increasingly used to support complex electronic systems
- Broad platform of technologies help improve product performance, comfort, convenience and safety



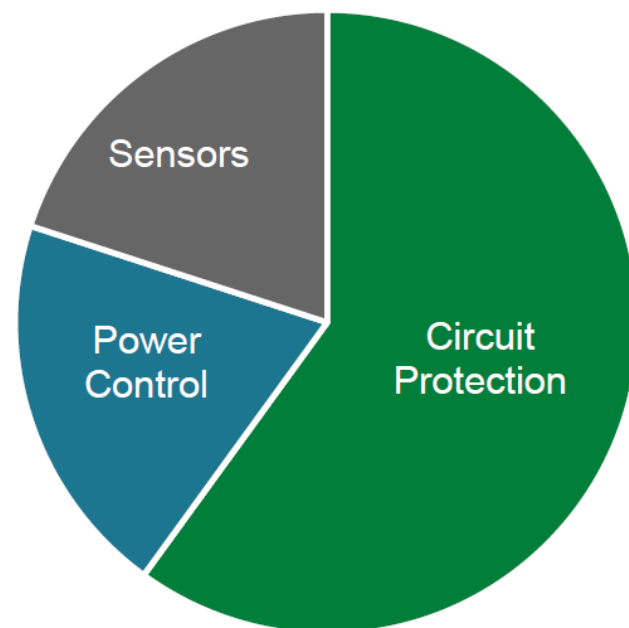
# Strategy and Enterprise Lean Six Sigma



**2012 Revenue:**  
**\$668 million**

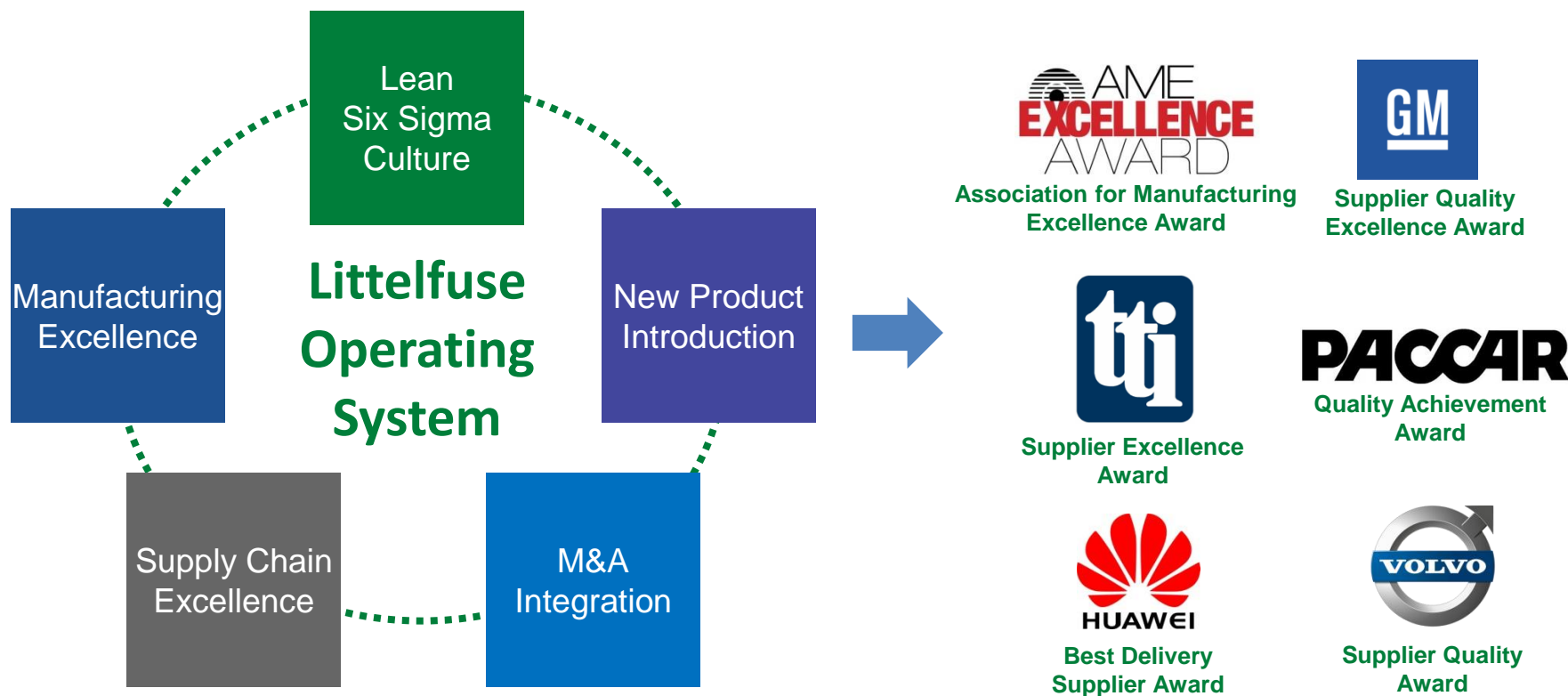


**2016 Revenue:**  
**\$1,056 million**

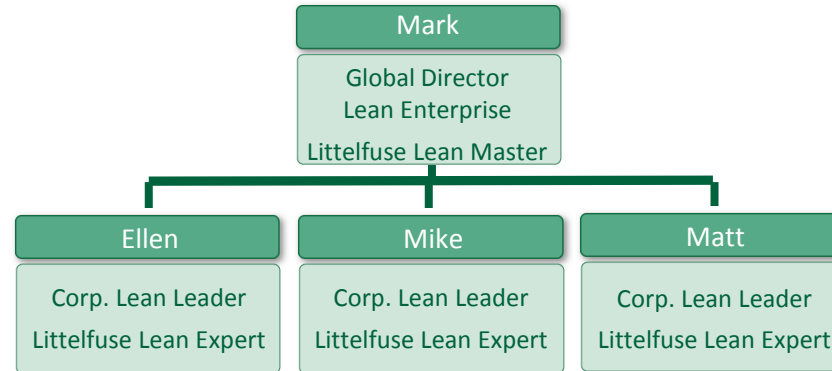


**2021 Target: Double Digit  
Annual Revenue Growth**

# Operational Excellence: A Foundational Element of Our Success; Recognized Externally



# Lean Enterprise 2011 (start)



- 4 corporate associates dedicated to lean enterprise
- 35 additional semi-dedicated associates globally

# Littelfuse Lean Enterprise – Doing Lean



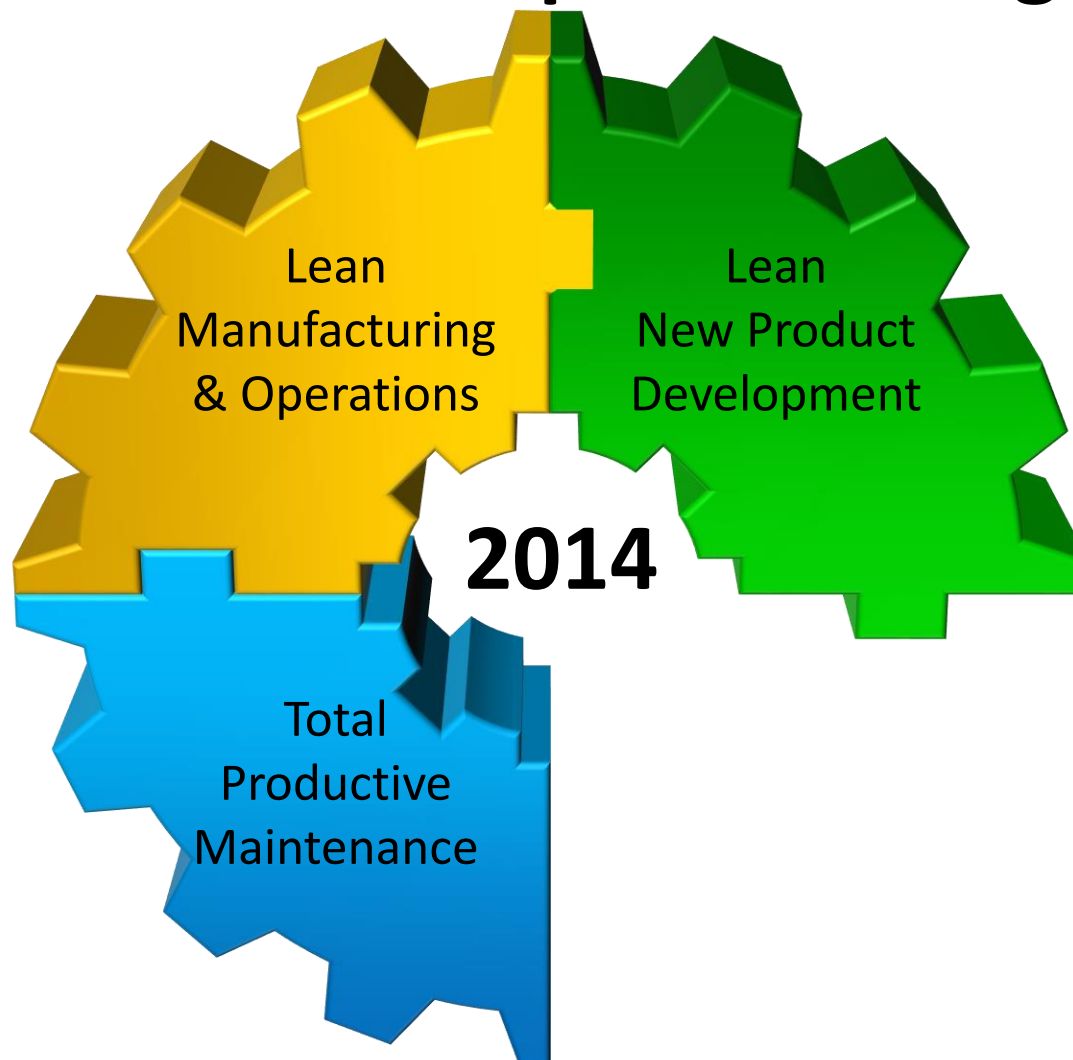
- Value Stream Maps
- A3
- 6S
- LSGA
- Pull
- Flow
- VOC
- SIPOC
- Standard Work
- More...

# Littelfuse Lean Enterprise – Doing Lean



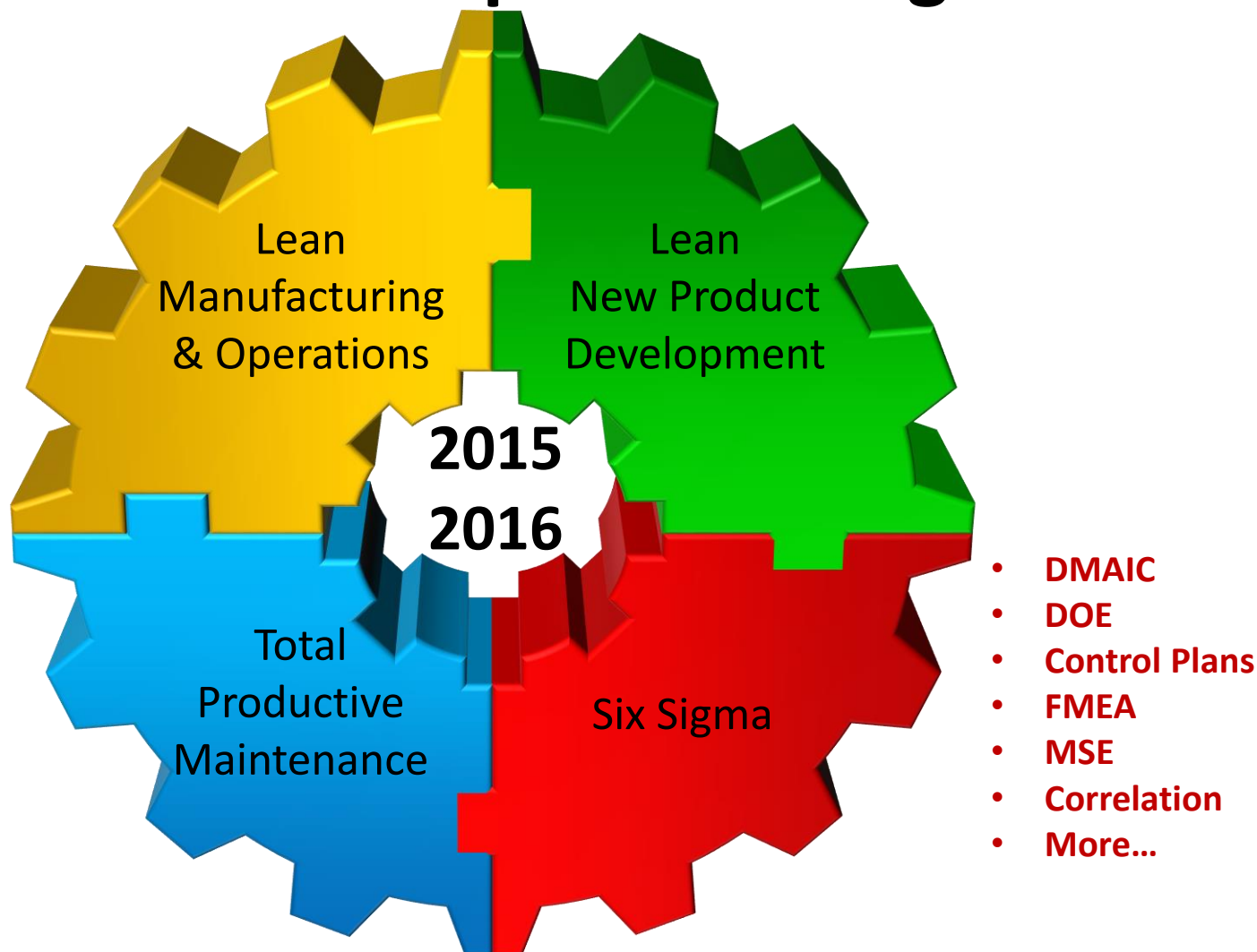
- OEE
- Autonomous Maintenance
- Preventive Maintenance
- Predictive Maintenance
- SMED
- More...

# Littelfuse Lean Enterprise – Doing Lean



- VA/VE
- 3P
- Lean NPD Events
- Risk Management
- Critical-to-Cost
- Critical-to-Quality
- More...

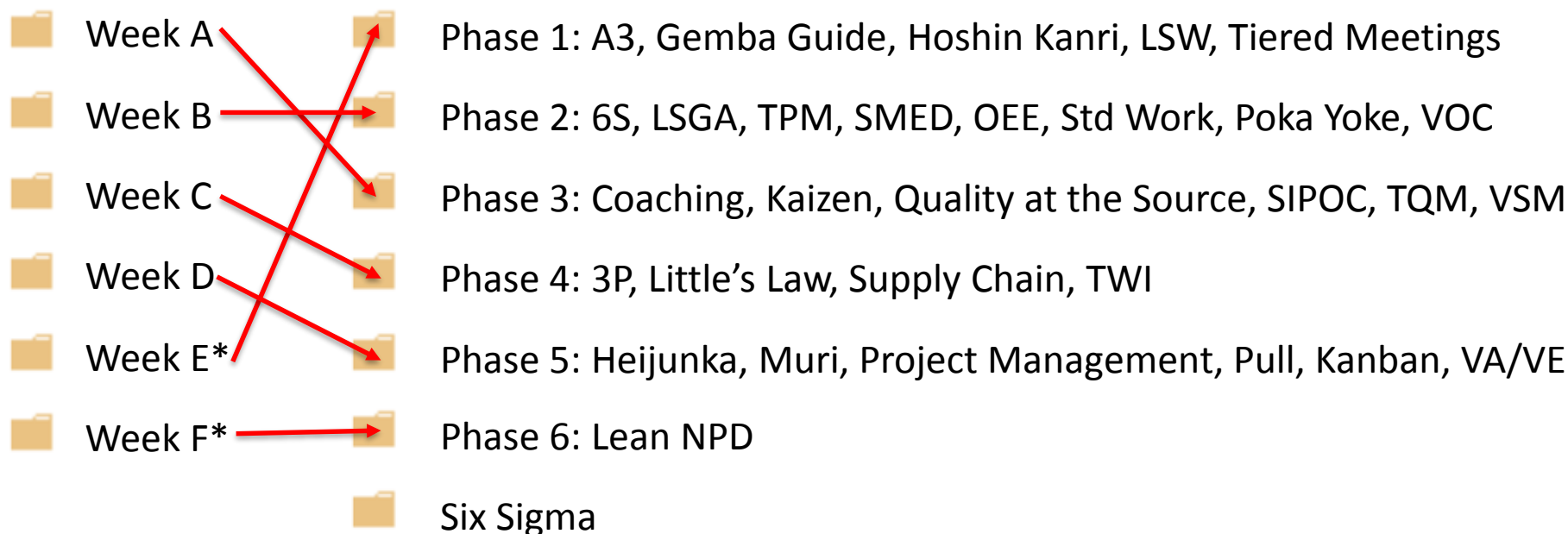
# Littelfuse Lean Enterprise – Doing Lean



# Today's Phases of Training

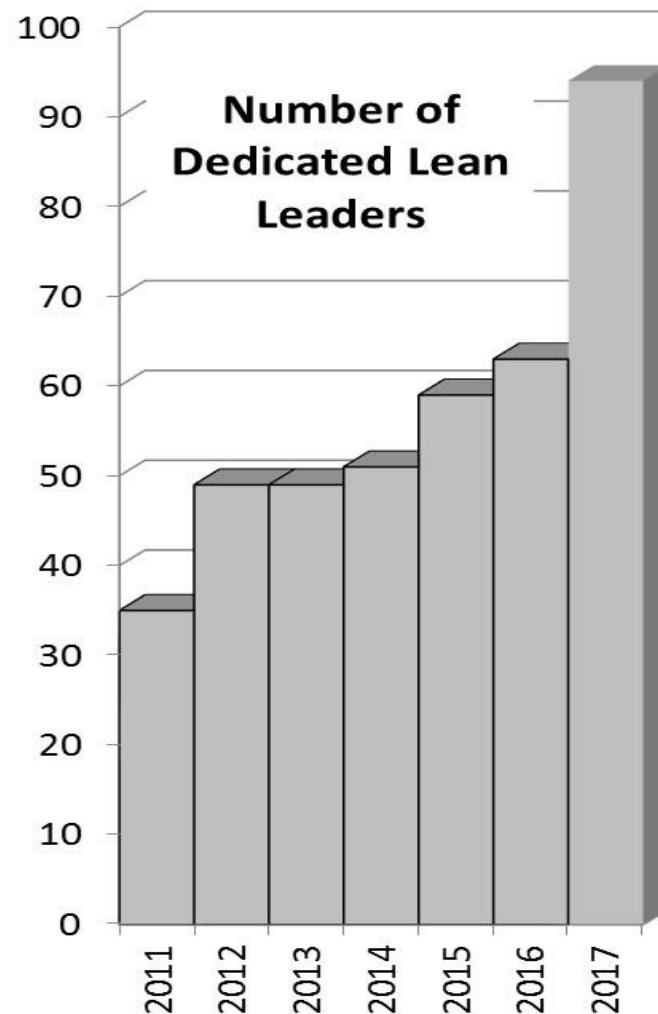
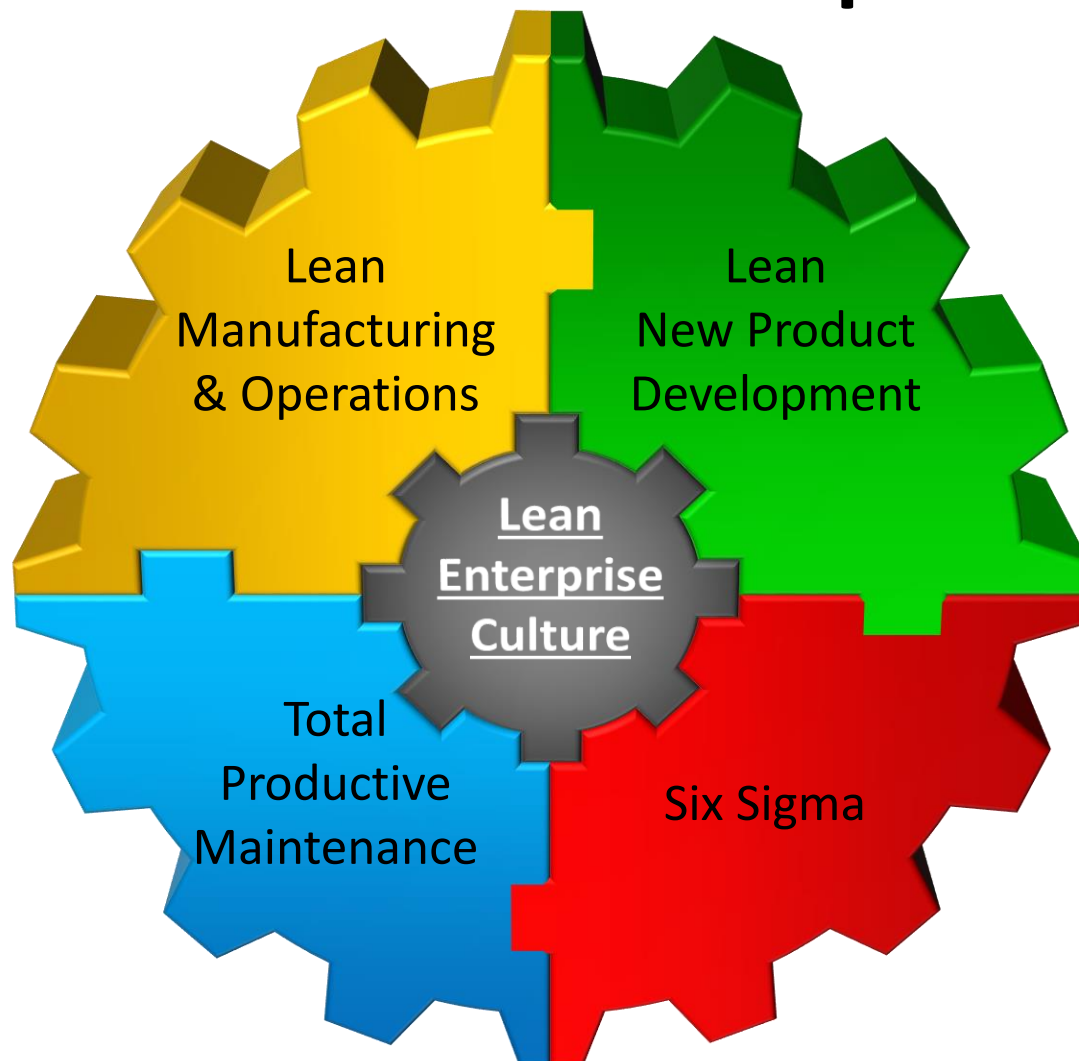
## At Start (2011)

## Now

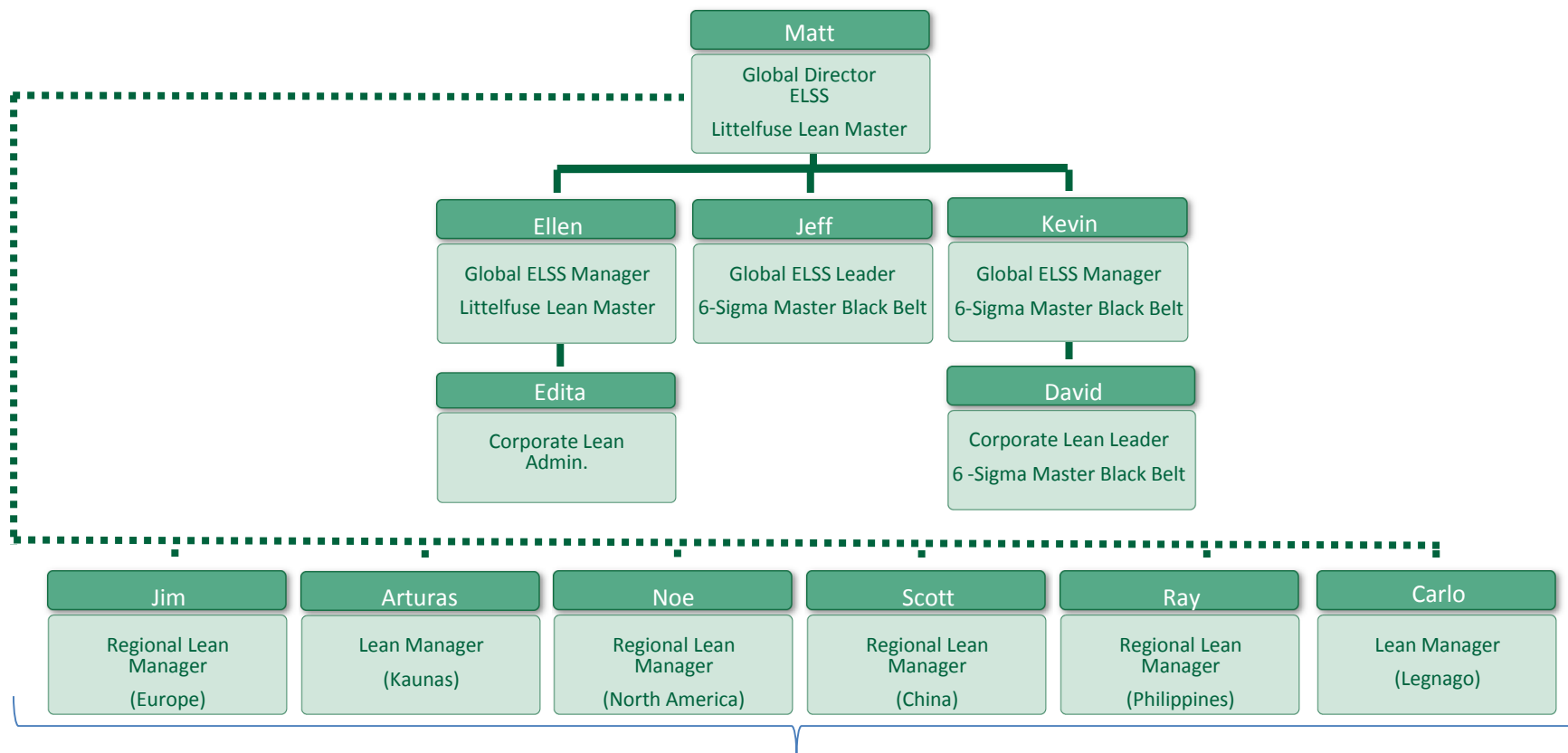


\*Week E started in 2014, Week F started in 2013

# Littelfuse Lean Enterprise – Being Lean

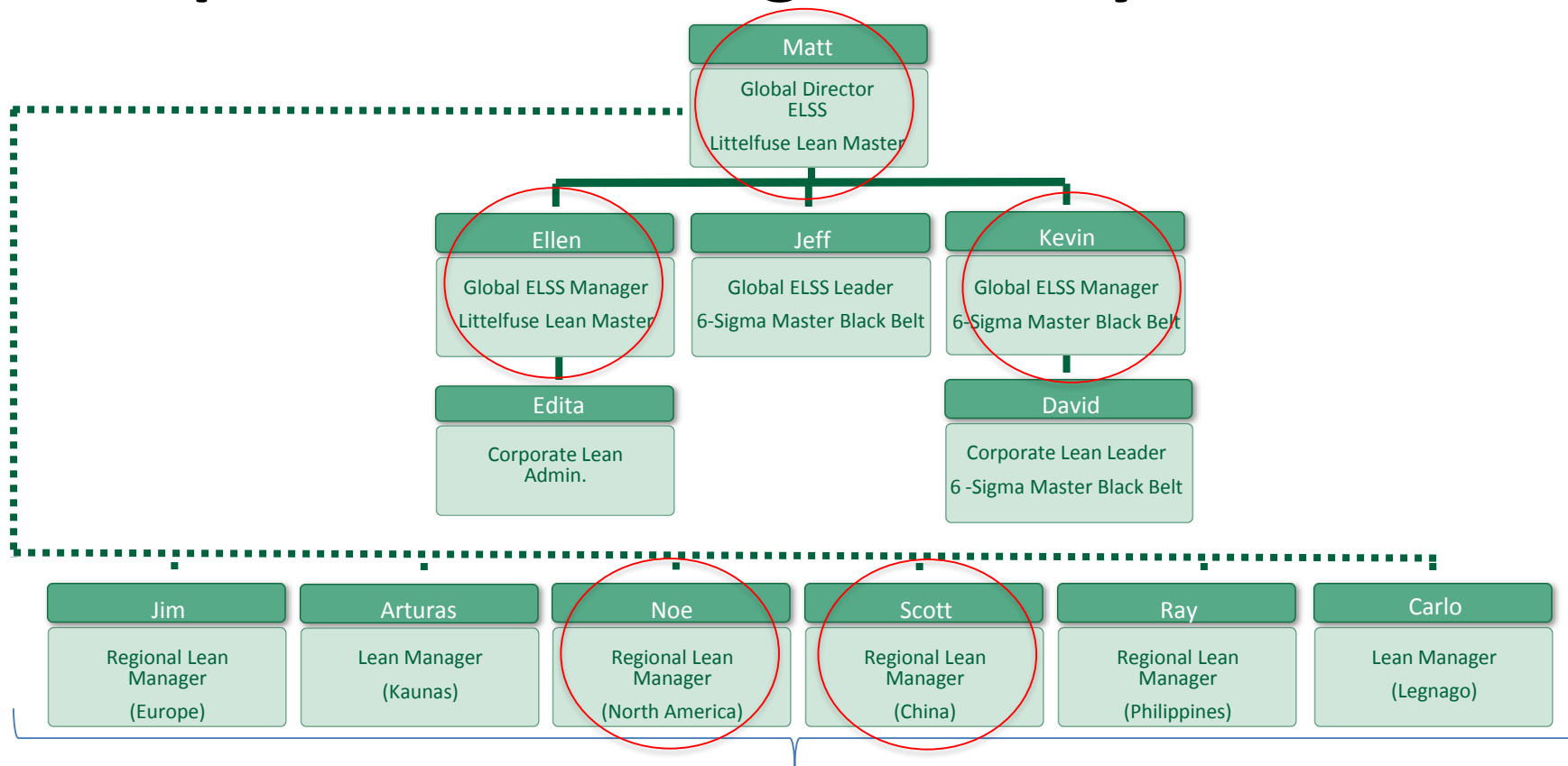


# Enterprise Lean Six Sigma Today



6 Corporate, 6 Regional and 82  
ELSS Implementers & Leaders

# Enterprise Lean Six Sigma Today



6 Corporate, 6 Regional and 82  
ELSS Implementers & Leaders

# ELSS = The Littelfuse CI Platform and Basis for LFOS

Current

## Lean

- Dongguan & Suzhou Receive 2017 AME Manufacturing Excellence Awards
  - Certified Lean Contributors - 832
  - Certified Lean Experts - 54
  - Model Lines 12 of 17
  - PFEF 14 of 17
  - TPM 12 of 17
  - Lean Manager (Europe) Hired
- } sites participating

# ELSS = The Littelfuse CI Platform and Basis for LFOS

## Lean

Current

- Dongguan & Suzhou Receive 2017 AME Manufacturing Excellence Awards
  - Certified Lean Contributors - 832
  - Certified Lean Experts - 54
  - Model Lines 12 of 17
  - PFEF 14 of 17
  - TPM 12 of 17
  - Lean Manager (Europe) Hired
- } sites participating

Next

- ELSS Guide Revision 6
- Upgrades to Phase 1 – 6 Lean Training
- Finalize Corporate Hoshin Cadence
- Customer Interaction Training for Engineers

# ELSS = The Littelfuse CI Platform and Basis for LFOS

Current

## Six Sigma

- Yellow Belt Trained: 1619
- Green Belt Trained: 168
- Certifications in Process (77 have passed exam)
- Black Belt Training 1 Done in China
- Master Black Belt Projects in Process (\$4.2 Million in Cost Impact)

# ELSS = The Littelfuse CI Platform and Basis for LFOS

Six Sigma	
Current	▪ Yellow Belt Trained: 1619
	▪ Green Belt Trained: 168
	▪ Certifications in Process (77 have passed exam)
	▪ Black Belt Training 1 Done in China
	▪ Master Black Belt Projects in Process (\$4.2 Million in Cost Impact)
Next	▪ Design for Six Sigma
	▪ Limited Upgrade from Minitab to JMP
	▪ Continue to Develop Regional Six Sigma Expertise

# ELSS = The Littelfuse CI Platform and Basis for LFOS

Current

## LFOS

- Lean Midyear Assessments



- Key LFOS Program Manager Role and Lean Leader Position Filled

# ELSS = The Littelfuse CI Platform and Basis for LFOS

Current

## LFOS

- Lean Midyear Assessments



- Key LFOS Program Manager Role and Lean Leader Position Filled

Next

- Upgrade Global Metric System (GMS) for Ops
- LFOS Visual Management
- Addition of End-of-Year Lean 4.0 Functional Assessments in Addition to Factory Assessments

# ELSS = The Littelfuse CI Platform and Basis for LFOS

## Lean

- Dongguan & Suzhou Receive 2017 AME Manufacturing Excellence Awards
  - Certified Lean Contributors - 832
  - Certified Lean Experts - 54
  - Model Lines 12 of 17
  - PFEF 14 of 17
  - TPM 12 of 17
  - Lean Manager (Europe) Hired
- } sites participating

- ELSS Guidebook Revision 6
- Upgrades to Phase 1 – 6 Lean Training
- Finalize Corporate Hoshin Cadence
- Customer Interaction Training for Engineers

## Six Sigma

- Yellow Belt Trained: 1619
- Green Belt Trained: 168
- Certifications in Process (77 have passed exam)
- Black Belt Training 1 Done in China
- Master Black Belt Projects in Process (\$4.2 Million in Cost Impact)

- Design for Six Sigma
- Limited Upgrade from Minitab to JMP
- Continue to Develop Regional Six Sigma Expertise

## LFOS

- Lean Midyear Assessments



- Key LFOS Program Manager Role and Lean Leader Position Filled

- Upgrade Global Metric System (GMS) for Ops
- LFOS Visual Management
- Addition of End-of-Year Lean 4.0 Functional Assessments in Addition to Factory Assessments

# Littelfuse Operating System

OPERATIONAL EXCELLENCE: EVERYONE, EVERY DAY, EVERYWHERE



# Big-impact examples

## Lean VSM Round 1-6, EBU

Measure	1st Round	6 <sup>th</sup> round	% Change
Floor Space (M <sup>2</sup> )			-13%
Capacity (5 days, 2 shifts)			23%
Margin			600%
Productivity (units/hour)			71%
OEE	65%	89%	37%
Cycle Time (seconds)			-32%
Number of Operators			-49%

## Six Sigma: Automotive Fuse

- High temperature application 160°C vs. traditional 130°C
- Increase safety margin for all automotive customers
- Prevent risks of terminal relaxation and melted fuses
- Design of Experiment applied to analyze effect of variables to gap and forces

**IMPACT:** Pleased Customer with the NPD process & develop an additional market opportunity with no competition!

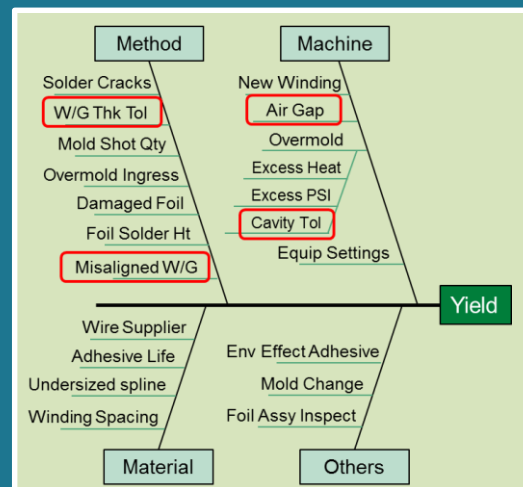
# Big-impact examples

## Lean VSM Round 1-6, SBU

Measure	1st Round	6 <sup>th</sup> round	% Change
Floor Space (M <sup>2</sup> )			-11%
Capacity (K/day)			26%
Output (EA) per year			41%
Productivity (units/hour)			65%
Cycle Time (hours)			-8%
Number of Operators			-18%
OEE (CLIP 3S)	68%	93%	37%

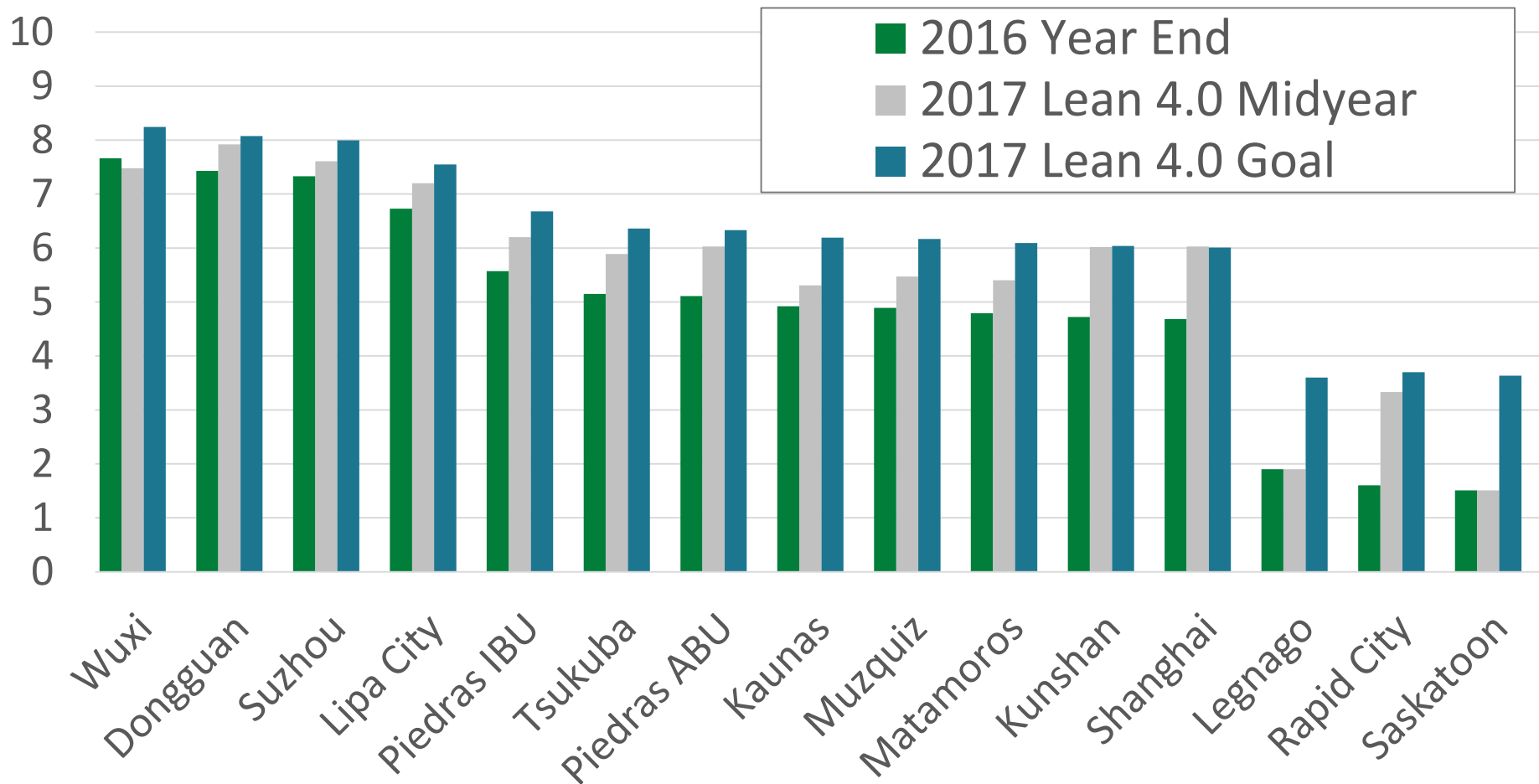
## Six Sigma: Sensor Product

- 30% yield attempting to produce at rate; improved to 95%
- Applied several experiments to find root cause(s)



Impact: \$3.7M / year

# Lean 4.0 Assessments (TNM)



# Successes

- Culture change (doing lean to being lean)
- Steering Committee: CEO, CLHRO, SVP Ops, VP Quality
- AME Awards  
2016: Wuxi, China  
2017: Dongguan, China  
Suzhou, China
- Nearing 900 lean certifications outside the 1%

# Lessons Learned

- Get buy-in and develop pull
- Littelfuse “advanced” topics should be done in advance
- Lean is a culture with tools, not a tool set
- Pillage then burn (lean tools then Six Sigma)
- Focus on the willing, others will see the results creating pull

# What is Next?

- Driving the existing facilities to assessment scores of 9+
- Starting from scratch with new acquisitions and accelerating their improvement
- Adding Marketing- and Sales-specific tools
- Adding DFSS and Master Blackbelt training and certification

# Discussion Leads

3P



**Matt  
Swain**

Global  
Director  
ELSS

Six  
Sigma



**Kevin  
Kent**

Global  
ELSS  
Manager

Hoshin  
Kanri



**Ellen  
Sieminski**

Global  
ELSS  
Manager

Tiered  
Meetings



**Noe  
Manriquez**

North  
America  
ELSS  
Manager

Leader  
Standard  
Work



**Scott  
Webber**

China  
ELSS  
Manager

# Thank You!

*Your opinion is important to us!*

**Please take a moment to complete the survey using the conference mobile app.**

**Session No: ThS/53**

**Beyond the lean tool basics: Creating and sustaining a global lean culture**

**Matt Swain**

Littelfuse, Inc.

[mswain@littelfuse.com](mailto:mswain@littelfuse.com)