

# **“Process Stabilization Through A3 and the Daily Management Process”**

**Angelo Esposito**

Manager of Quality & Operational  
Excellence

**ODG (Ontario Drive and Gear)**

**ODG**



Welcome





## Who is ODG?

- Started in 1962
- Two divisions – Gear and Vehicle
- Brand names – ODG Gear and ARGO
- Sales 2013 of nearly \$60M
- Total employees 230





# 1967

The first Argo amphibious all terrain vehicle was developed









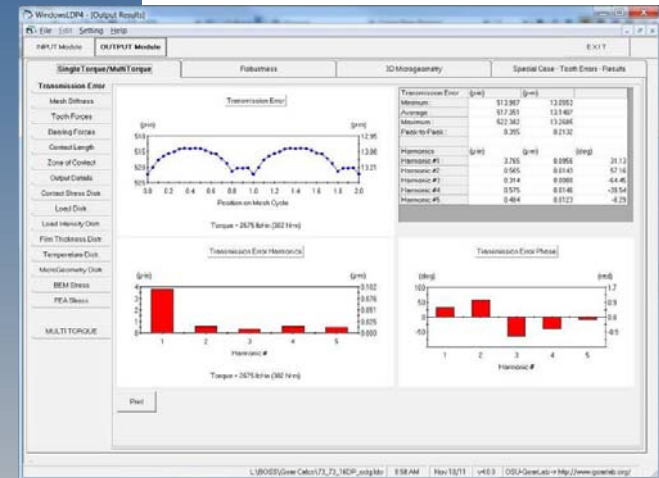
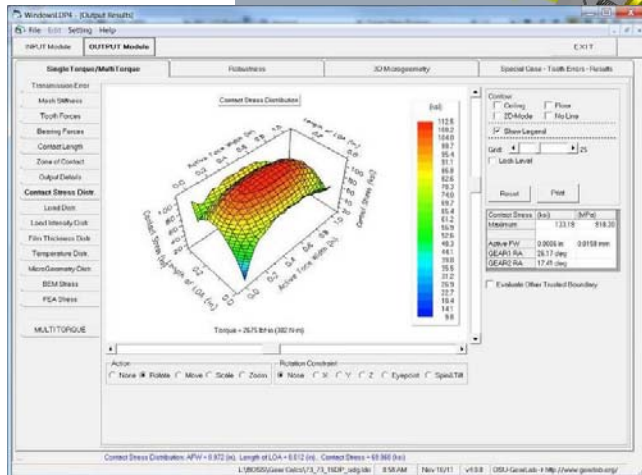
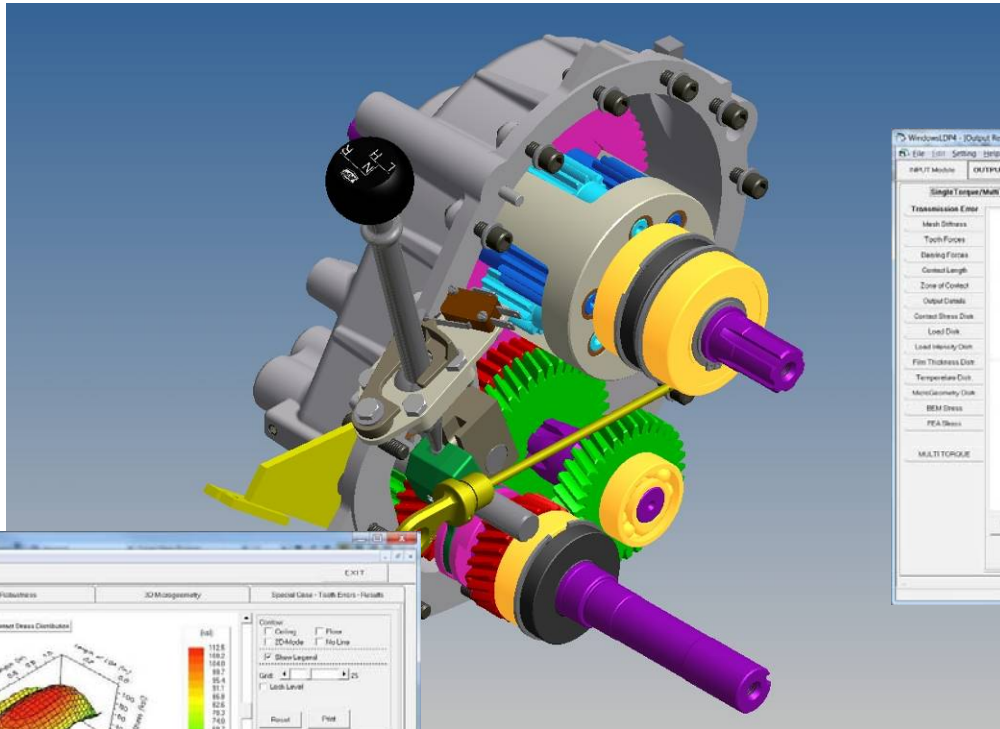
# ODG

## Gears

- High mix, low volume, high quality gear manufacturer
  - Over 1000 skews
  - Target 1 to 50,000 pieces
  - Manufacture up to 500 mm, AGMA 12
- Industries supplied
  - Industrial, off-highway, agricultural, construction, automotive, military, aerospace, natural resources and ATV



## Engineering Design





# Gear Technology





# Transmission Assembly









**ODG**

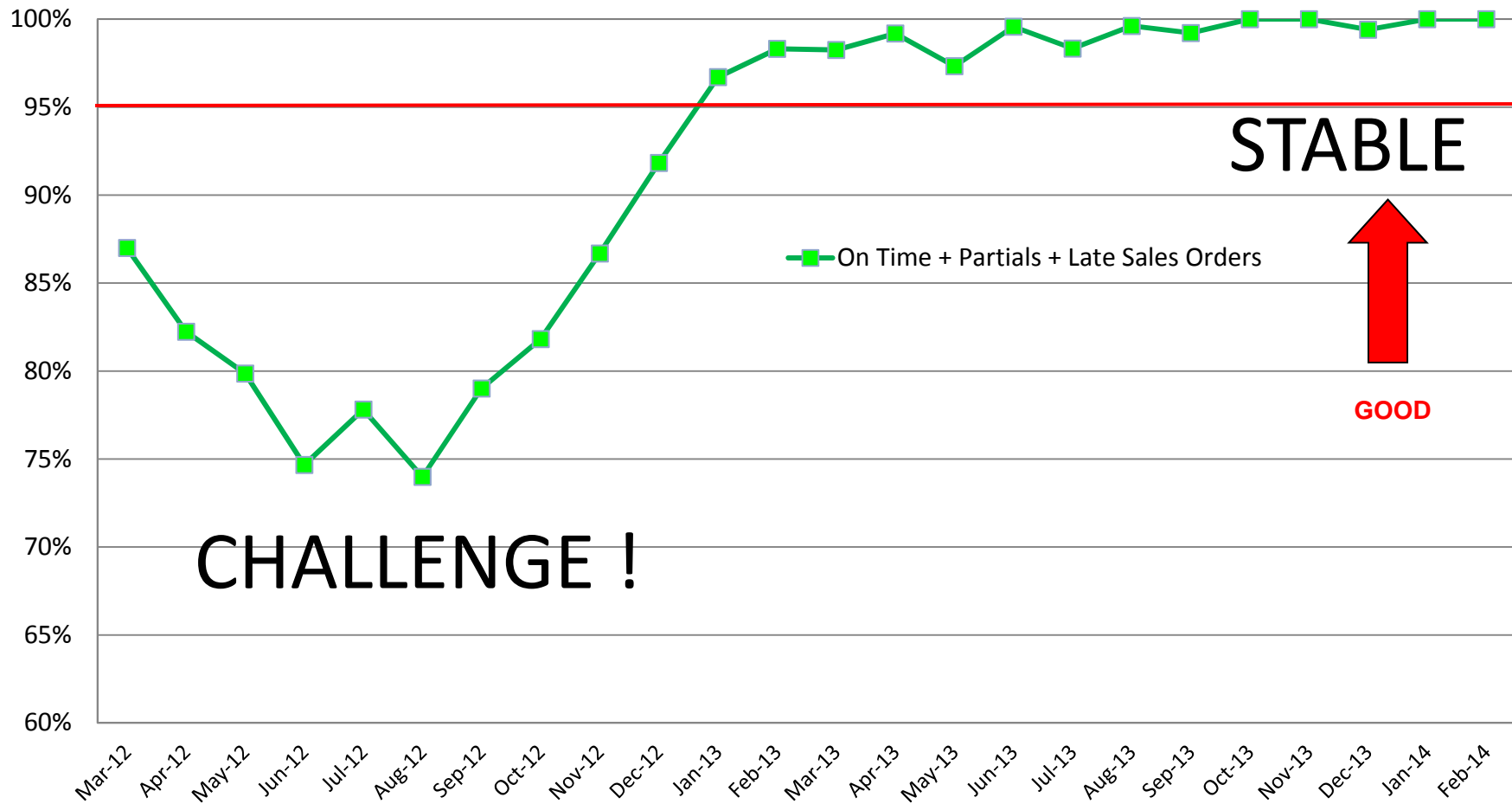
**Sales**

**GROWTH !**



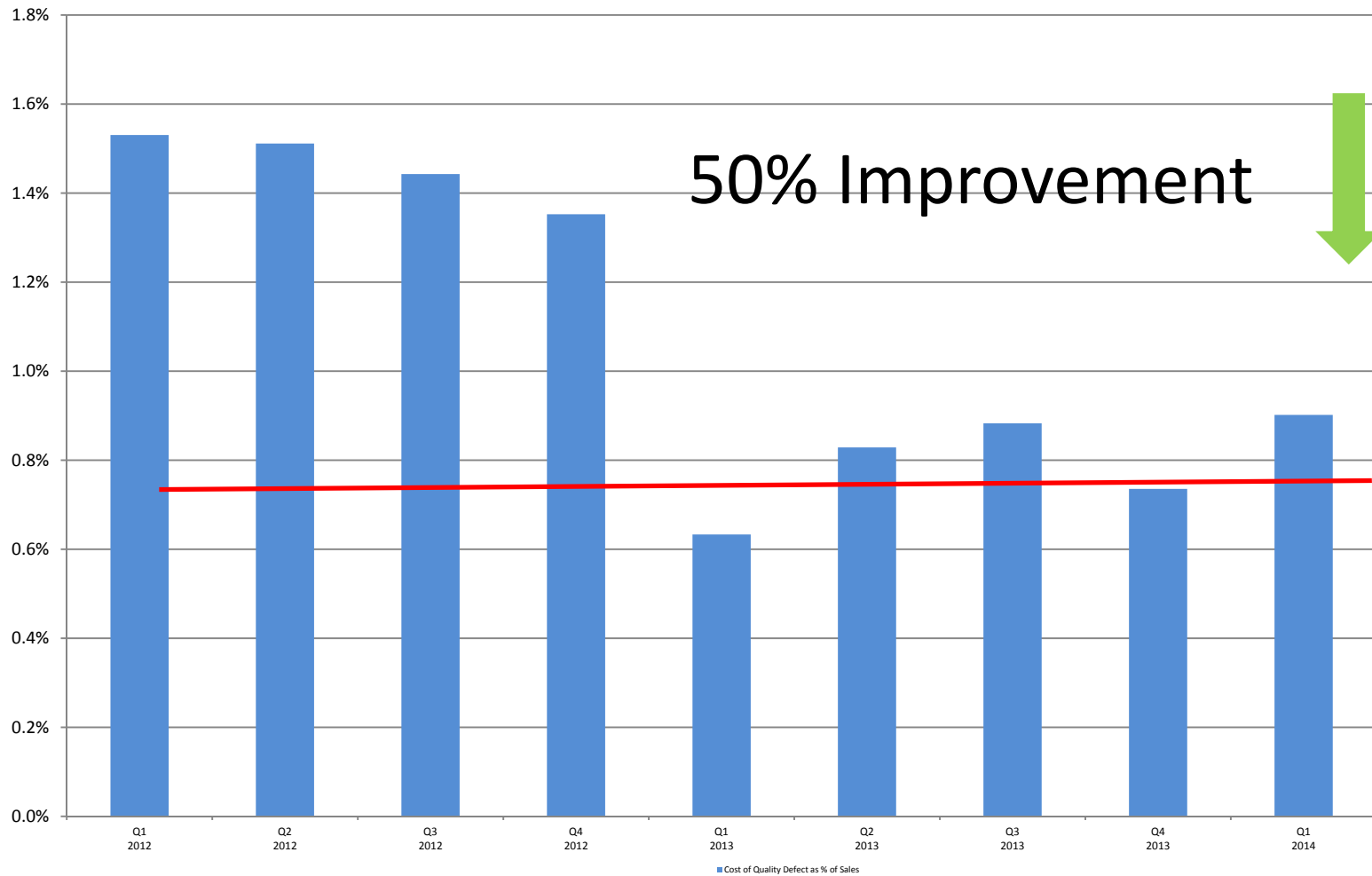


## On Time Delivery





Quality - % Cost of Sales





What was needed...

Stabilize Operations Process  
Using A3 and The Daily  
Management Process



# Focus on Foundational Elements...

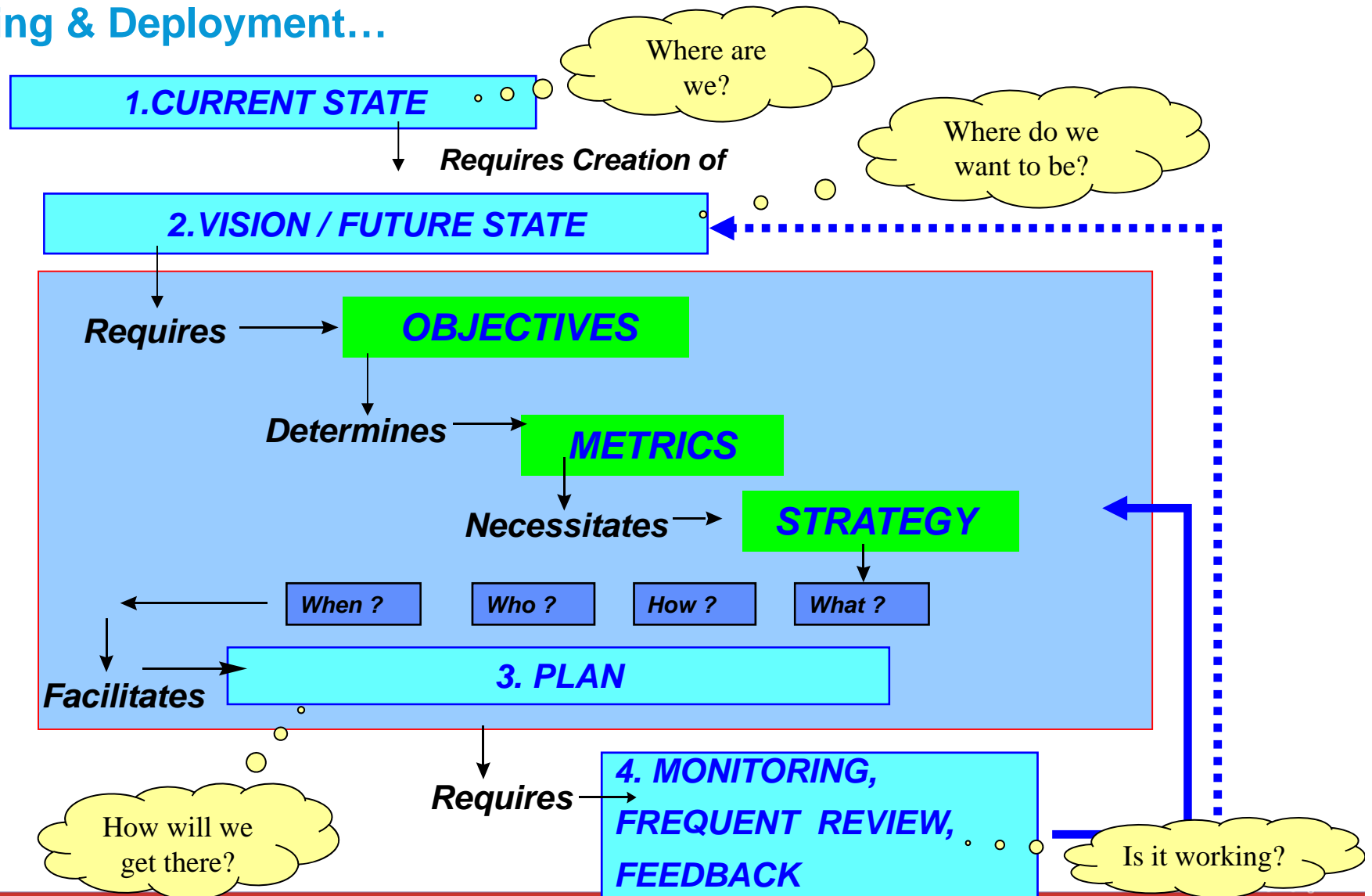
Consistency in:

- Machines
- Manpower
- Materials
- Methods

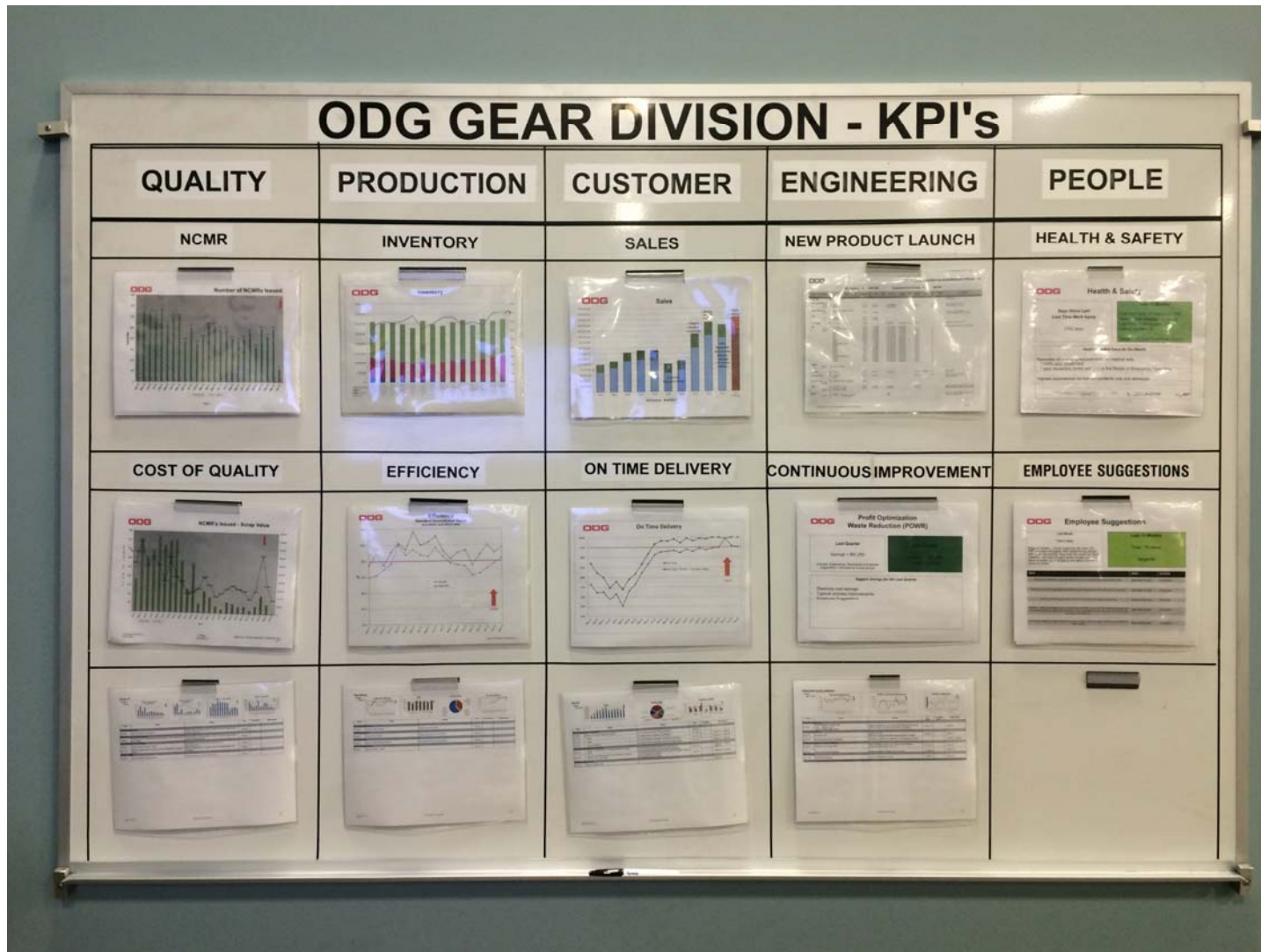


## MASTER PLAN

### Planning & Deployment...

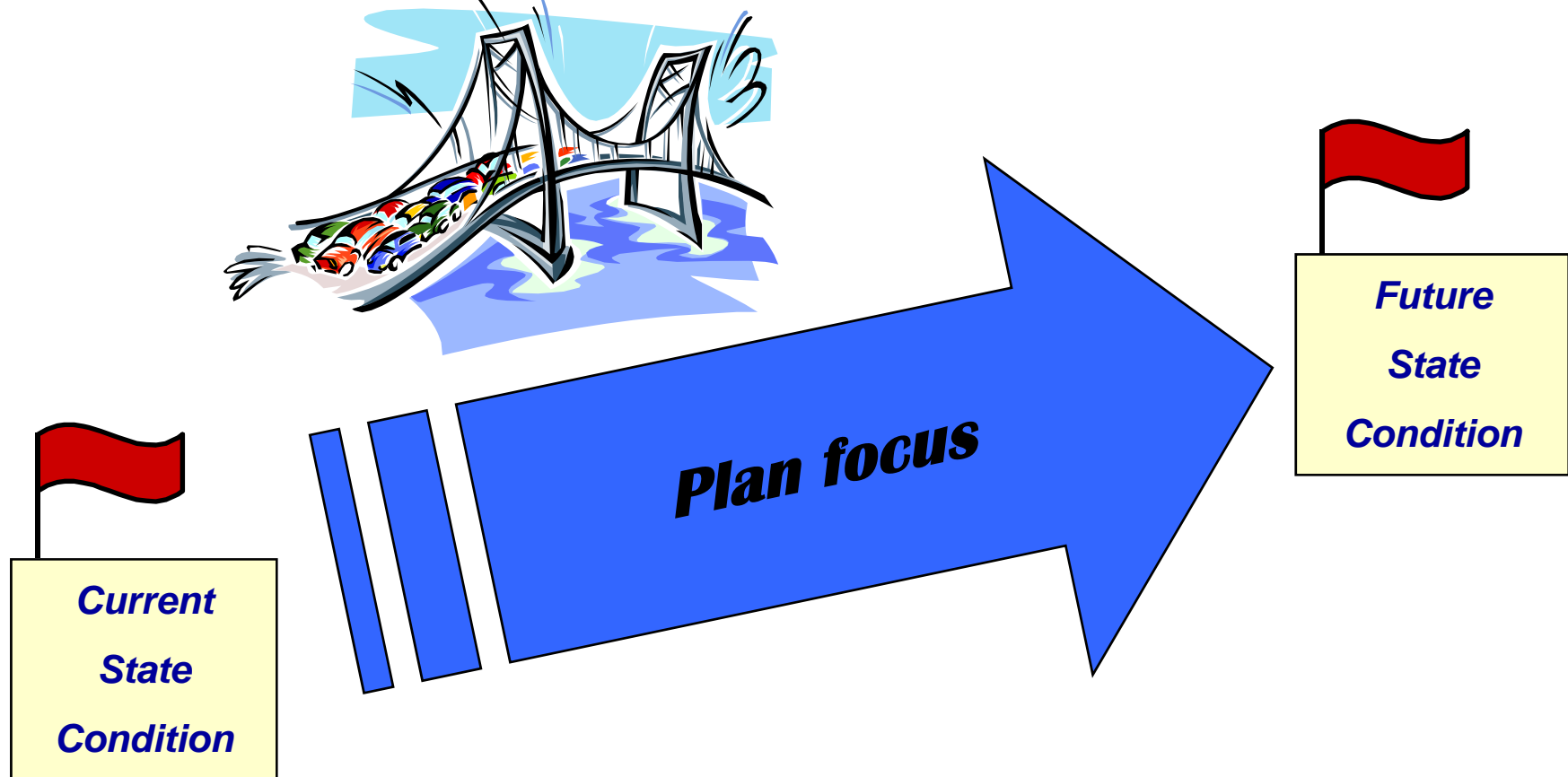








Where are we ?  
Where do we want to be..?





## Two main areas of focus..

- On Time Delivery
  - 75% > 100%
- Cost of Quality
  - 1.6% > 0.8%



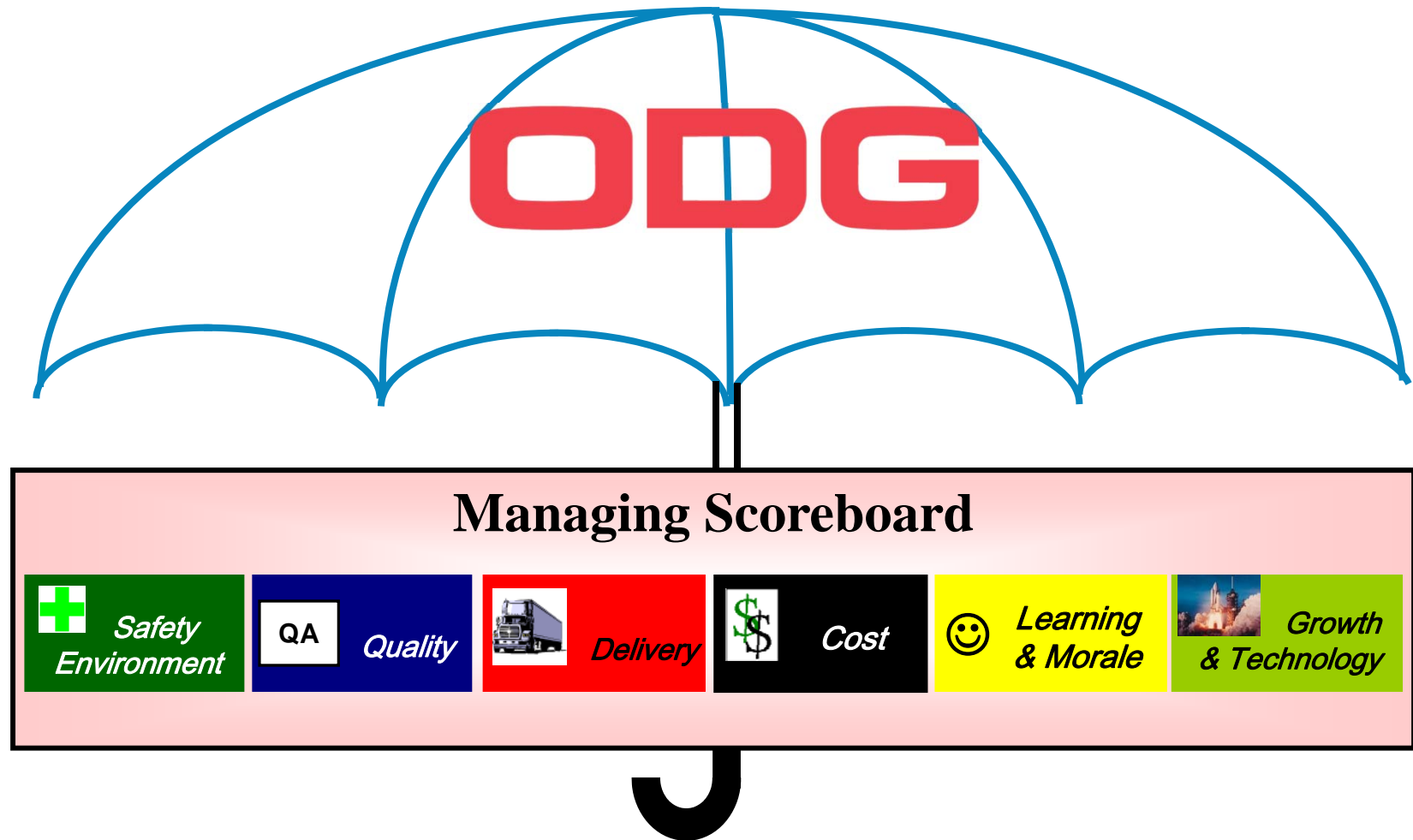
Team agreed on the strategies, timing and duration of activities, champions of the activities, milestones and review timing, and the target measurables.

A roadmap toward the vision.





...Protection



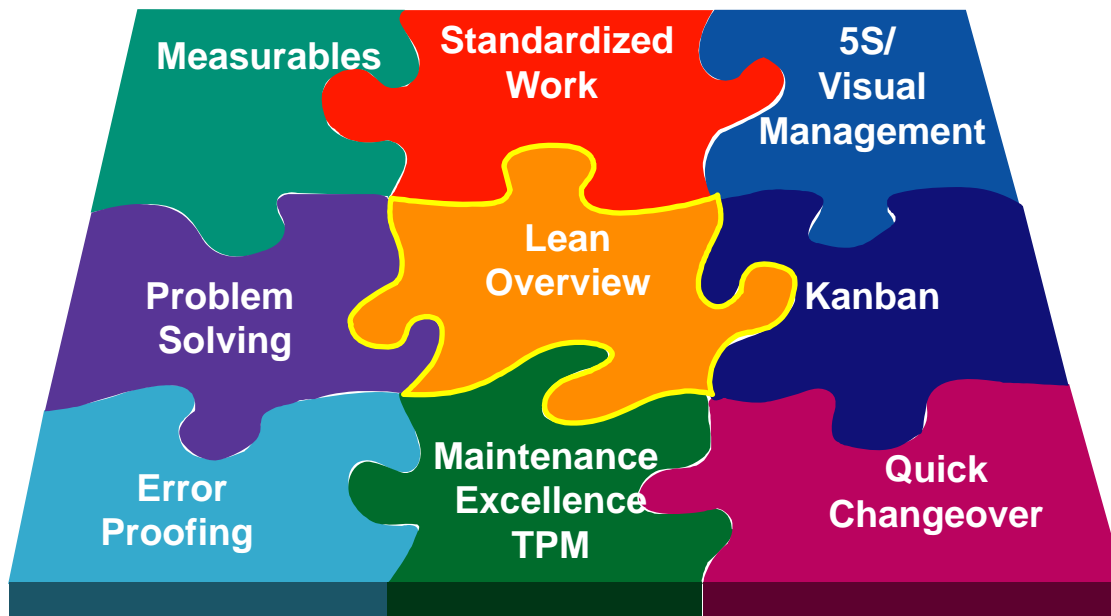


So...

*WHERE DO WE BEGIN?*

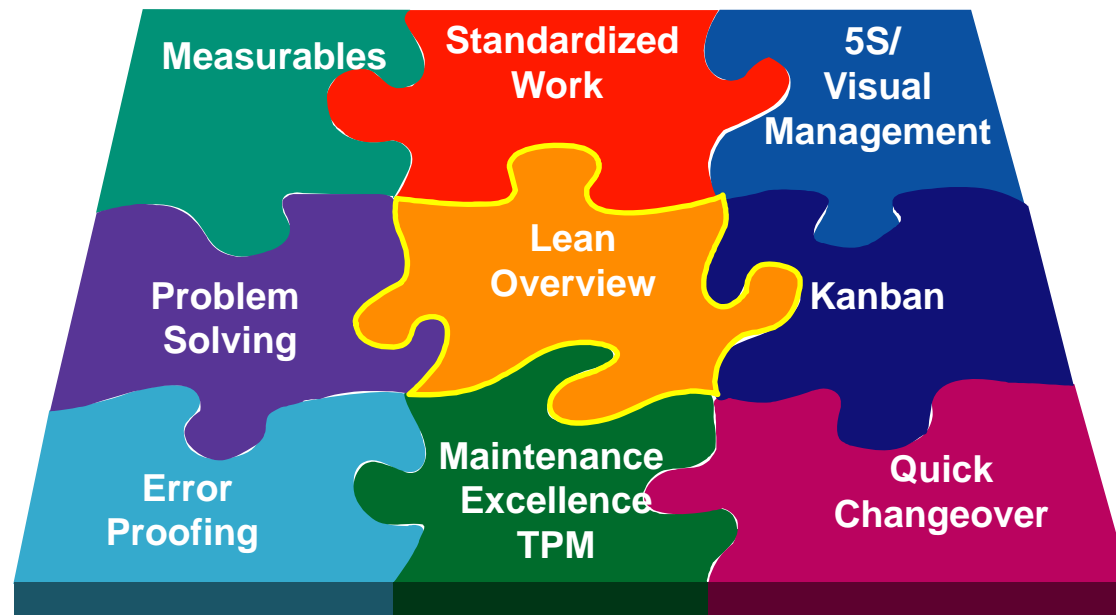


# *Operating System Daily Management Process*





## What is Lean?





**Training developed that defines principles  
and more importantly provides a clear  
understanding of Lean and the  
standardized tools necessary to execute  
Lean principles.**



- Formal Problem Solving process (A3)
- Clear understanding of our Systems
- Visual Management
- Drive and dedication
- Urgency and Accountability











### Specify Value

Understand and specify what adds value from the perspective of the customer

### Integrate the Value Stream

Identify steps in the whole value stream to highlight waste

### Make the Product Flow

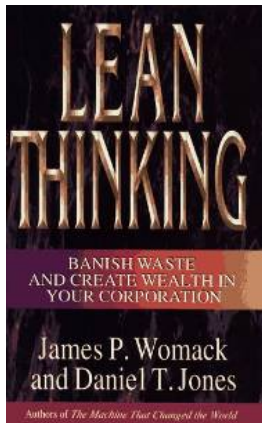
Create a continuous flow of activities along the value stream

### At the Pull of the Customer

Only carry out activities in response to pull from the customer

### In Pursuit of Perfection

Strive for perfection by continually creating value and removing successive layers of waste

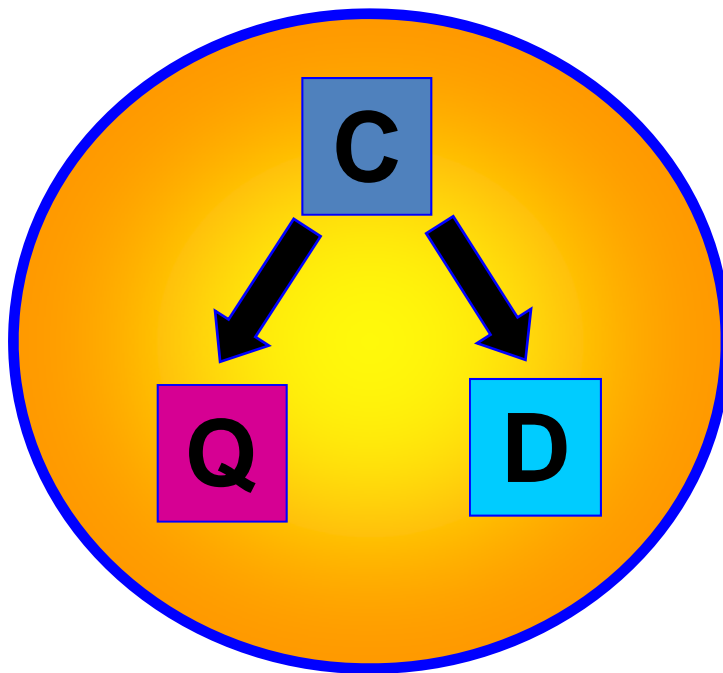




## Paradigms...

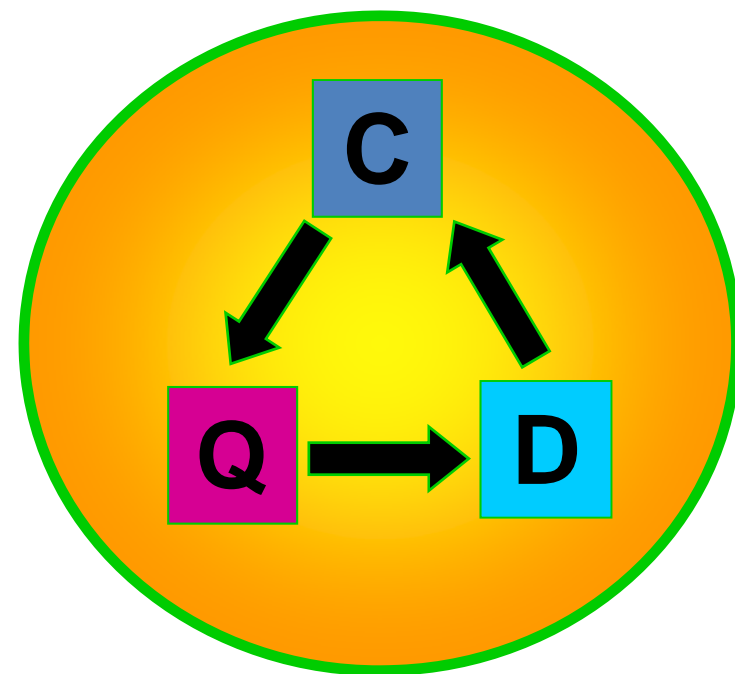
**Old Paradigm:**

**You Can Have 2 of 3**

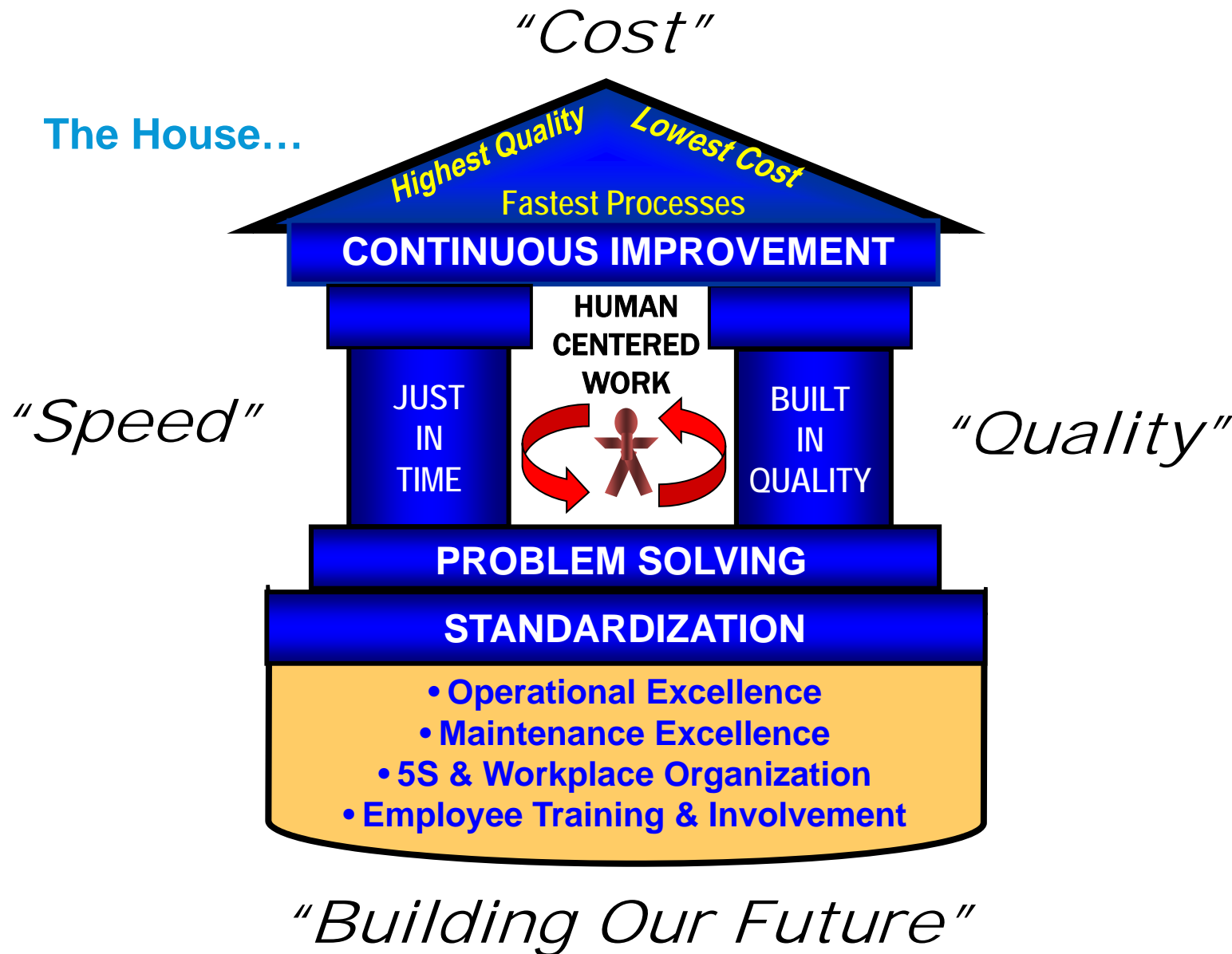


**New Paradigm:**

**Must Provide all 3**









Foundational Elements to our system  
and Lean Manufacturing emphasizing a  
sequenced application of tools.  
Without these foundations the house is  
unstable.

- Multi-skilled Operators
- Standardization
- 5S & Workplace Organization
- Visual Controls & Visual Management – 50 ft 15 secs.

**PROBLEM SOLVING**

**STANDARDIZATION**

- Operational Excellence
- Maintenance Excellence
- 5S & Workplace Organization
- Employee Training & Involvement

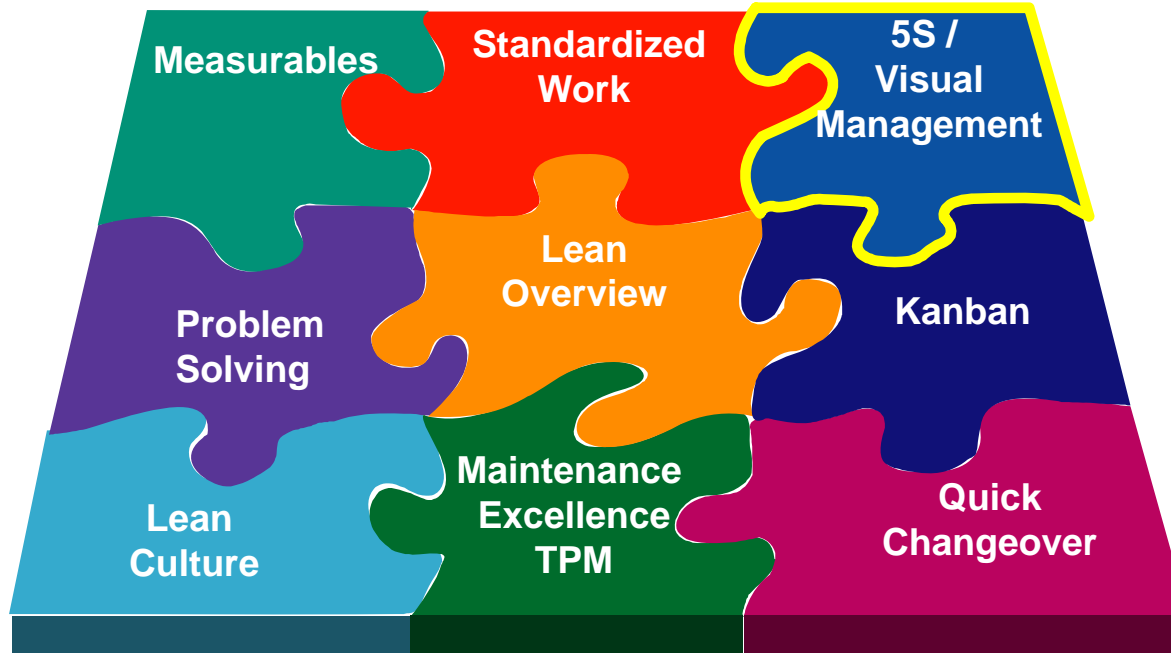
- A3 Problem Solving
- Six Sigma
- Reoccurrence Prevention

### Training

- Lean Camp, Basic Training
- Specific Training



# 5S/Visual Management...





## *5S Activities*

**BEFORE**





## *5S Activities*

**AFTER**

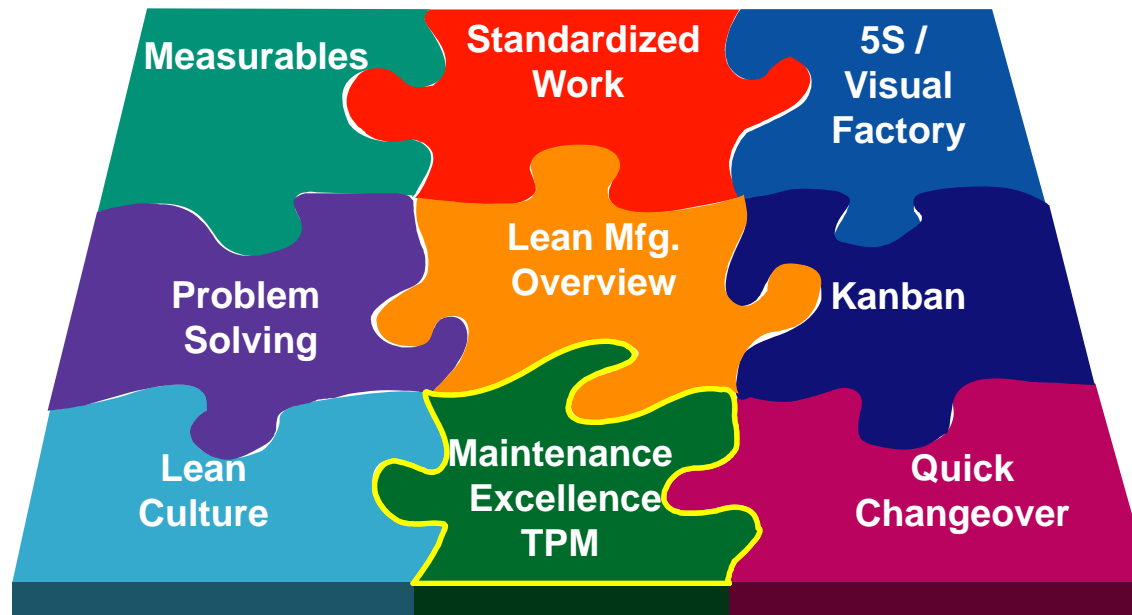








# Total Productive Maintenance and Maintenance Excellence...





## The House...

### Continuous Improvement

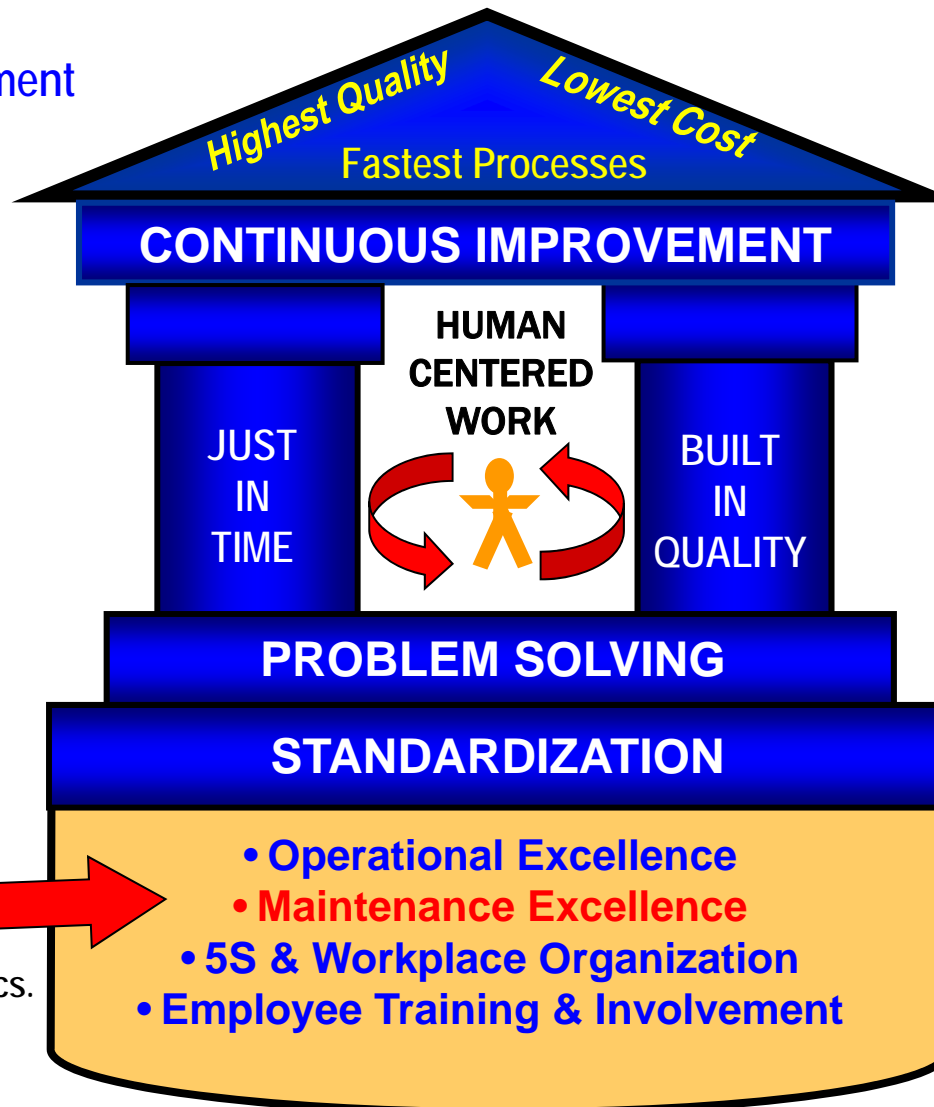
- PDCA
- Kaizen and Quick Change Over
- Elimination of Waste
- Measurables KPIs

### Just In Time

- Takt Time
- Level Production
- Pull System, Kanban
- Flow
- Multi-skilled Operators

### Standardization

- ETQ
- Standardized Work
- 5S & Workplace Organization
- Visual Controls & visual Management – 50 ft 15 secs.



### Human Centered Work

- Lean Culture
- Communication
- Support for the Value-Adder

### Lowest Cost

- Total Cost
- Price – Cost = Profit

### Built In Quality

- Quality Standards
- Error Proofing
- Andon
- MSA

### Problem Solving

- A3 Problem Solving
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## The House...

### Continuous Improvement

- PDCA
- Kaizen and Quick

Highest Quality

Lowest Cost

Fastest Processes

### Human Centered Work

- Lean Culture
- Communication

**Maintenance Excellence - another foundational element to our System and Lean Manufacturing emphasizing a Zero Tolerance, Zero Mileage condition.**

- Standardized Work
- 5S & Workplace Organization
- Visual Controls & visual Management – 50 ft 15 secs.

- Operational Excellence
- Maintenance Excellence
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- Employee Training & Involvement

- Six Sigma
- Reoccurrence Prevention

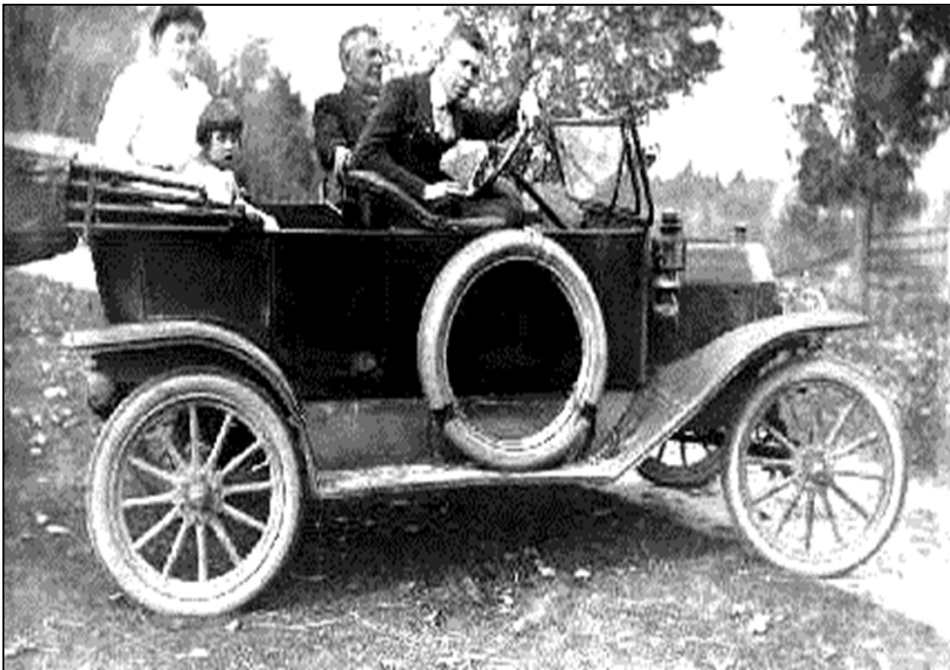
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# TPM Objectives...

The concept of “Zero Mileage Equipment”



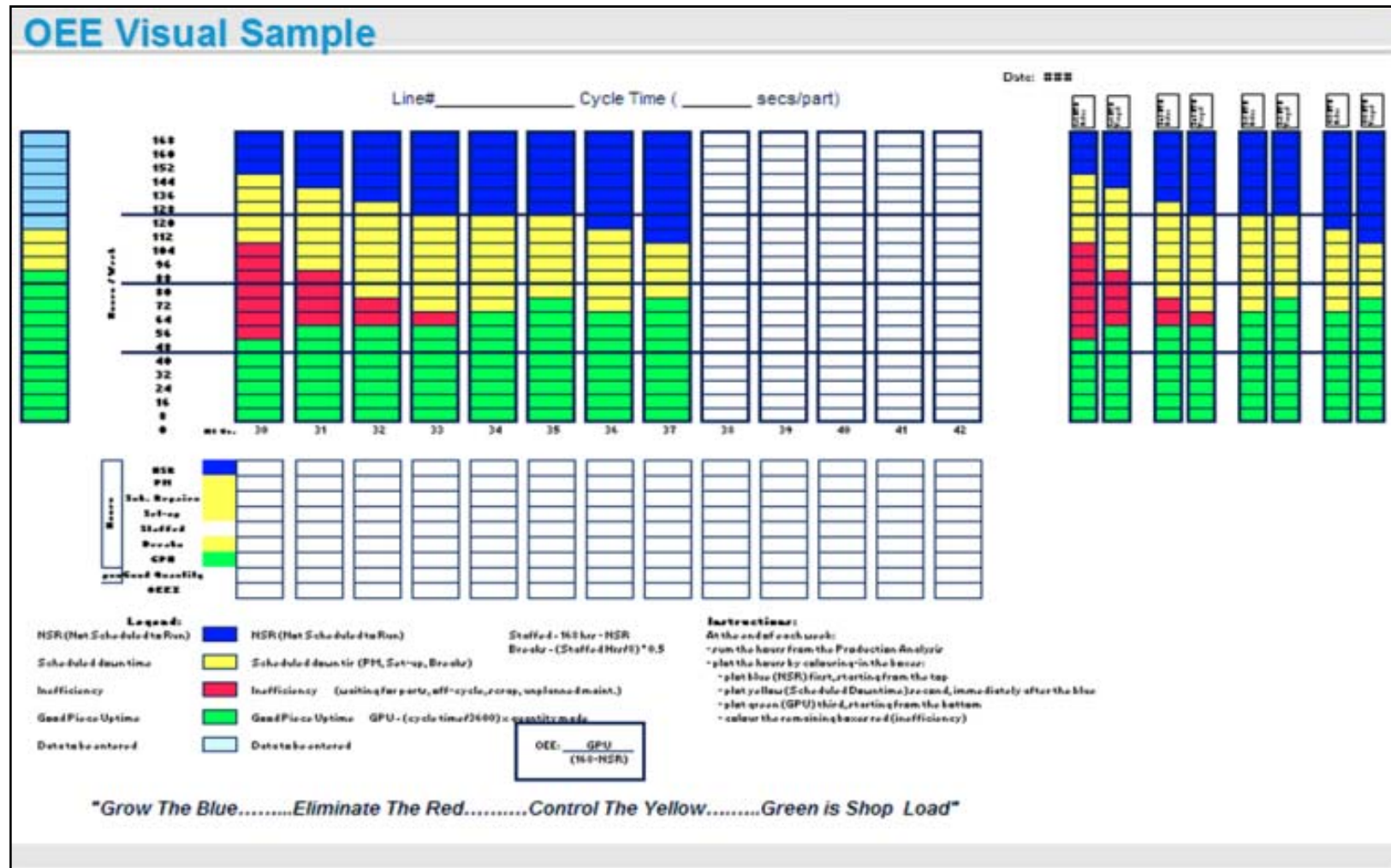


## How Do We Measure Maintenance & TPM?


- OEE (Overall Equipment Effectiveness)
- % Planned vs. Unplanned maintenance
- Repeat failures
- MTBF (Mean Time Between Failure)
- MTTR (Mean Time To Repair)



## Visual OEE







**WC70**  
**LIEBHERR**

**MC-483**  
**L2**

● GOOD RUN
 ● U/S DOWN

● SETUP
 ● IDLE

DATE <u>Sept 6</u>			DATE <u>Sept 5</u>		
TIME	STATUS	PC/HR	TIME	STATUS	PC/HR
6 - 7 AM	<span style="color: green;">—</span>		6 - 7 AM	<span style="color: green;">—</span>	
7 - 8 AM	<span style="color: green;">—</span>		7 - 8 AM	<span style="color: green;">—</span>	
8 - 9 AM	<span style="color: green;">—</span>		8 - 9 AM	<span style="color: green;">—</span>	
9 - 10 AM	<span style="color: green;">—</span>		9 - 10 AM	<span style="color: green;">—</span>	
10 - 11 AM	<span style="color: green;">—</span>		10 - 11 AM	<span style="color: green;">—</span>	
11 - 12 PM	<span style="color: green;">—</span>		11 - 12 PM	<span style="color: green;">—</span>	
12 - 1 PM			12 - 1 PM	<span style="color: green;">—</span>	
1 - 2 PM			1 - 2 PM	<span style="color: green;">—</span>	
2 - 3 PM			2 - 3 PM	<span style="color: green;">—</span>	
3 - 4 PM			3 - 4 PM	<span style="color: green;">—</span>	
4 - 5 PM			4 - 5 PM	<span style="color: green;">—</span>	
5 - 6 PM			5 - 6 PM	<span style="color: green;">—</span>	
6 - 7 PM			6 - 7 PM	<span style="color: green;">—</span>	
7 - 8 PM			7 - 8 PM	<span style="color: green;">—</span>	
8 - 9 PM			8 - 9 PM	<span style="color: green;">—</span>	
9 - 10 PM			9 - 10 PM	<span style="color: green;">—</span>	
10 - 11 PM			10 - 11 PM	<span style="color: green;">—</span>	
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12 - 1 AM			12 - 1 AM	<span style="color: green;">—</span>	
1 - 2 AM			1 - 2 AM		
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4 - 5 AM			4 - 5 AM		
5 - 6 AM			5 - 6 AM		

PART# 34-201 FINISH TIME: \_\_\_\_\_

JOB# 19393 STD PPH: \_\_\_\_\_

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PART# 12-103 PRATO STD PPH: \_\_\_\_\_

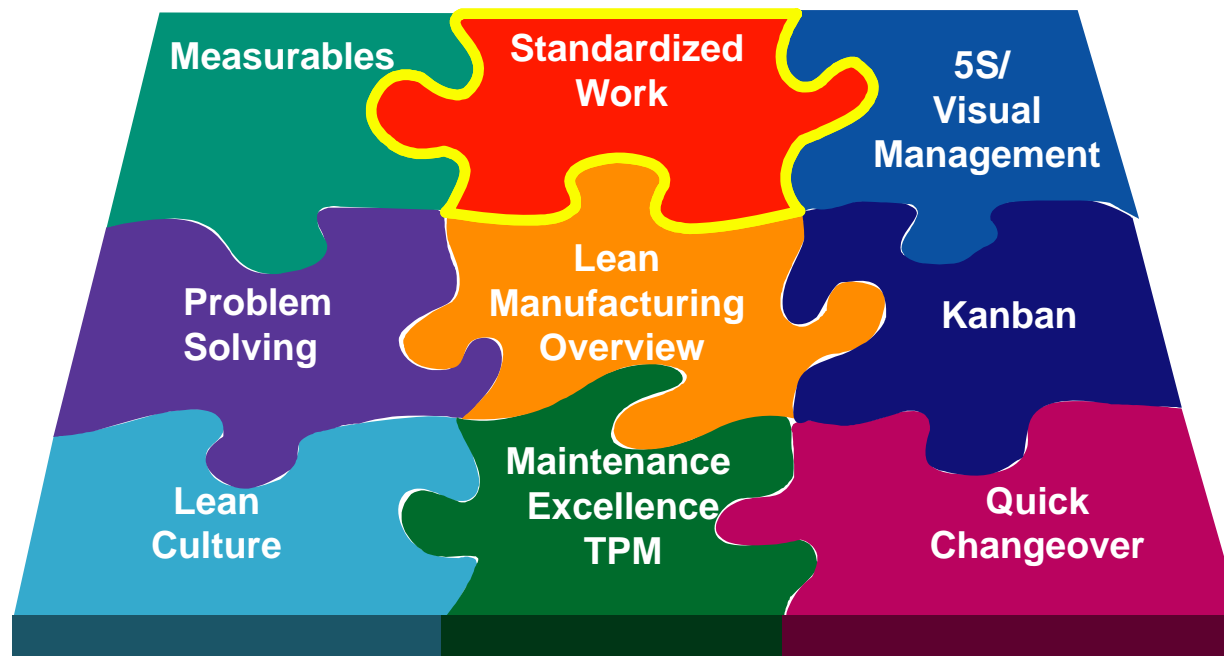
JOB# \_\_\_\_\_ FINISH TIME: Sept 6

CURRENT JOB

RECORD  
 1. DATE  
 2. TIME  
 3. PART  
 4. JOB  
 5. FINISH TIME  
 6. STD PPH  
 7. CURRENT JOB



# STANDARDIZATION





## The House...

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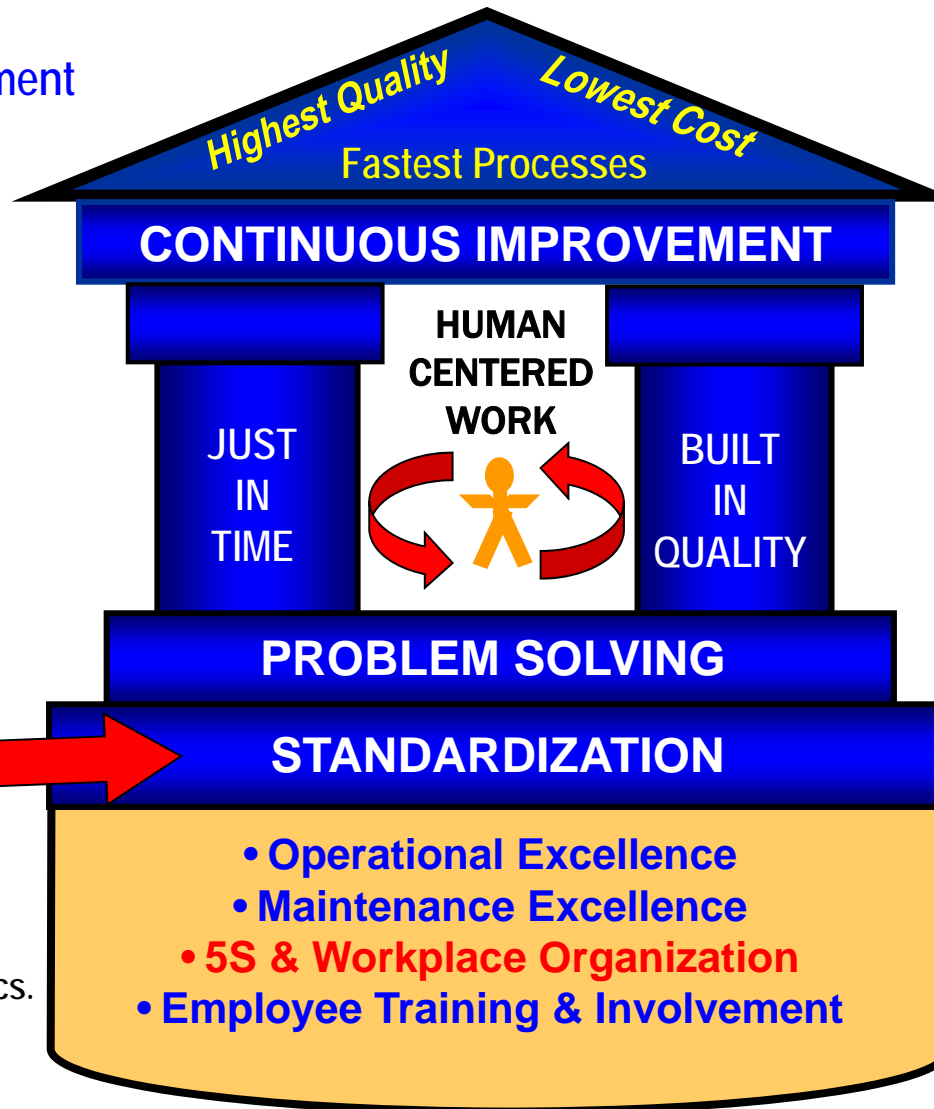
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# Standardization - another foundational element of our Lean Manufacturing System emphasizing a consistent result, making the abnormal stand out from the normal

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# What Does It Look Like?

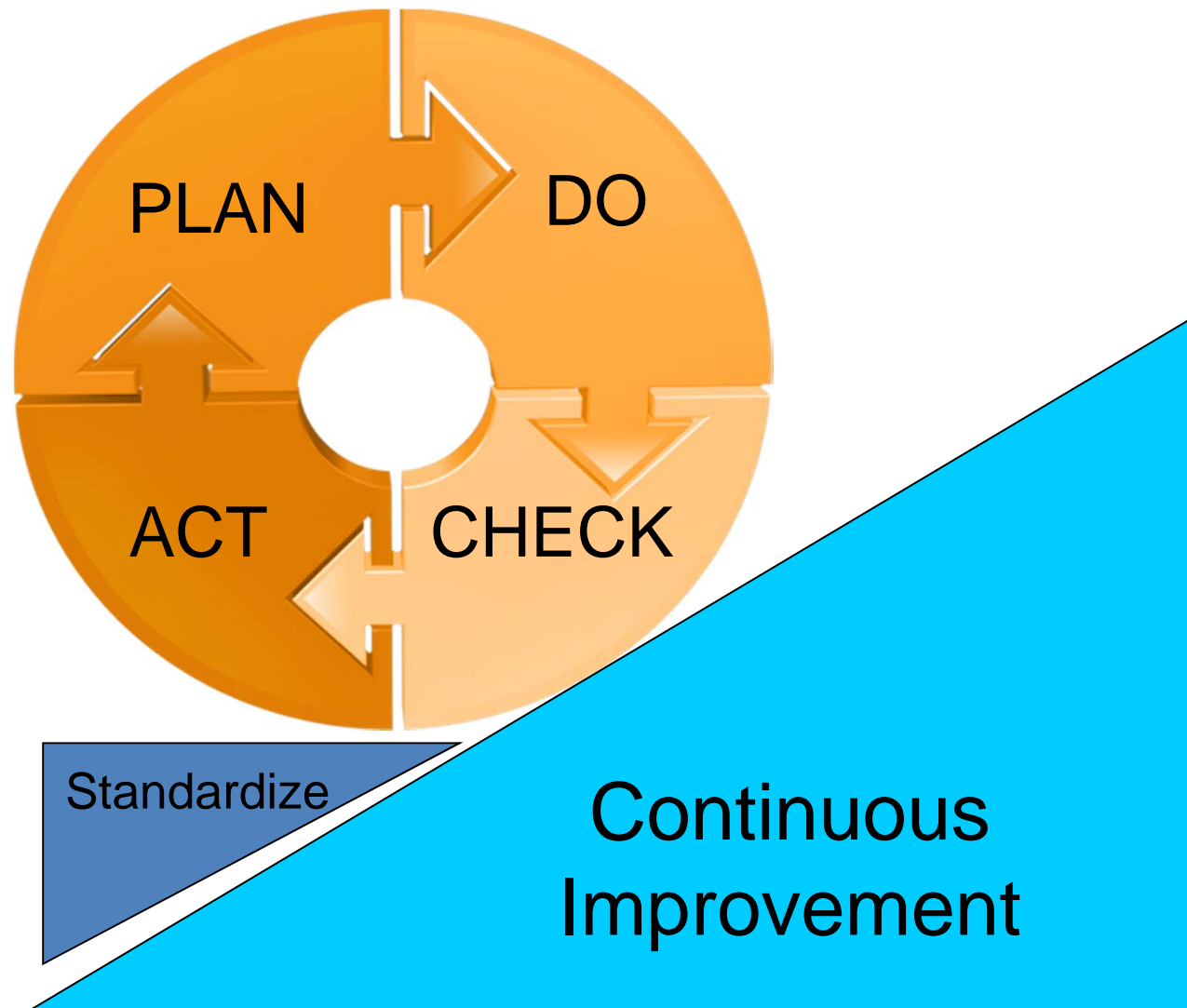
## Traditional Work:

- Manage symptoms
- React to fires
- Search for things
- Engineers design processes
- Use a variety of individual methods
- Inconsistent results

## Standardized Work:

- Eliminate root cause
- Prevent problems
- Find things easily
- Processes designed by operator consensus
- Follow and improve the standard tool
- Consistent results







## Benefits of Standardization...

- Quicker identification of problems
- Provides baseline from which to improve



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## House...

The tools...

### Continuous Improvement

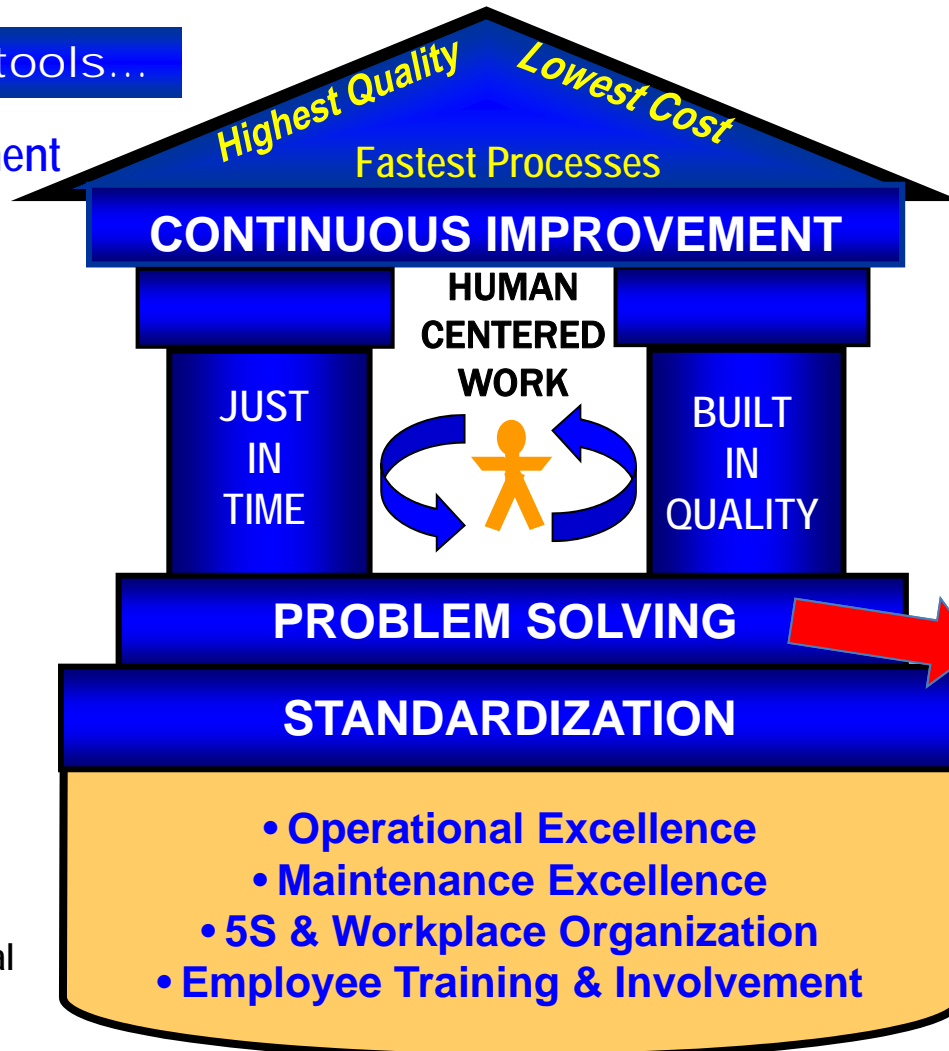
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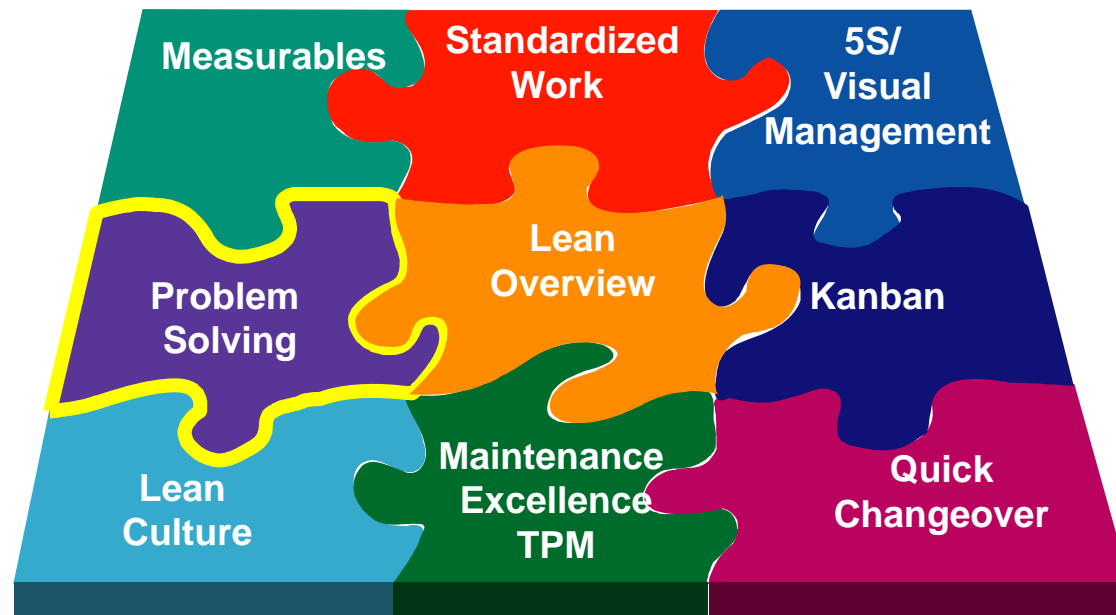
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*"Building Our Future"*



# PROBLEM SOLVING





## Problem Solving...

The key to elimination of firefighting!

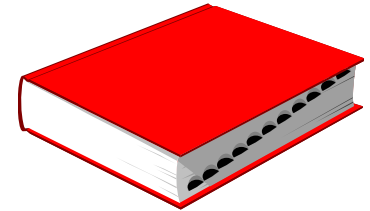




# Defining a Problem...

Problems:

- Are abnormalities that vary from the desired or expected condition
- Are **OPPORTUNITIES**



We must utilize a structured method to determine the quickest, most cost effective way to ensure the root cause of a problem is:

- Identified
- Addressed
- Permanently eliminated



# *A3 PROBLEM SOLVING*





- Formal Problem Solving process
- Drive and dedication
- Urgency and Accountability
- The classification of problems / opportunities
- The 8 steps of problem solving



## The House...

### Continuous Improvement

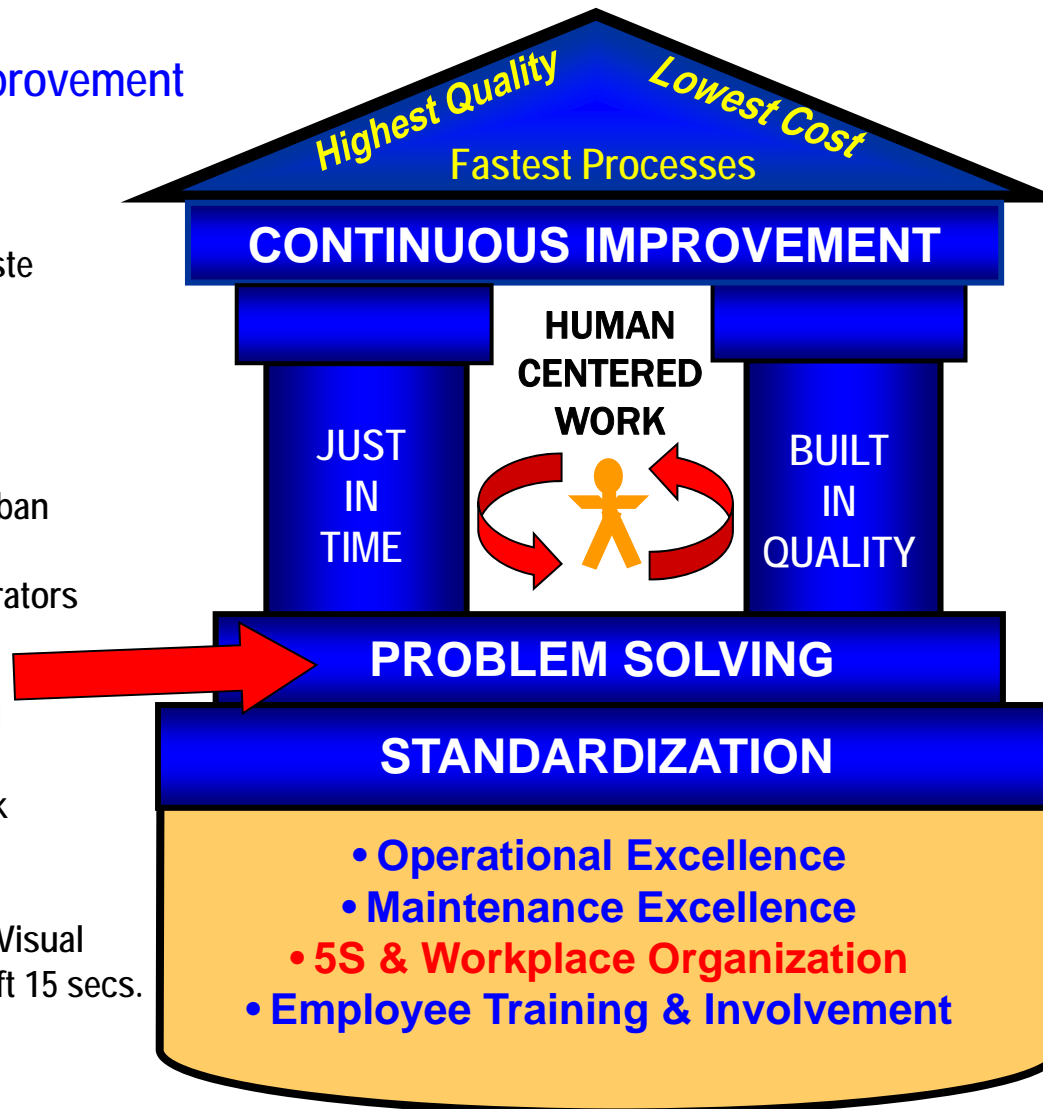
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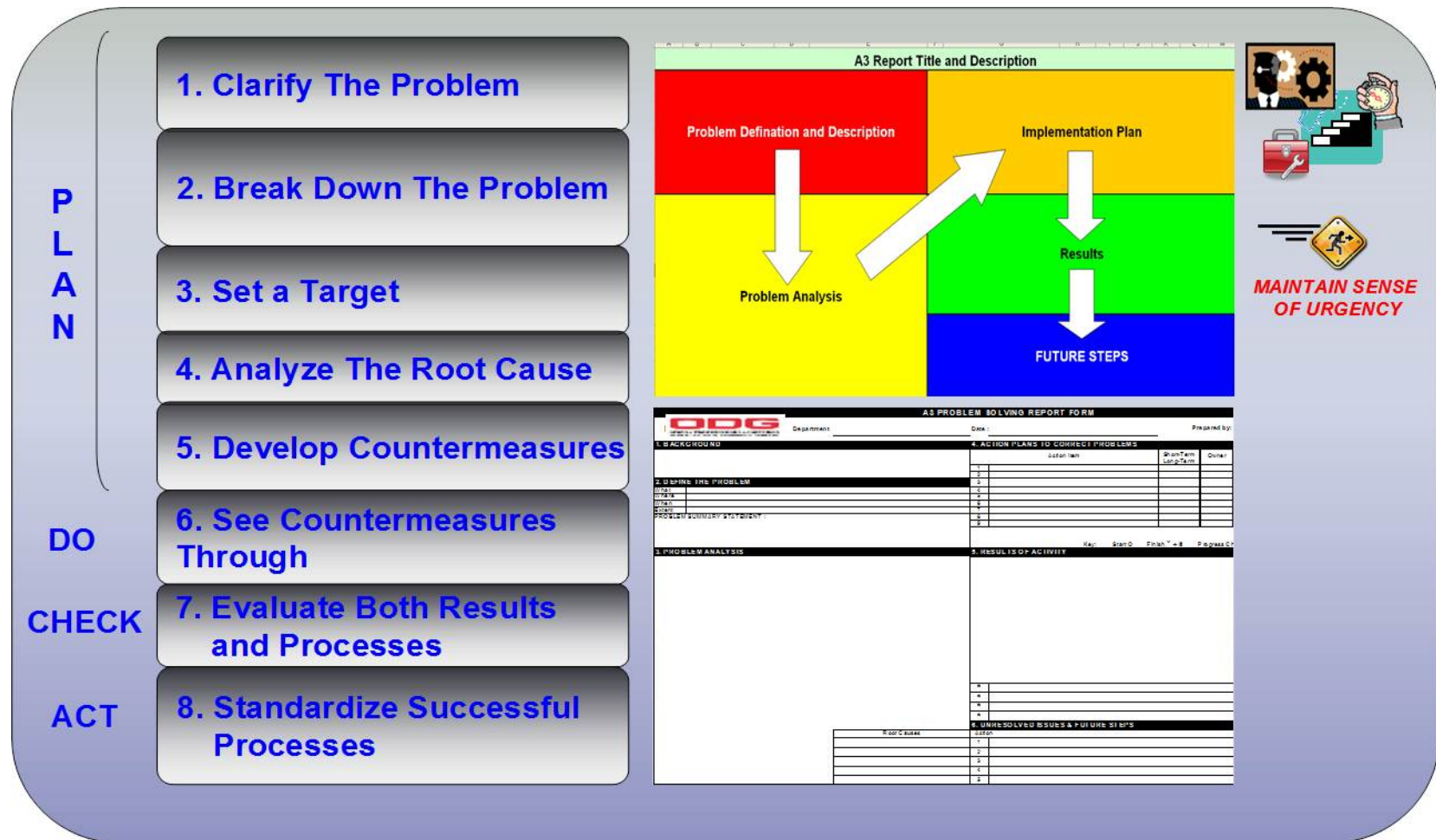
The House...

**Problem Solving - another foundational element to our System and Lean Manufacturing emphasizing a systematic elimination of problems and abnormalities**



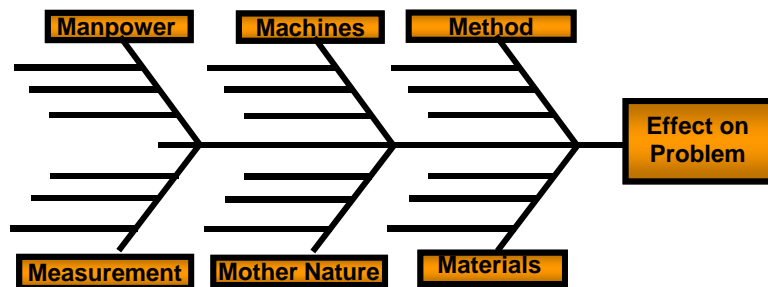


## *The 8 Steps for A3- PDCA Problem Solving*



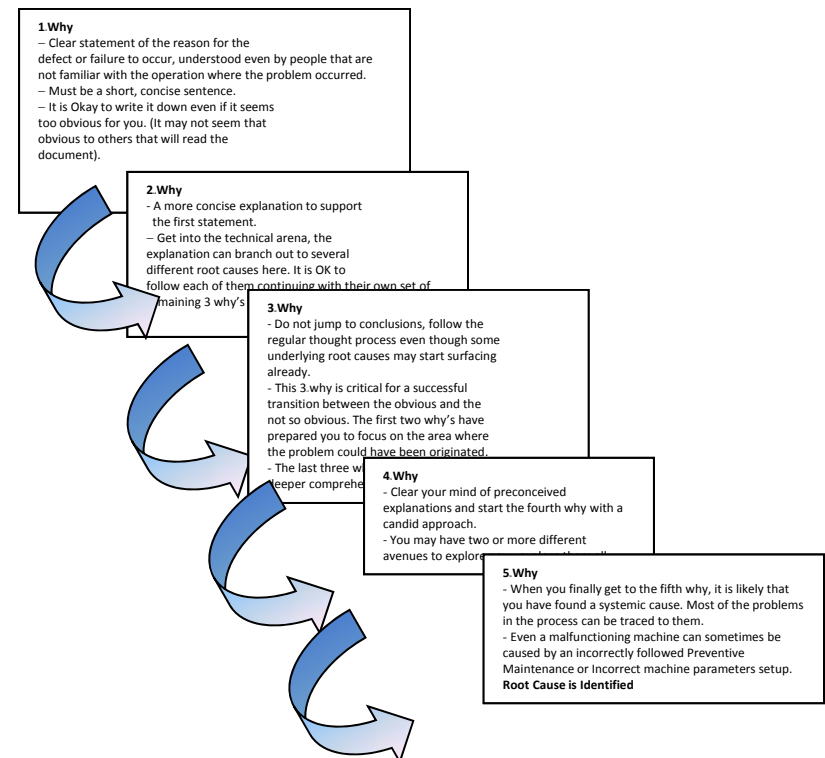


## CAUSE AND EFFECT DIAGRAM (Also known as fishbone diagram)



## 5 WHY – ROOT CAUSE ANALYSIS

**"By repeatedly asking "Why" (five is a good rule of thumb), you can peel away the layers of symptoms which can lead to the root cause of a problem."**





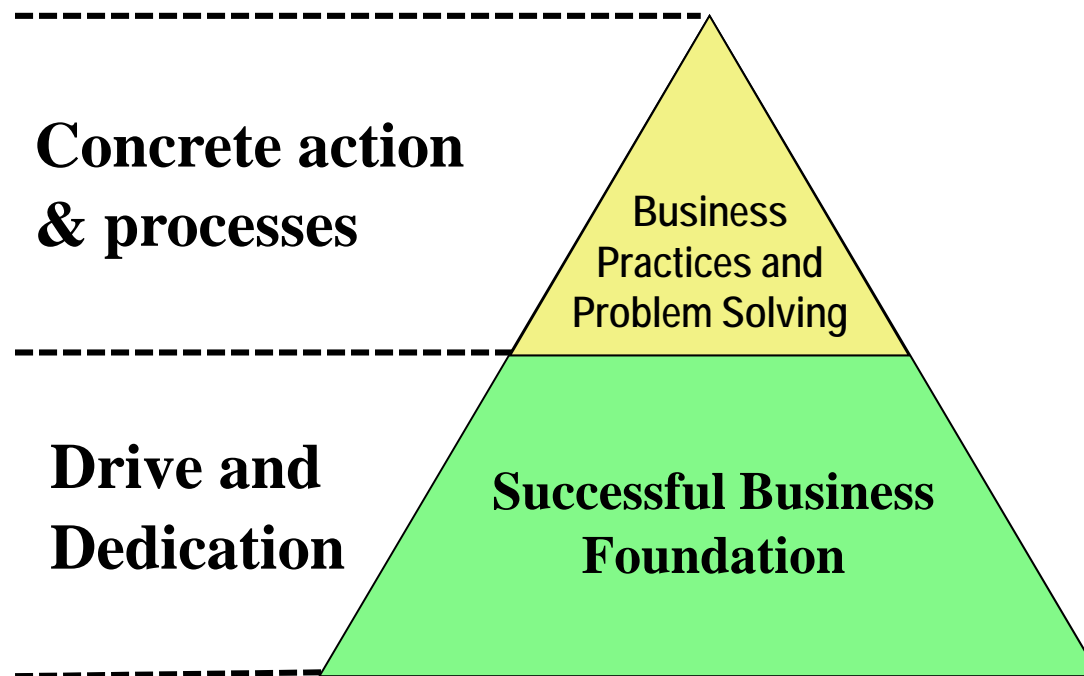
- To bring ownership to the team /team member
- To bring an emphasis on finding the “right “ problem, with the “right” data
- To emphasize the “right” countermeasure
- To **eliminate, not “manage”, the problem**



1. The critical thinking behind problem solving
2. Formal resolution
3. Making problem solving stick







For many successful companies, drive and dedication underscore the way they do business. Their business practices and problem solving methods are the concrete actions and processes that make their business successful.



- The goals of problem solving:
  - To emphasize the “right” countermeasure
- Once you’ve found the “right” problem, you need to find the correct countermeasure.
- With practice, this will be easy!



# MRP

## Work to do list

Before

Past due!



## MRP - Live

After





Industrial Sales Orders Due by 4/14/14

server.odg.com/IndustrialSalesOrdersDue.php

Sales Order	Status	Customer	Stock Code	BF	Description	Order	To Ship	B.O.	On Hand	LSkip Date	Cost Req Date	DI	Plan Comp Date	Notes	Red Floor
083247	4	RAYMOGR	401-066		PINION, MOTOR 16T RDP (S)	30	30	0	0	2014-04-17	2014-04-17	0	2014-04-18	WC20-1,WC70-2,INSP,STORE	
083381	4	RAYMOGR	1014726		GEAR 30T 12DP 1.1044 ID HT (S)	120	120	0	2	2014-04-17	2014-04-17	0	2014-05-11	STORE	
083382	4	RAYMOGR	1154670		PINION - HELICAL, 21T 12 DP (M)	144	144	0	0	2014-04-17	2014-04-17	0	2014-05-10	INSP,STORE	
083596	4	TRACKLE	2274-105		TRACKLESS YOKE, ASM (S)	25	25	0	0	2014-04-17	2014-04-17	0	2014-04-14	INSP,WC31,INSP,STORE	
083832	4	VOLVOBR	12741362		GEARBOX ASM - ALL WD (M)	4	4	0	4	2014-04-17	2014-04-17	0			
081721	1	ROTZLER	218-011		ROTZLER BRAKE PISTON (M)	300	300	0	0	2014-04-21	2014-04-21	0	2014-04-18	WC43-2,INSP,STORE	
083110	3	VIRTUCO	CC05-305		C-COM-PINION, DBL-D,1HT,16DP (M)	25	25	0	1	2014-04-21	2014-04-21	0	2014-04-17	WC71-2,INSP,STORE	
084424	1	MACNAM	48039		MAGNA PLANETARY ASSEMBLY (M)	720	720	0	792	2014-04-21	2014-04-21	0	2014-04-16	ASMDPT,INSP 04/11 QTY 330	
082651	1	RAYMOGR	1077486		GEAR, HELICAL - 9TT 16DP LH (S)	150	150	0	166	2014-04-22	2014-04-22	0			
082778	1	RAYMOGR	1077486		GEAR, HELICAL - 9TT 16DP LH (S)	26	0	26	166	2014-04-22	2014-04-22	0			
083007	1	RAYMOGR	1173064		SHAFT, AXLE - 7 HOLE (S)	180	180	0	255	2014-04-22	2014-04-22	0	2014-05-08	INSP,WC25-2,INSP,STORE	
083281	1	RAYMOGR	1173064		SHAFT, AXLE - 7 HOLE (S)	90	90	0	255	2014-04-22	2014-04-22	0	2014-05-08	INSP,WC25-2,INSP,STORE	
083332	1	ROTZLER	220-001		ROTZLER BASE, FINAL - TH2 (M)	100	100	0	790	2014-04-22	2014-04-22	0	1969-12-31	STORE	
083333	1	ROTZLER	210-001		ROTZLER BASE, FINAL - TH1 (M)	100	100	0	0	2014-04-22	2014-04-22	0	2014-04-22	WC22,WC43-2,WC62,INSP,STORE	
083512	1	RAYMOGR	410-029-06		GEAR, HELICAL - 72T 12DP LH (S)	120	120	0	0	2014-04-22	2014-04-22	0			
083516	1	RAYMOGR	1016477		GEAR 30T 12DP 1.0015 ID HT (S)	24	24	0	17	2014-04-22	2014-04-22	0	2014-04-30	WC42,WC71-1,INSP,CHT,INSP,WC26,INSP,STORE	
084155	1	ROTZLER	210-007		ROTZLER GEAR, SUN - TH1 18T (S)	200	200	0	0	2014-04-22	2014-04-22	0	2014-04-30	WC71-2,INSP,CHT,INSP,WC64,INSP,STORE	
084640	1	VOLVOBR	12741362		GEARBOX ASM - ALL WD (M)	8	8	0	4	2014-04-22	2014-04-22	0			
084054	1	TIGERCA	G1885000	P	TIGERCAT - GEAR BOX HI DRIVE (K)	4	4	0	0	2014-04-23	2014-04-23	0			
084812	1	TIGERCA	G1473000	P	TIGERCAT - 2.18 GEAR RATIO KIT (K)	6	6	0	0	2014-04-23	2014-04-23	0			
084812	1	TIGERCA	419028	C	TIGERCAT-PINION, SPUR - 11T (S)	12	12	0	20	2014-04-23	2014-04-23	0	2014-05-15	INSP,WC25-1,WC11,WC70-2,INSP,STORE	
084891	1	TIGERCA	G1474000	P	TIGERCAT - 2.53 GEAR RATIO KIT (K)	6	6	0	0	2014-04-23	2014-04-23	0			
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084893	1	TIGERCA	G1441000	P	TIGERCAT-GEARBOX KIT (K)	2	2	0	0	2014-04-23	2014-04-23	0			
084893	1	TIGERCA	369008	C	TIGERCAT-CARRIER, BEARING - L (M)	2	2	0	2	2014-04-23			1969-12-31	STORE	
084893	1	TIGERCA	369018	C	TIGERCAT-CARRIER, BEARING - R (M)	2	2	0	0	2014-04-23			1969-12-31	STORE	
084893	1	TIGERCA	381408	C	TIGERCAT-SHAFT, SHIFTING (M)	2	2	0	9	2014-04-23			2014-04-16	WC41,INSP,STORE	
084893	1	TIGERCA	7083A	C	TIGERCAT-WASHER, THRUST (S)	2	2	0	14	2014-04-23			2014-04-19	CHT,INSP,WC30,INSP,STORE ht due 4/14	
084894	1	TIGERCA	G1441000	P	TIGERCAT-GEARBOX KIT (K)	2	2	0	0	2014-04-23	2014-04-23	0			



Sales Order	Status	Customer	StockCode	RF	Description	Order	To Ship	B.O.	On Hand	LShipDate	CustReqDate	DL	PlanCompDate	Notes	Red Floor
083247	4	RAYMOGR	401-068	✓	PINION, MOTOR-16T SDP (S)	30	30	0	0	2014-04-17	2014-04-17	0	2014-04-18	WC20-1,WC70-2,INSP_STORE	
083381	4	RAYMOGR	1014726	✓	GEAR, KIT 12DP-1, 1044 ID HT (S)	120	120	0	2	2014-04-17	2014-04-17	0	2014-05-11	STORE	
083382	4	RAYMOGR	1154670	✓	PINION - HELICAL, 21T 12 DP (M)	144	144	0	9	2014-04-17	2014-04-17	0	2014-05-10	INSP_STORE	
083596	4	TRACKLE	2274-105	✓	TRACKLESS-YOKE, ASM (S)	25	25	0	0	2014-04-17	2014-04-17	0	2014-04-14	INSP,WC51,INSP_STORE	
083832	4	VOLVOBK	12741362	✓	GEARBOX ASM - ALL WD (M)	4	4	0	1	2014-04-17	2014-04-17	0		WC41-2,INSP_STORE	
081721	1	ROTZLER	210-011		Incomplete Jobs for 41902B										
083110	3	VIRTUCCO	CC05-305											WC71-2,INSP_STORE	
084424	1	MAGNAM	48039	✓										ASSEMBLY,INSP 04/11 QTY: 330	
082651	1	RAYMOGR	1077486												
082778	3	RAYMOUS	1077486												
083907	1	RAYMOGR	1173964	✓										INSP,WC25-2,INSP_STORE	
083281	1	RAYMOUS	1173964	✓										INSP,WC25-2,INSP_STORE	
083332	1	ROTZLER	220-001											STORE	
083333	1	ROTZLER	210-001											WC22,WC43-2,WC62,INSP_STORE	
083512	1	RAYMOGR	410-029-06											WC42,WC71-1,INSP,CHT,INSP,WC36,INSP_STORE	
083516	1	RAYMOGR	1016477											WC71-2,INSP,CHT,INSP,WC64,INSP_STORE	
084155	1	ROTZLER	210-007												
084640	1	VOLVOBK	12741362	✓											
084054	1	TIGERCA	G1885000												
084812	1	TIGERCA	G1473000												
084812	1	TIGERCA	41902B	✓	C TIGERCAT-PINION, SPUR - 33T (S)	12	12	0	20	2014-04-23	2014-04-23	0	2014-05-15	INSP,WC25-1,WC11,WC70-2,INSP_STORE	
084891	1	TIGERCA	G1474000		P TIGERCAT - 2.53 GEAR RATIO KIT (K)	6	6	0	0	2014-04-23	2014-04-23	0			
084892	1	TIGERCA	G1475000		P TIGERCAT - 2.89 GEAR RATIO KIT (K)	6	6	0	0	2014-04-23	2014-04-23	0			
084893	1	TIGERCA	G141000		P TIGERCAT-GEARBOX KIT (K)	2	2	0	0	2014-04-23	2014-04-23	0			
084893	1	TIGERCA	369008	✓	C TIGERCAT-CARRIER, BEARING - L (M)	2	2	0	2	2014-04-23			1999-12-31	STORE	
084893	1	TIGERCA	369018	✓	C TIGERCAT-CARRIER, BEARING - R (M)	2	2	0	0	2014-04-23			1999-12-31	STORE	
084893	1	TIGERCA	381460	✓	C TIGERCAT-SHAFT, SHIFTING (M)	2	2	0	9	2014-04-23			2014-04-16	WC41,INSP_STORE	
084893	1	TIGERCA	7093A	✓	C TIGERCAT-WASHER, THRUST (S)	2	2	0	14	2014-04-23			2014-04-19	CHT,INSP,WC30,INSP_STORE	
084894	1	TIGERCA	G141000		P TIGERCAT-GEARBOX KIT (K)	2	2	0	0	2014-04-23	2014-04-23	0		ht due 4/14	

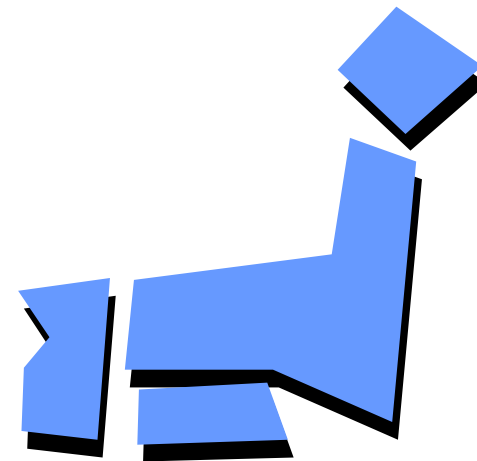






# Control Points – Measures...

**What's  
Actually  
Happening**



**Current Situation  
(WAH)**



# Standards...

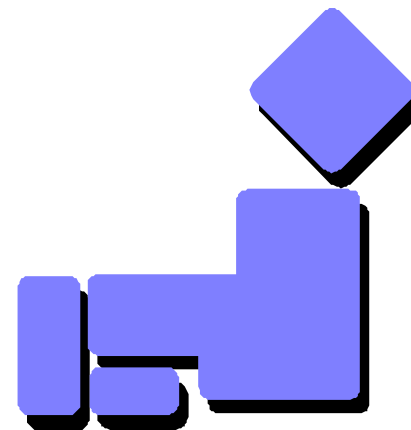
A specific, known expectation of –

**What**

**Should**

**Be**

**Happening**



**Standard  
(WSBH)**



## Problem Identification Tools...

- Standards
- Visual controls
- Reports
- Variation in measurables
- Flow diagrams
- Check sheets
- SPC
- Pareto diagram





# LEAN SIGMA...

## Harvesting the fruit - Lean, A3, & Six Sigma



### Sweet Fruit

#### *Six Sigma / Lean Tools*

Product Development for Six Sigma  
Process Entitlement

### Bulk of Fruit

#### *Lean Tools / A3 Problem Solving / Six Sigma*

Process Characterization  
and Organization

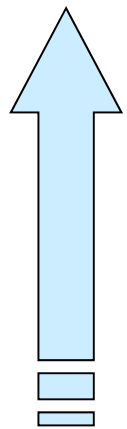
### Low Hanging Fruit

#### *Lean Tools / A3 Problem Solving*

Continuous Improvement Tools

### Ground Fruit

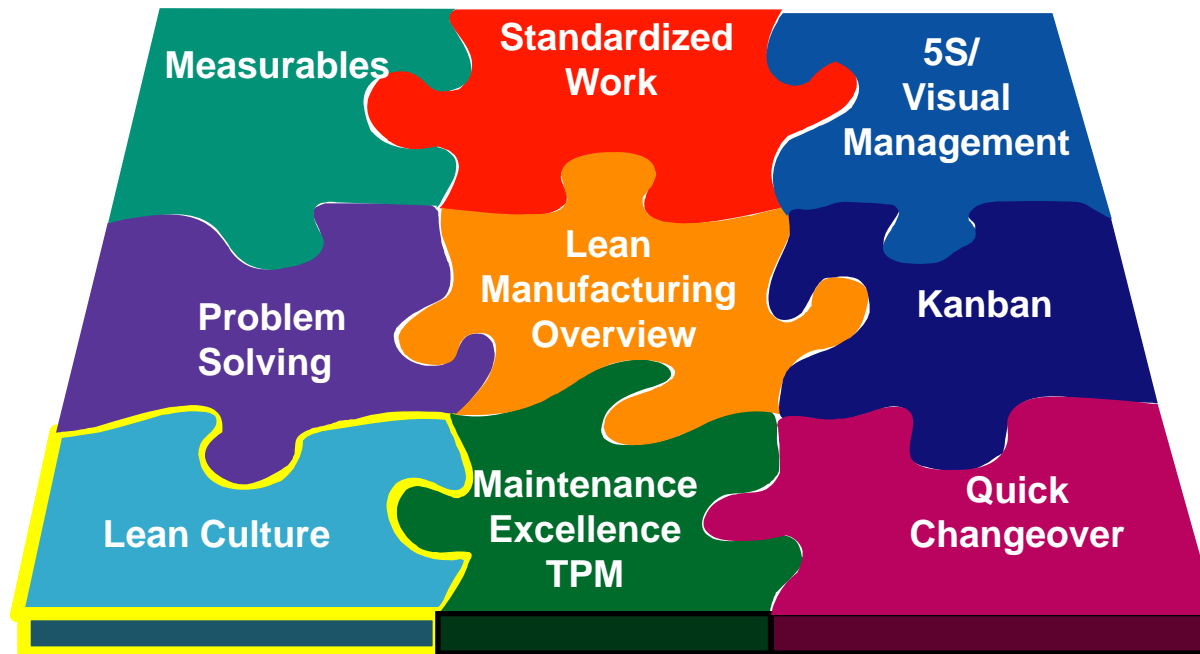
Logic and Intuition



Degree  
of  
Difficulty



# LEAN CULTURE





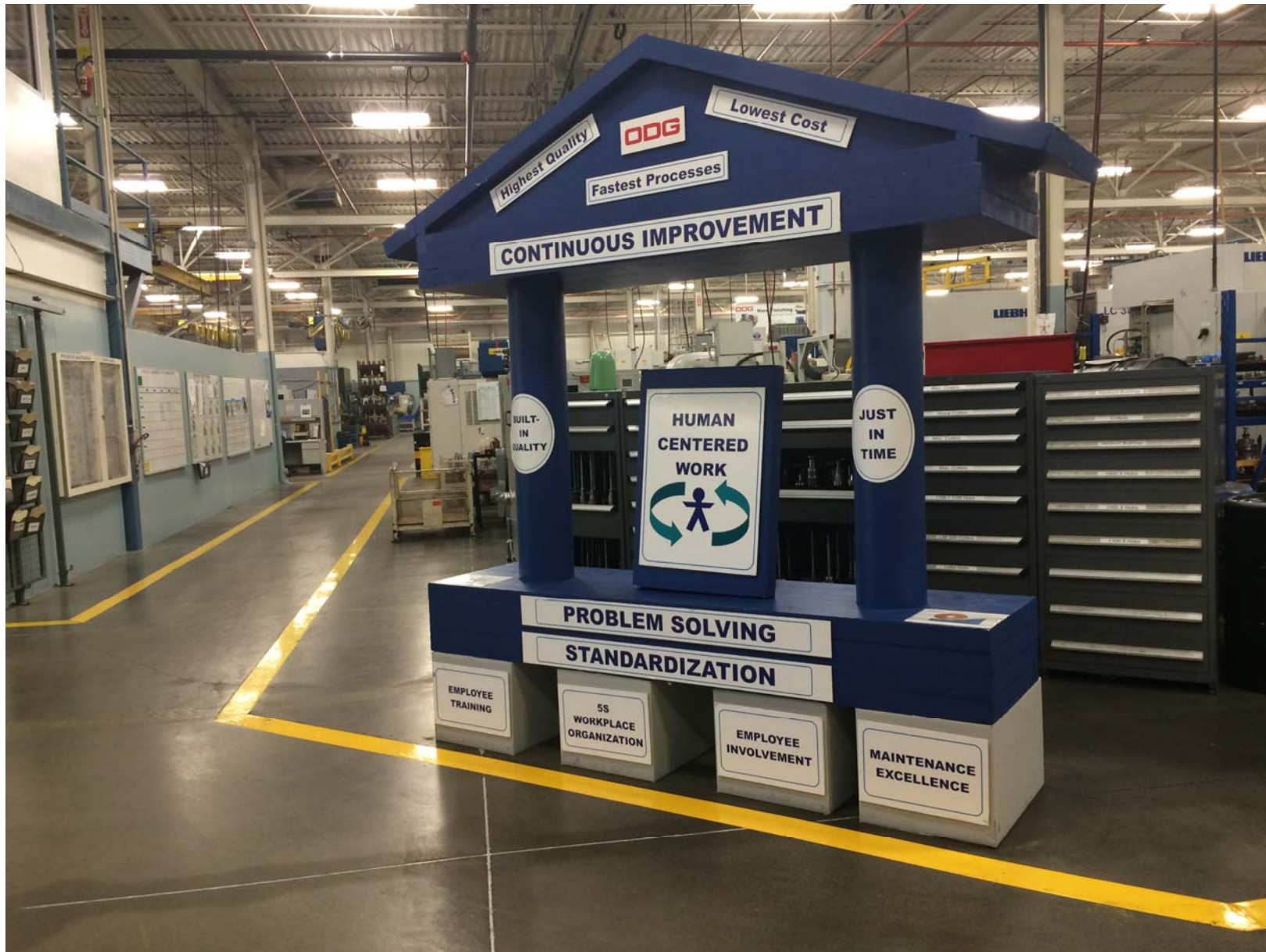
# Focus on Foundational Elements...

Consistency in:

- Machines
- Manpower
- Materials
- Methods

# STABILITY







# **Thank You!**

Please complete the session survey at:  
**AMESurvey.org**

**Session Code:**

**“Process Stabilization Through A3 and the Daily  
Management Process”**

**Angelo Esposito**

**ODG (Ontario Drive and Gear)**

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