

# GPS Tools to Navigate Roadblocks of CI

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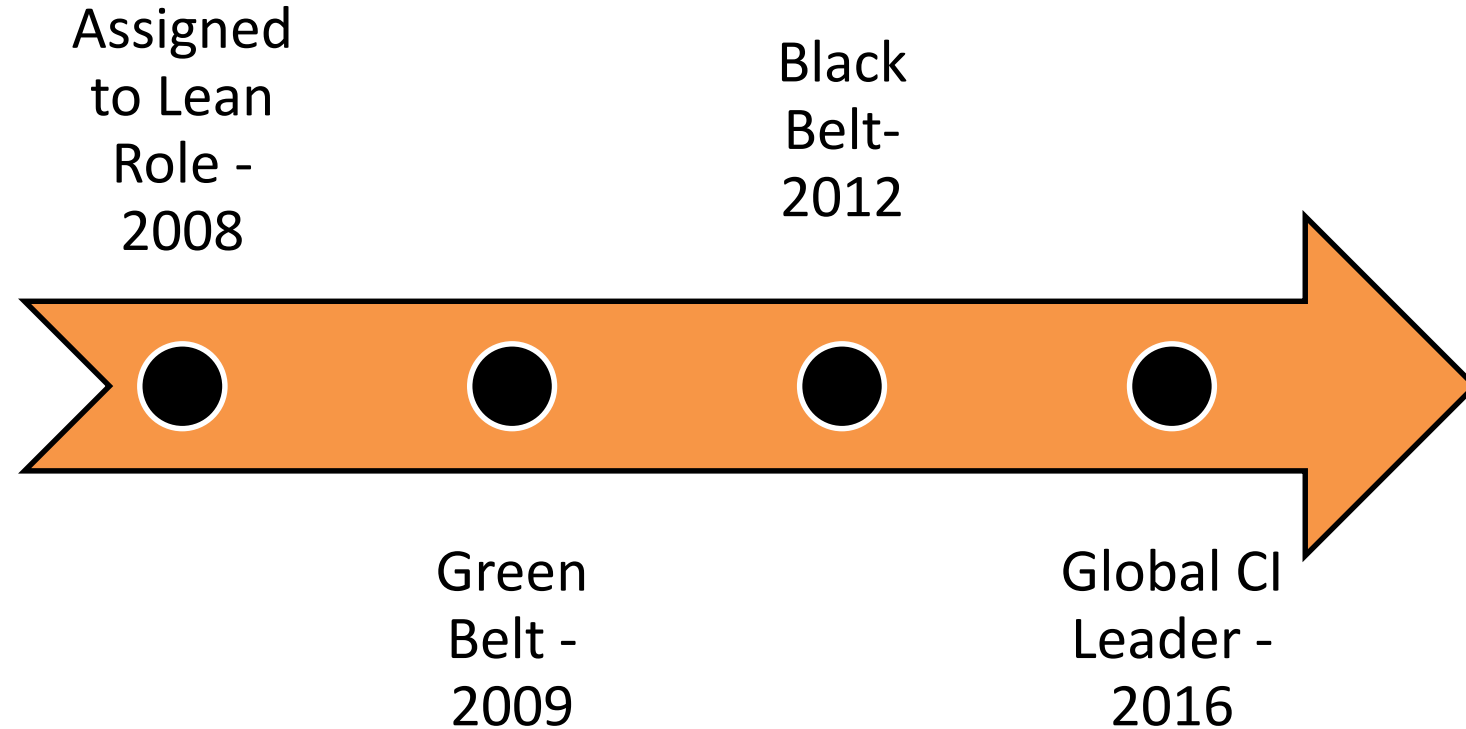
Director, Customer Experience

**Flex, Ltd / United States Air Force**

# Introduction – About Me



- Practicing CI for a Decade
- United States Air Force
  - Training
  - Maintenance, Repair, and Overhaul
  - Recruiting
  - Operations
  - Healthcare
- Flex
  - Manufacturing
  - Customer Journey



# Introduction – About Flex



Medical

**\$2**  
Billion

Automotive

**\$2**  
Billion

Industrial  
Goods

**\$1**  
Billion

Home  
Appliances

**\$1**  
Billion

Capital  
Equipment

**\$1**  
Billion

Energy

**\$2**  
Billion

Telecom

**\$3**  
Billion

Networking

**\$3**  
Billion

Enterprise  
Compute

**\$2**  
Billion

Wearables

**\$1**  
Billion

Connected  
Living

**\$1**  
Billion

Mobile

**\$2**  
Billion

**\$25B**  
revenue

**100**  
sites in over 30  
countries

**200,000**  
employees

**20,000**  
designers &  
engineers

**50M**  
sq. ft. of  
manufacturing &  
services space

**1M**  
parts managed

**16K**  
global suppliers

**1,000**  
customers

**flex**

# Introduction – About USAF



685K



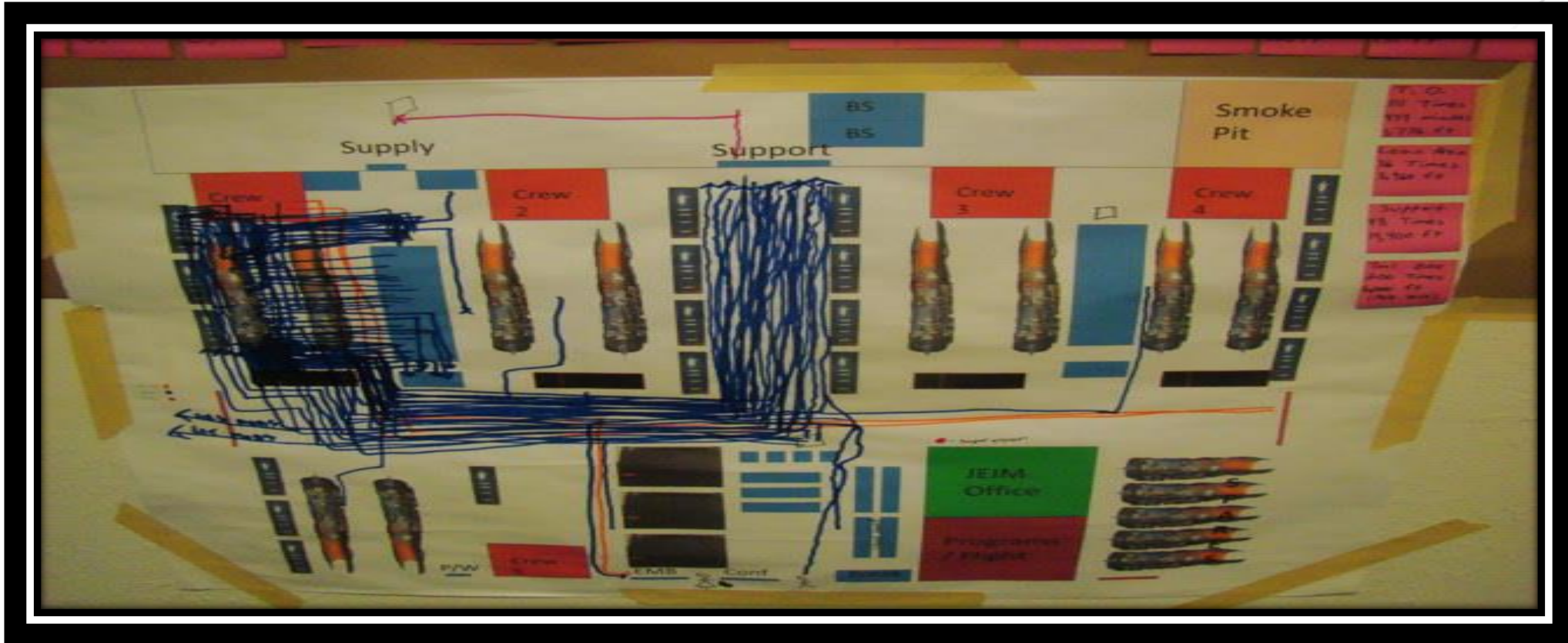
\$156.2B



200+

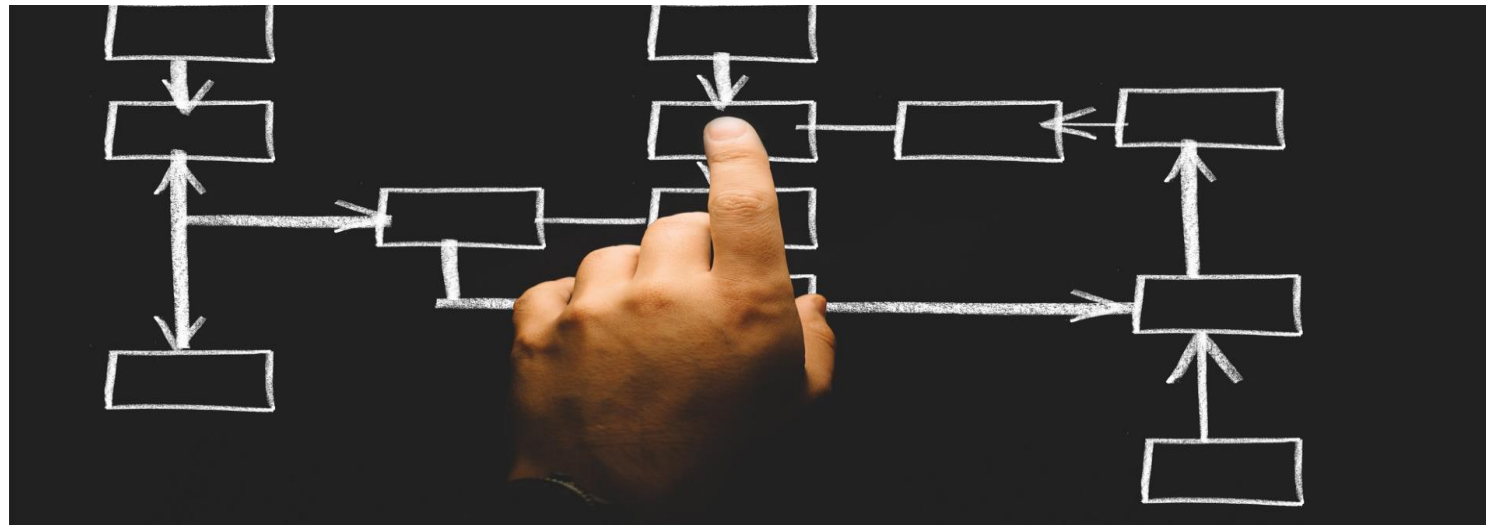


# Solved the Wrong Problem?



# We Can't be Hypocrites

- Myriad of Tools...Myriad of Opportunities to use them incorrectly
- CI is a Process...Is there a way to improve it?



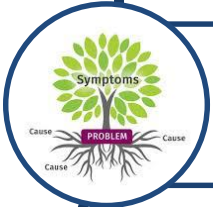
# Our Roadmap



Problem Awareness



GPS Tools



Root Cause



Sustaining Results

# Problem Statements



## Do these look familiar?

- “Tire delivery to aircraft takes too long.”
- “Scrap rate exceeds contract terms.”
- “Patient’s survey scores are on a decreased trend due to long wait times at the clinics.”

# Problem Statements

- A problem statement should describe
  - What is/is not happening
  - How Often it is happening
  - Impact if not solved
  - Where it is happening
  - When it is happening
  - Who is being affected

## Define the Problem - Example

*Over the last three weeks, **Lines 3 and 5** has seen a **3% spike in scrap rate** compared to other lines averaging **1% increase per week**. This increase is costing us **\$40K/month** impacting both our P&L and our customer relationship*

# GPS Tools

- Pareto Analysis
- Span of Control
- Waste Analysis
- Kepner – Tregoe Problem Analysis
- CI



# Uh oh! – A Roadblock

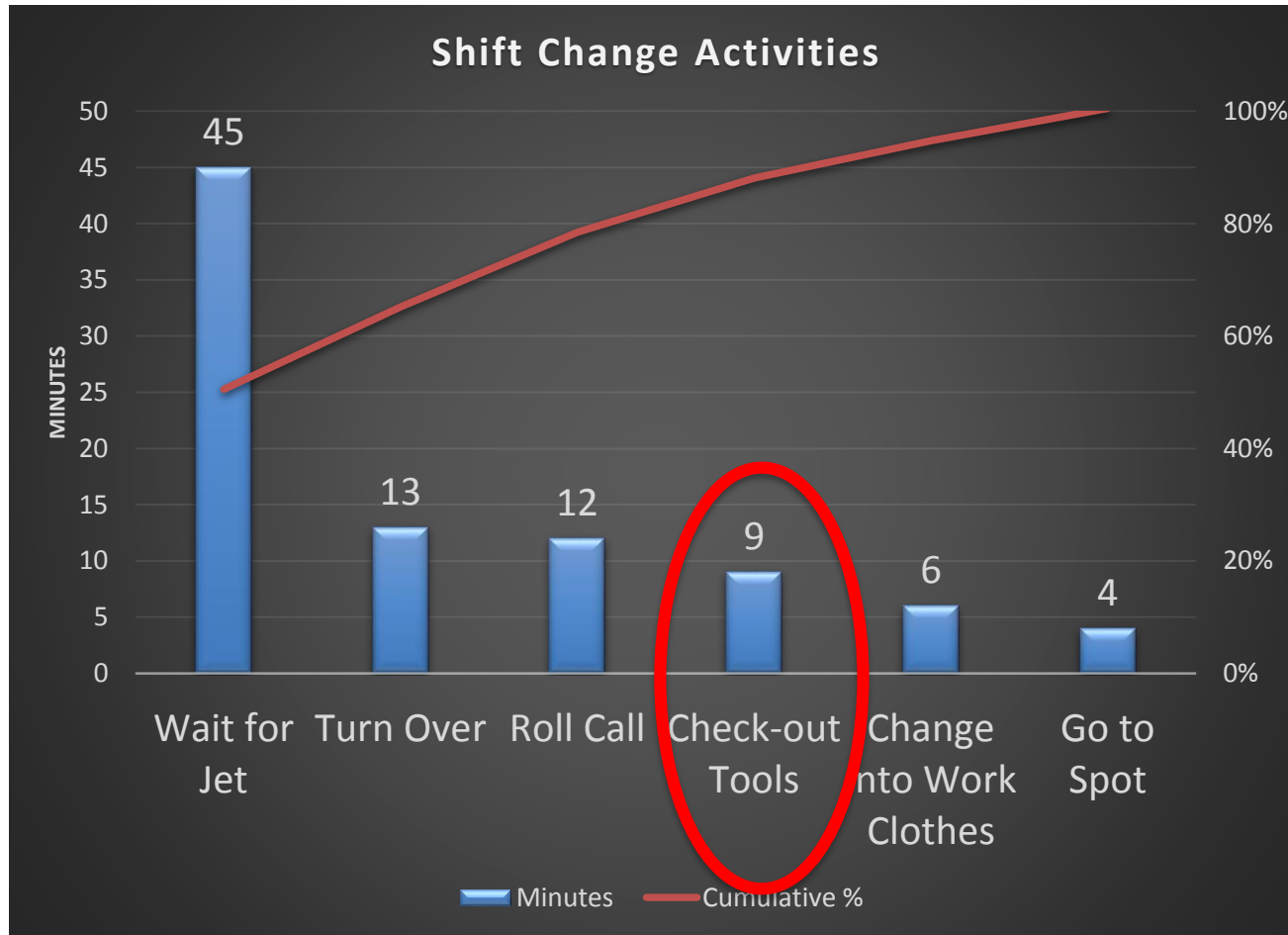


1hr 15min “Rush Hour”



Source: Team Resources

# Pareto



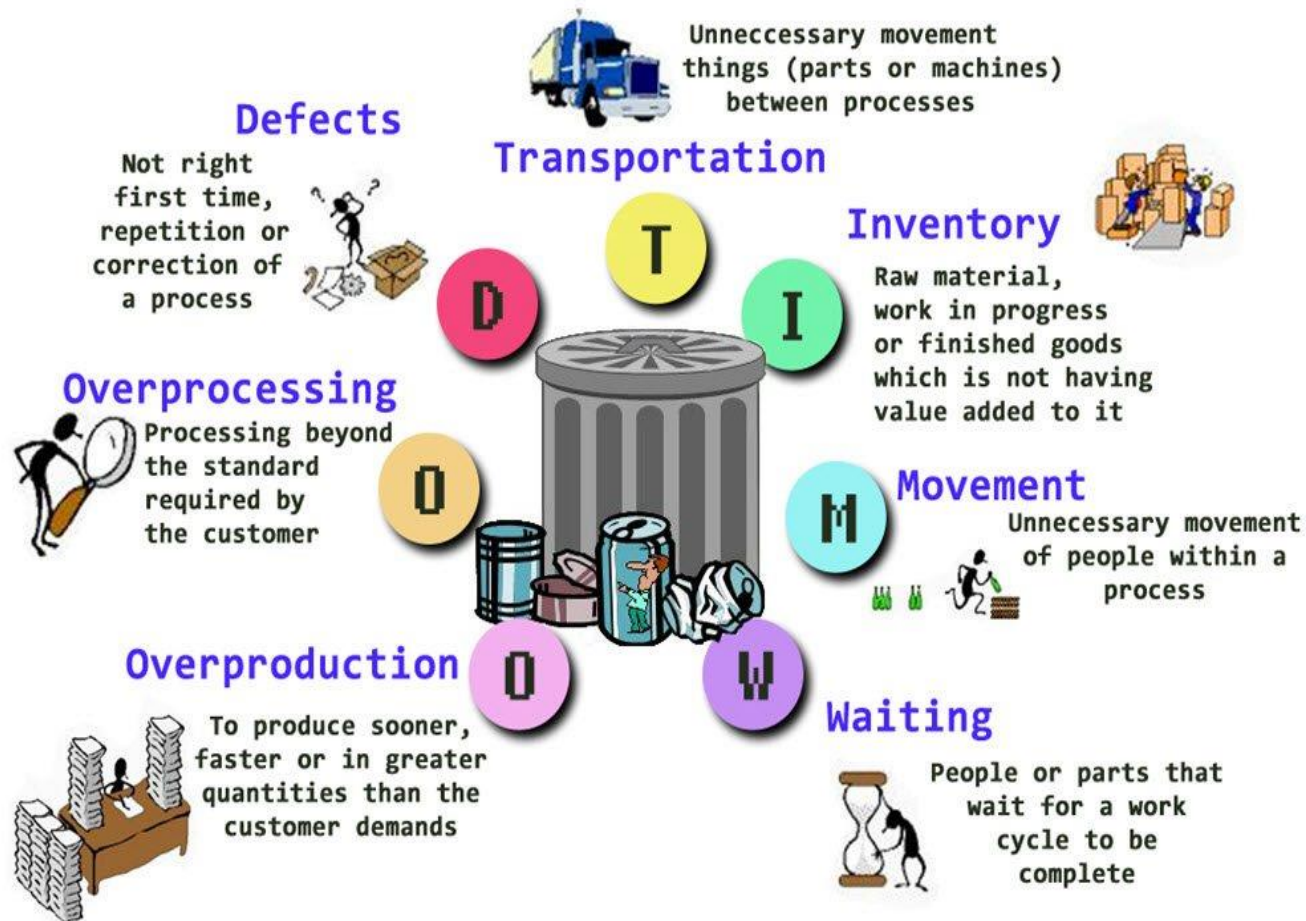
- Points to where your analysis should focus
- Reduces effort and overcorrection
- Keeps within Voice of the Customer
- Based off chart, should we invest \$1M in implementing RFID to our Tool Rooms?

# Span of Control

- Know the TRUE Problem
- Span of Control (AKA Sphere of Influence)
- Sometimes, it's a different process that needs addressed



# Waste Analysis



**NVA**

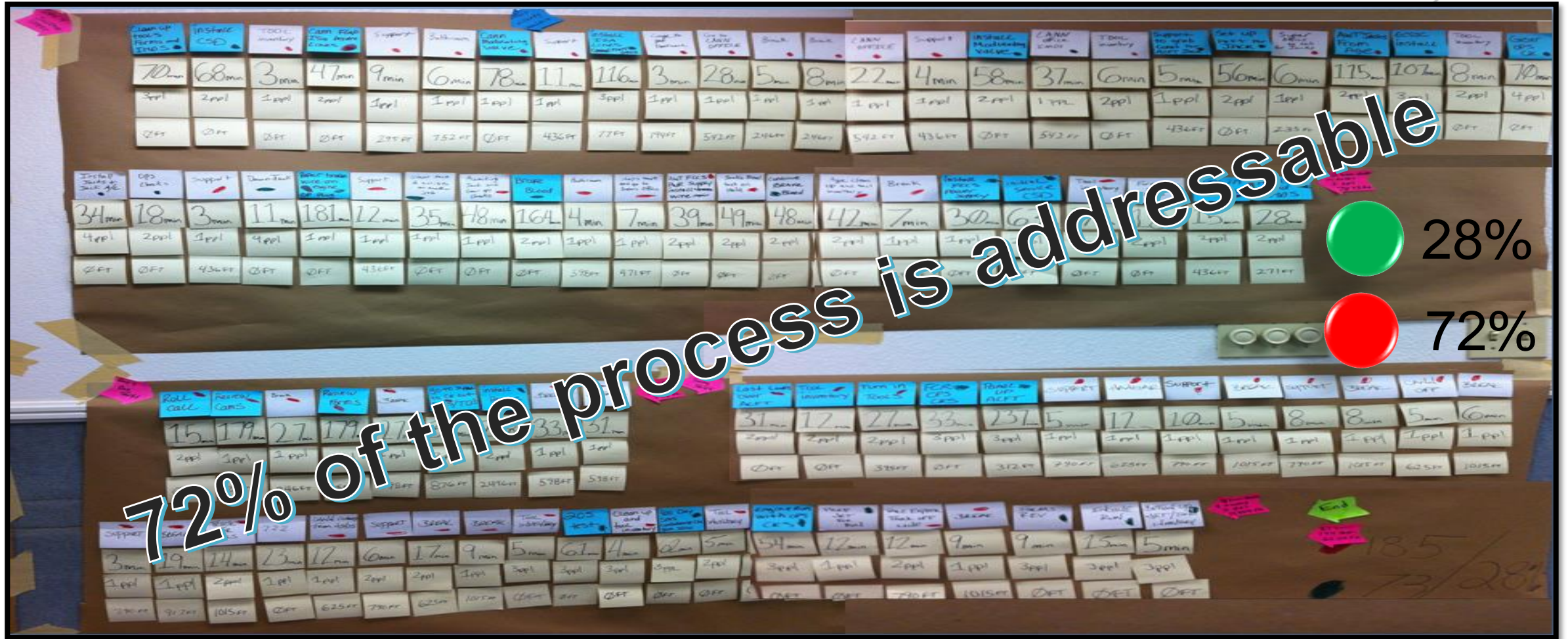
**NVA  
/ R**

**VA**

# Uh oh! – A Roadblock

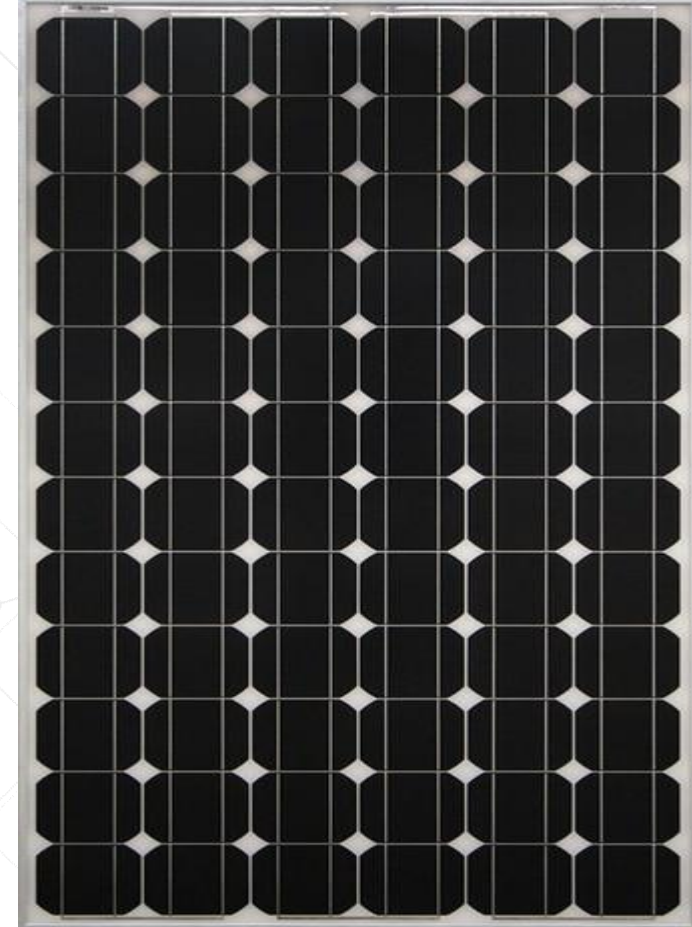


# Black & White (Red & Green)



# Uh Oh! – A Roadblock

- Scenario: Customer Reports Photovoltaic Modules Have Microcracks
  - 10% of AR has been withheld
  - Risk of \$1M in warranty reserves to reimburse damaged panels
- Focus Areas:
  1. Incoming Materials
  2. Assembly Process
  3. Packing Materials and Shipping Methods
  4. Design



# Kepner – Tregoe Problem Analysis

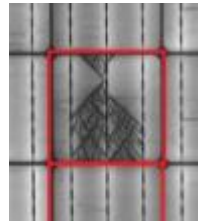
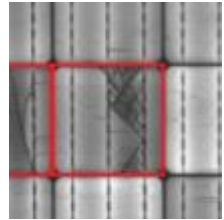


## IS / IS NOT Analysis

Find distinctions to narrow search

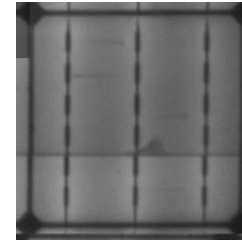
	IS	IS NOT
WHAT	Two Puncture Wounds	Cuts, Injuries, Asphyxiation
WHERE	Side of Neck Near Vein	Face, Torso
WHO	Mostly Single and Female	Married, Engaged
WHEN	Discovered at night	During Day
EXTENT	1/4" diameter spaced 1" apart with blood drained	Any other size puncture wounds or blood in body

# Defect Mapping Comparison: 47 Tested Panels



	F	E	D	C	B	A
1	1	2	3	2		
2		2	2	3	1	1
3	1	1	4	3	6	2
4	2	2	1	1	5	1
5	2	2	4	1	2	1
6	1	1	1	1	1	2
7	1	4		3	5	4
8	1	4	1		1	3
9	2	3		2	2	4
10	2	3	3	2	3	1
11	2	4	1		1	1
12	3	3	3	3	3	

**Defects from Customer Test**



	F	E	D	C	B	A
1						
2	1					
3	1		1			
4						
5			2			
6						
7		10				
8		1			1	
9			1			
10	1	1			2	
11						
12			1			

**Defects from Production**

# Transport Conditions

## Chennai: The Pothole Capital

- ❖ Panels loaded/off-loaded minimum 4 times
- ❖ Panels travelled 10+ days at 1,128km (700 miles)
- ❖ Transportation method did not use Air Ride Transport

## According to ISFH and TUV:

- ❖ Mechanical Load during transportation most important cause for crack growth



<https://www.thehindu.com/news/cities/chennai/chennai-the-pothole-capital/article6824225.ece>

# Avoid the 5-Why Pitfalls

- Starting Too Soon
- Stopping At 5 Whys
- Jump To Predetermined Causes
- “Five Whos” – “Root Blame
- Accepting As “The Way It Is”
- Know When to Stop:
  - Arguing Theology
  - Entered into a Loop

Problem:  
Inappropriate ER vs UC usage rates costing 5X more than necessary and 52% loss of bonus to org

Why?

Current Education / Awareness is not aiding the decision making process

Why?

Material is not targeted to the most appropriate user

Why?

We haven't identified who the target audience should be

Solution:  
Pareto users and devise awareness campaign for most at risk

# Uh Oh! – A Roadblock

- 25% Error Rate in Tank Accountability
  - Technicians look for tanks average 5x a month
  - Takes average 1.5hrs to find missing tank
  - Quarterly audits required vs 2-yr requirement taking up to 3-days to accomplish



# GPS Tools Point to Process

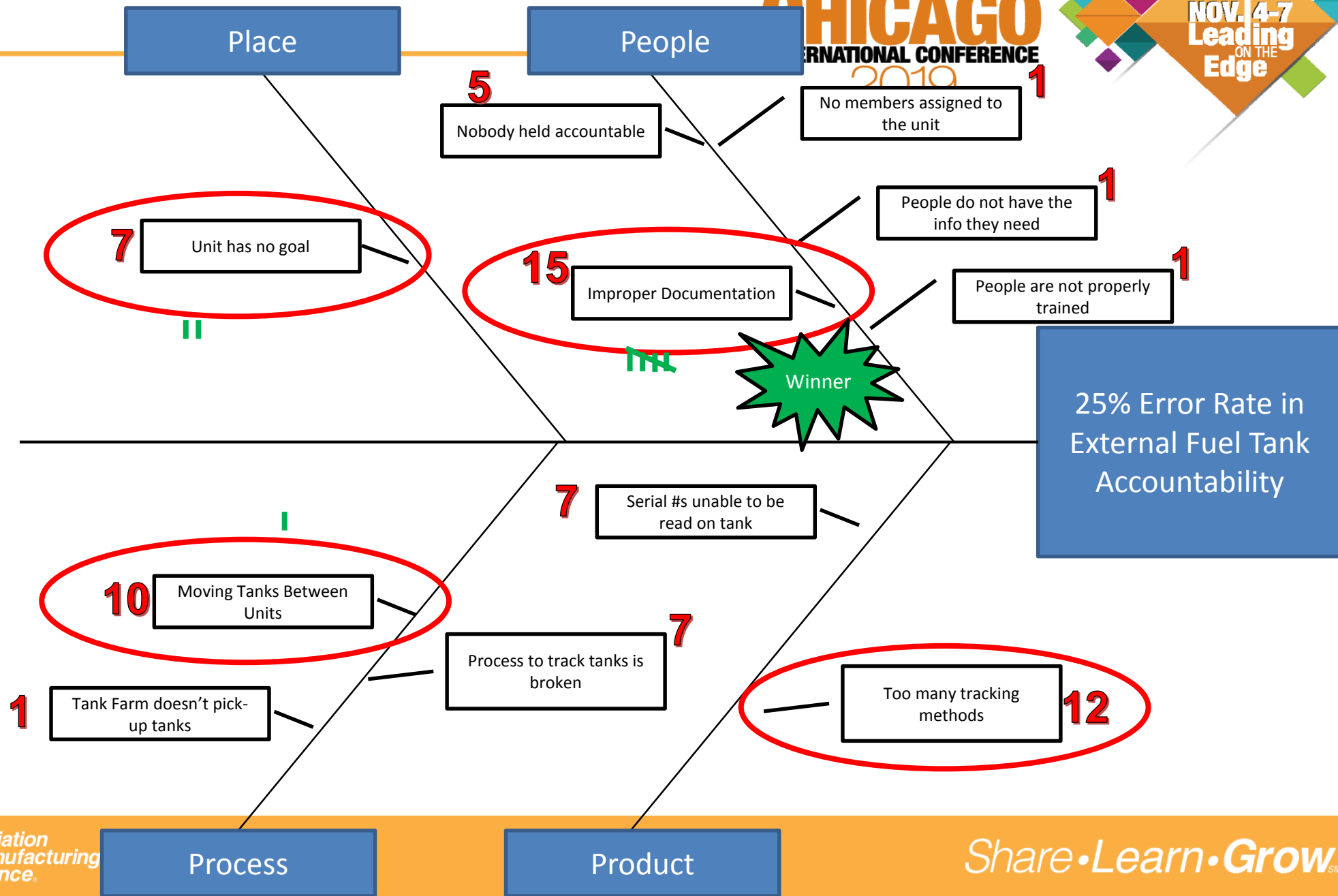
1. Pareto shows error is with 4 of the 6 Part Numbers
  2. Is / Is Not Analysis shows error occurs with only centerline tanks vs wing tanks
- Proposed champion solution:
    - hand-off ownership to the users
  - With no centralized pool, will limit availability



# The Tailed Fishbone

A New Twist in Designing A Fishbone  
Diagram





# 5-Whys

WHY?

Why 25% Error Rate?

Incorrect Documentation on Installation

WHY?

Why Incorrect Documentation on Installation?

Force Load When Provided System Error

WHY?

Why are they Force Loading?

Using Incorrect "Cheat Sheets"

WHY?

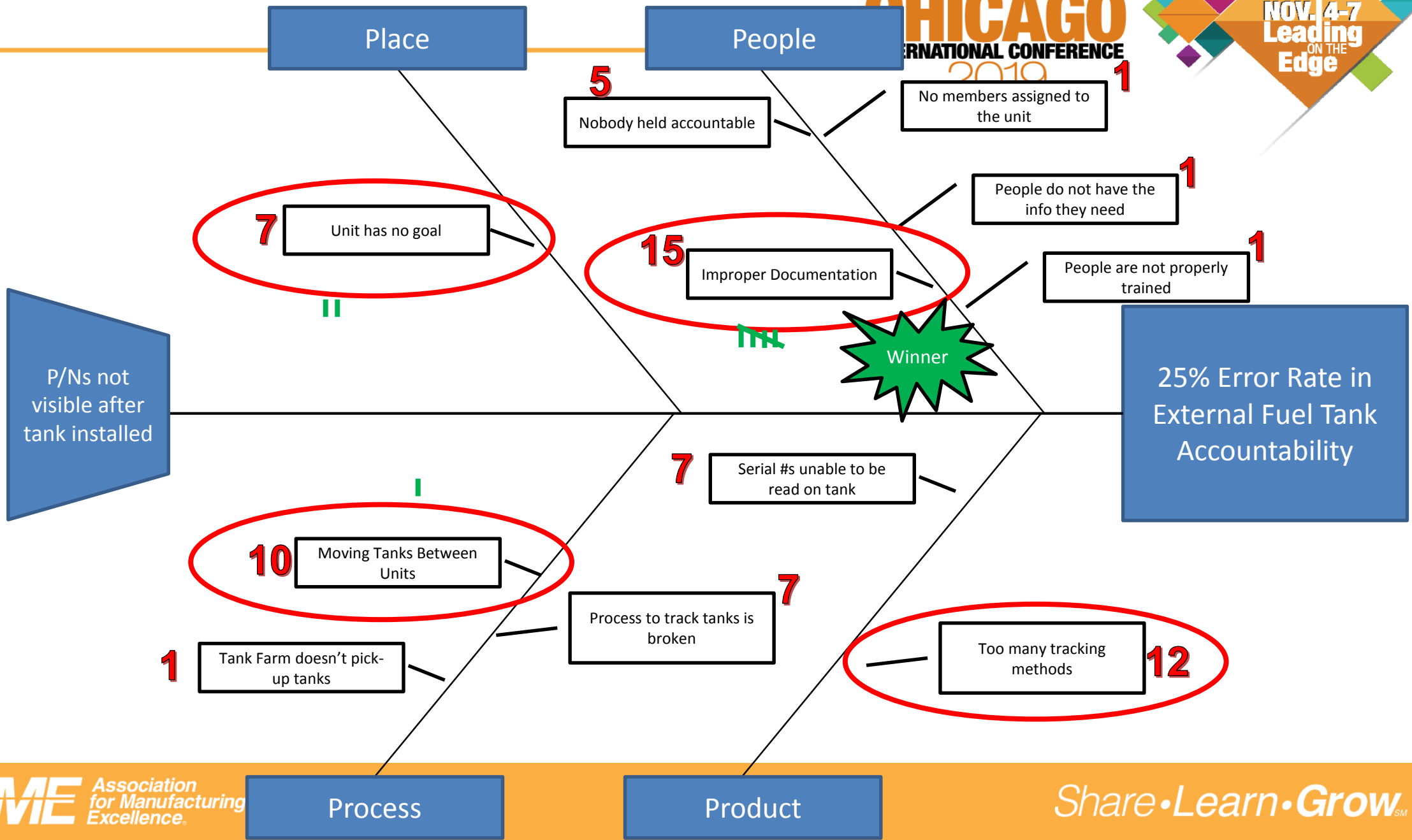
Why Using "Cheat Sheets?"

Part Number not Visible After Installed

WHY?

Why Cheat Sheets Incorrect?

Technicians not aware there are 5 different part numbers



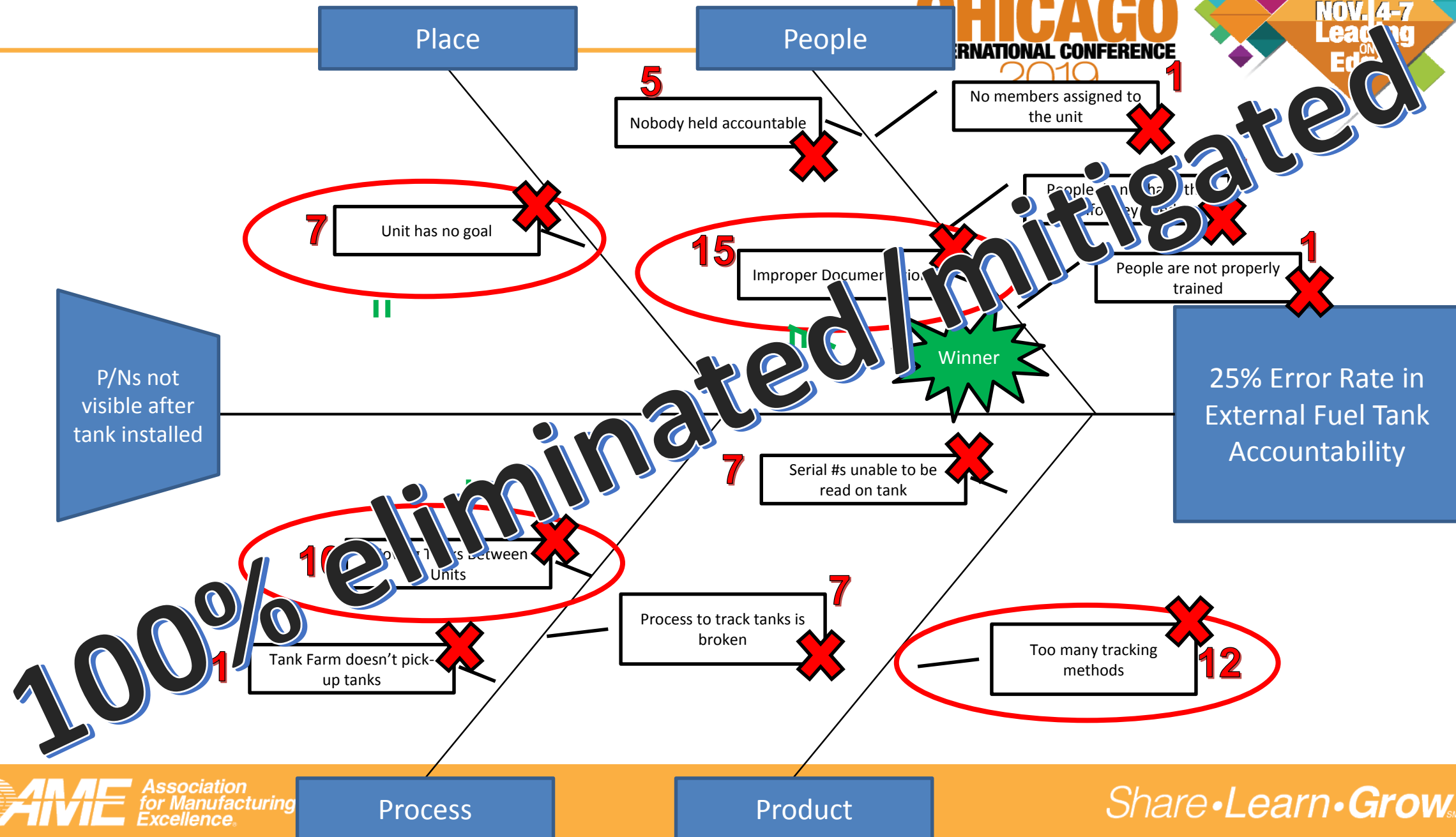
# Solution

Then



Now





# Solution Model

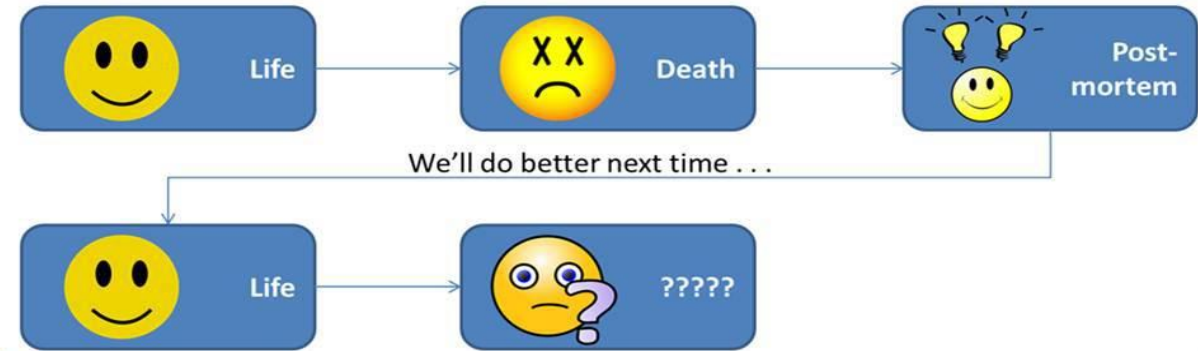


# Pre-Mortem

- Prevent your improvement effort from dying
- Identify cause of failure before it occurs
- Use tools like Fishbone and/or 5-Why
- Establish your Keys to Success
- Lessons Learned before they're learned

## Which Would You Prefer???

The Postmortem Process: Learning from Our "Mistakes"



The Premortem Process: Preventing Our "Mistakes"



\*The KaiZone

# Uh Oh...A Roadblock

- We don't have enough foot soldiers
- Getting them into training is no problem
- We Root Blame the individual and their leadership
- Recommendation: Come to Class with Signed Contract

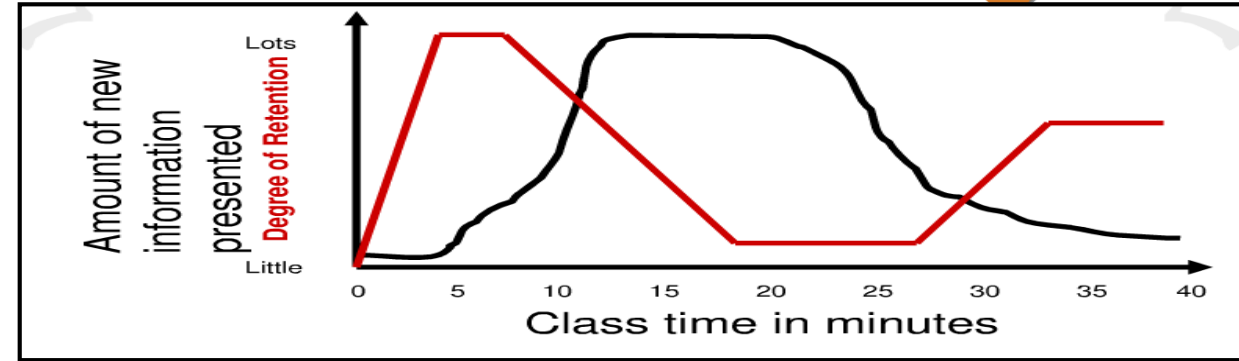


77% Drop Out After Academics

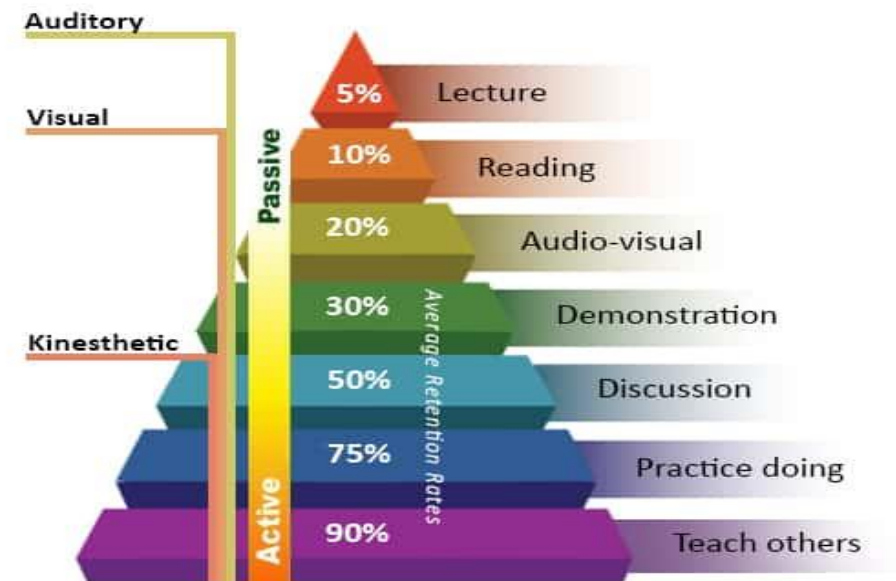


# We're Not Immune

- Put together a Kaizen
  - SME Facilitator
  - Candidate
  - Student
  - Leader
- VSM and RCA Process
- Identified failure in VAKT and Flow in alignment to Retention



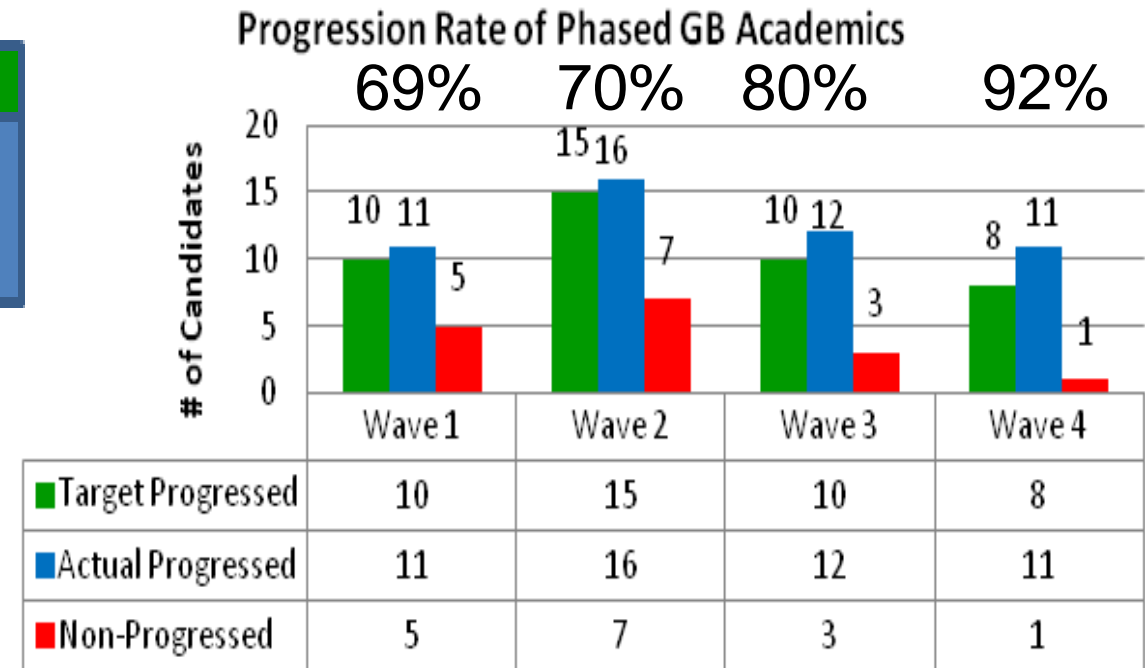
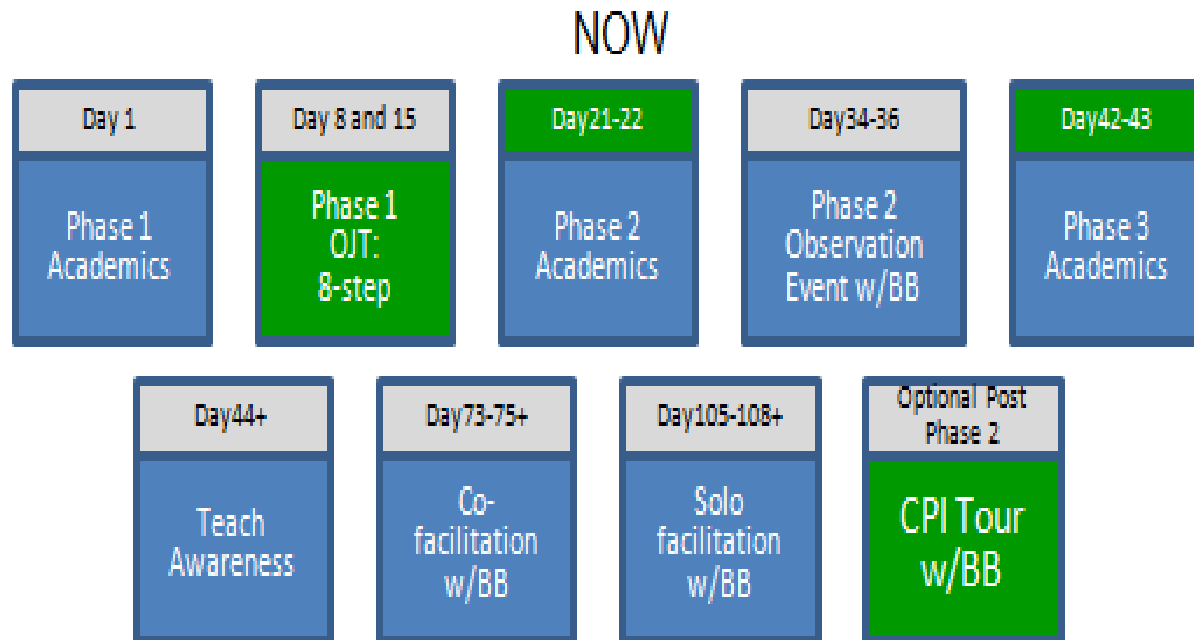
\*How the Brain Learns by David Sousa



Adapted from the NTL Institute of Applied Behavioral Science Learning Pyramid

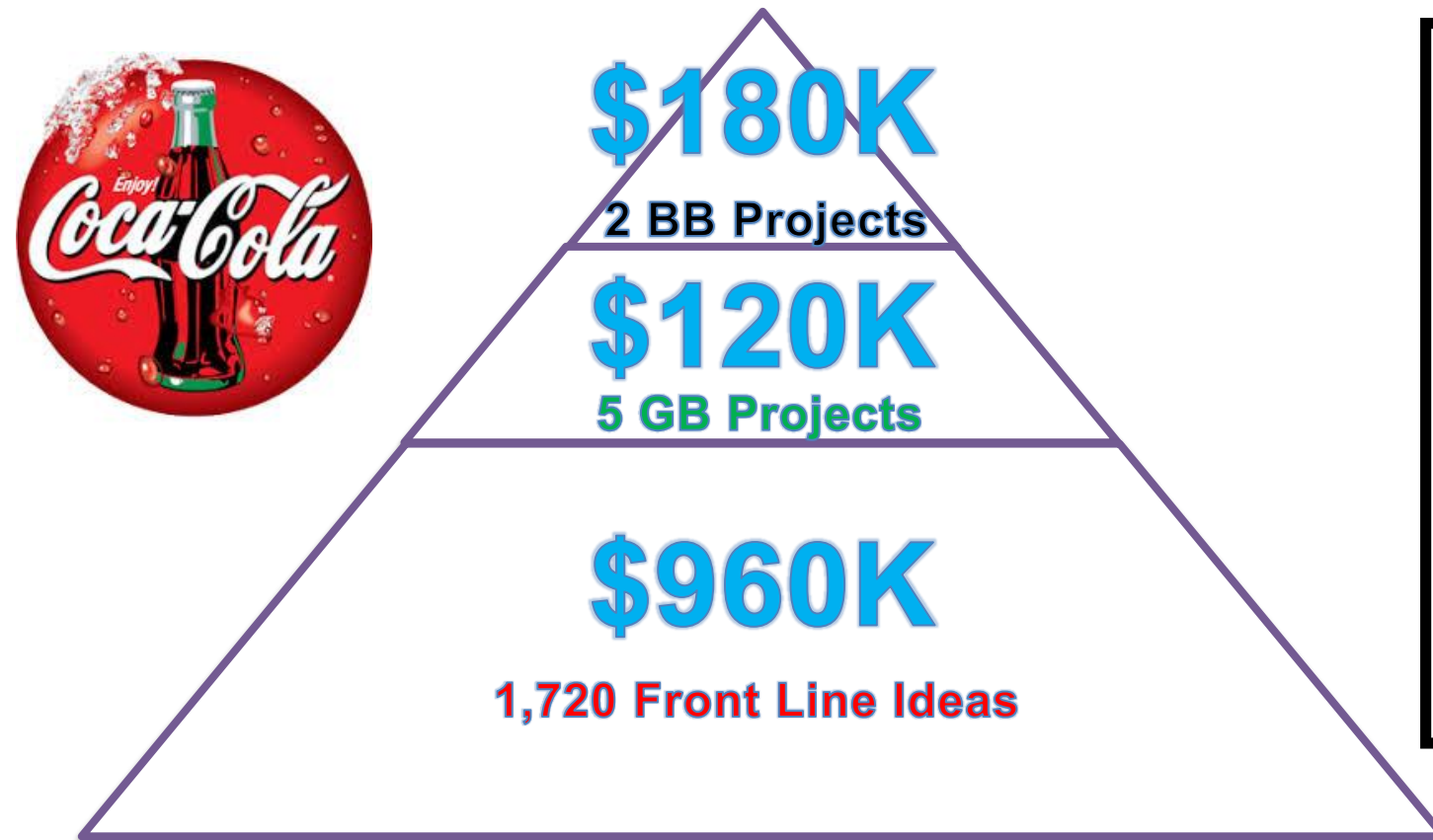
# The Solution

- Phased approach with intermixed OJT
- Went from 23% progression to 92%



# Also...Consider This

- Don't Overcomplicate This: Think 2-Second Lean®



Source: The Idea Driven Organization



# Summary of Pitfalls

F

- Failing to Prevent Failures
- Pre-Mortems / FMEAs

A

- Assigned Solutions
- Pareto, Waste, or Problem Analysis / SOLUTION Model

## Incorrect / Incomplete Problem Statement

I

- Incorrect Problem Statements
- Who, What, When, Where, Frequency, Impact

L

- Learning (Training) vs Improving
- CI applied to CI

## Failing to Prevent Failure

U

- Unavailing Efforts in applying CI to CI
- Applying CI to CI

R

- Required, but Non-Value Add (NVA/R)
- Waste Analysis with only VA & NVA

## Not Applying CI to CI

E

- Excess Countermeasures
- Tailed Fishbone, SOLUTION Model

S

- Separated from Span of Control
- Work within Span of Control and/or Sphere of Influence



# Thank You!

***Your opinion is important to us!***

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

**Session No: TS/02**  
**GPS Tools to Navigate Roadblocks of CI**  
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