Nexteer Supplier 3L5Y Training

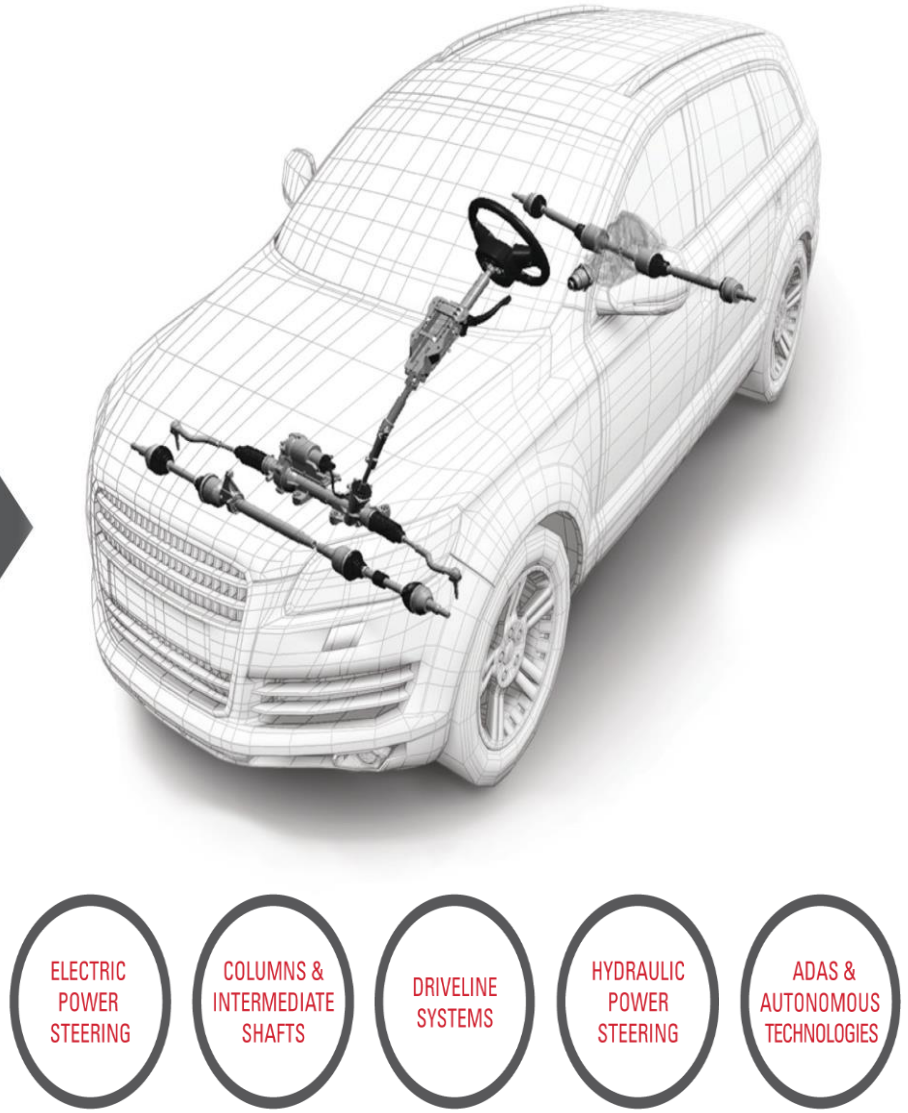
What is a 3L5Y & How to fill out Nexteer's Excel Form

nexteer AUTOMOTIVE

a leader in intuitive motion control

Last Updated:

September 17, 2018



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3L5Y Learning Objectives

Part A – 3L5Y (3 Legged 5 Why) basic concepts

- What is a 3 legged 5 Why?
- When to use the 3L5Y ?
- Leg #1 – Specific Problem
- Leg #2 - Detection
- Leg #3 – Systemic
- Corrective Actions, Lessons learned, Look Across
- Ford, GM & FCA requirements

Part B – How to fill out Nexteer's 3L5Y Excel Form

- Where to find the Excel form
- What is in each Excel Worksheet tab
- 1 page summary "cheat sheet"
- Leg #1 – Specific Problem - Containment & Corrective Actions
- Leg #2 – Detection – Corrective Actions
- Leg #3 - Systemic – Corrective Actions
- Other items to fill out on Excel form

A Core "Problem Solving" Tool at Nexteer

What is a 3 Legged 5 Why:

- 5 Why is a problem solving tool
  - Effectively finds the Root Cause by analyzing cause and effect relationships
  - A Focused approach to solving chronic and / or systemic problems
  - For more complex problems, a 5 why can be combined with other problem solving tools such as Shainin Red X, Fast X, or Six Sigma.
- Can be used with various problem solving formats
  - Nexteer's 3L5Y, or, 5 Phase process
  - GM's Drill Deep
  - Ford's 8 D problem solving
  - FCA's "8 Step" problem solving

When to Use 5 Why:

- Customer Issues
  - Required for all WFCCs (Worldwide Formal Customer Complaint) and warranty issues
- Supplier Issues
  - Must used by suppliers for all problem reports
- Internal Issues
  - Informal complaints including Field Engineer Incident reports
  - Quality system audit issues
  - First Time Quality (FTQ)
  - Fast Response Internal Quality Issues

Nexteer 3L5Y Definitions

- **3L5Y** – 3 Legged 5 Why- A problem solving tool to find root cause. It systematically drills down to the real root cause.
- **Root Cause** – the fundamental reason for the occurrence of a problem.
- **Containment** – all suspect material is contained from usage including – WIP(work In Process) , finished good, in-transit, at customer.
- **FCC** – Formal Customer Complaint from a OEM.
- **RPN** – Risk Priority Number -used in PFMEA to create a summary value per AIAG requirements.
- **PSCC** – Product Safety Compliance Committee –Typically issue associated with a severity of 9 or 10. See procedure G1789 for details.

Takata Airbag Recall

- Vehicles made by 19 different automakers have been recalled to replace frontal airbags.
- NHTSA stated **"the largest and most complex safety recall in U.S. history."**
- The airbag's inflator, is a metal cartridge loaded with propellant wafers.
- If inflator housing ruptures in a crash, metal shards can be sprayed throughout the passenger area.

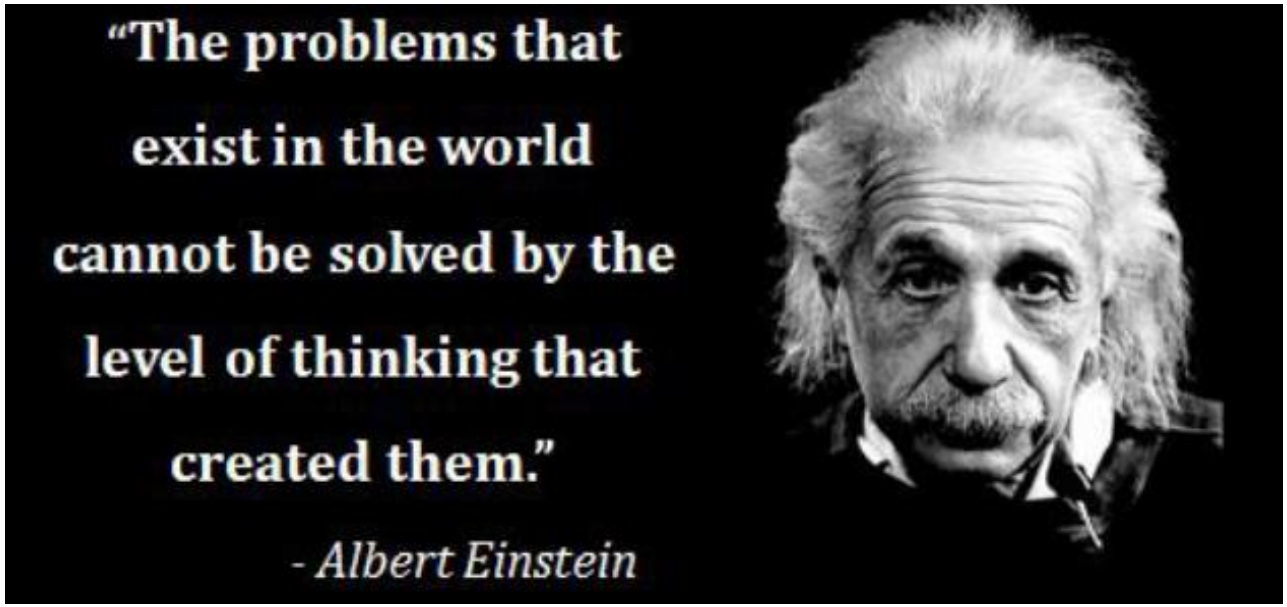
Root Cause: airbags that use ammonium nitrate-based propellant without a chemical drying agent.

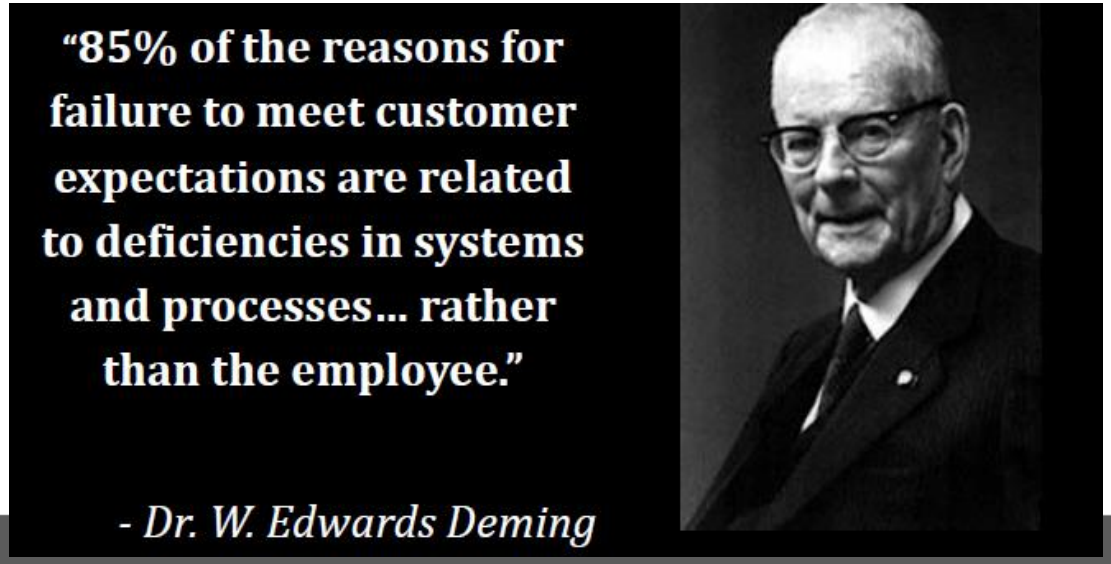
WHY - 3L5Y Problem Solving is Needed

Why use a 3 Legged 5 Why:

- What does it mean for Nexteer if we use **bad** parts?
  - Customer dissatisfaction
  - Uncompetitive / nonconforming performance
  - Uncompetitive costs
  - Potential loss of business, or recalls
- Why use the 3 legged 5 Why?
  - Provides a **road map** to a permanent corrective action.
  - Stops the problem from happening again, both safety and quality issues.
  - Increases employee and customer satisfaction.
  - Increases quality, profitability, and market share.

WHY - 3L5Y Problem Solving is Needed





Einstein and Deming's thoughts on **WHY** problem solving is needed……

History of 5 Why Problem Solving

History –

- The technique was developed by the Toyota Motor Corporation during the evolution of its manufacturing methodologies.
- The "5" in the name derives from an anecdotal observation on the “typical” number of iterations needed to resolve the problem.

5 Why Example

The vehicle will not start. (the problem)

1. ***Why?*** - The battery is dead. (First why)
2. ***Why?*** - The alternator is not functioning. (Second why)
3. ***Why?*** - The alternator belt has broken. (Third why)
4. ***Why?*** - The alternator belt was well beyond its useful service life and not replaced. (Fourth why)
5. ***Why?*** - The vehicle was not maintained according to the recommended service schedule. (Fifth why, a root cause)

HOW - Planning and Preparing to do a 3L5Y

- Planning/Preparing
  - A **cross-functional team** **must** be used to problem solve
    - Include Operations, Engineers, Quality, PC&L, etc.
    - Need knowledge, opinions, and observations of different people
    - People with process and product knowledge and authority to correct the problem
    - Empowered to “think outside the box” and “change the rules”

How - Planning and Preparing to do a 3L5Y

Planning/Preparing

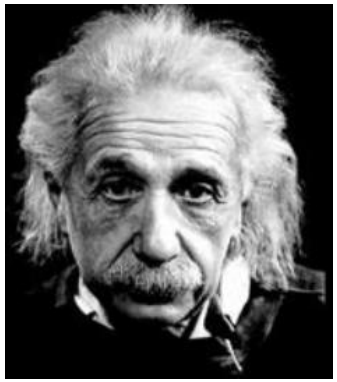
- To solve problems we have to overcome our normal pattern of thinking which occurs due to our past experiences. Think outside the box. (AIAG Problem Solving Guideline)

- Often a problem is solved from someone who does not have knowledge of the history of the problem because they can see it from a different perspective.

- Don't jump to conclusions, or, assume the answer is obvious
  - Same issue may be due to a different cause
  - Previous corrective actions may have corrected only a symptom

How - Planning and Preparing to do a 3L5Y

- Planning/Preparing
  - **MUST** Include pictures (photos, graphics)
    - Keeps team focused on issue
    - Helps customer/others understand corrective action and apply lessons learned
    - Walk the process – do not try to solve problem from your desk.
  - **Must** include test data and facts to show you can turn root cause off and on.



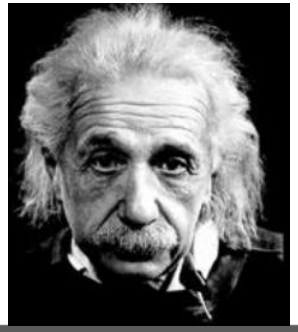
"*Imagination is more important than knowledge*"

– Albert Einstein

3L5Y - Problem Definition – *Most Important thing you do!*

- **Define the Problem**
  - The Problem statement **must be** clear and accurate
  - Define problem as the customer sees it
  - Include
    - Who found it?
    - When was it identified?
    - How was it detected?
    - How many? Frequency?

- Do **not** add "**causes**" into the problem statement



"A Problem Well-Defined is Half Solved"

- Albert Einstein

3L5Y - Problem Definition – Good and Bad Examples

- **Are the Problem Definitions below good??**

Was the problem definer an Einstein, or, a Poor Problem Solver?

(1). Noisy pump

(2). Nexteer Saginaw Plant 6 was notified by first shift supervisor John Smith, that he found three rake brackets, part #28271777, with broken mounting pads, that prevented the columns from being assembled correctly. John Smith found them at 8AM, on August 17, 2018, in plant 6, department 23.

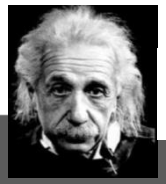
(3). REPS gear has broken casting.

(4). Drawing G datum out of spec

(5). On June 5th, at 10 AM, during a GM Lansing assembly plant audit, GM quality engineer Matt Anderson, detected a thumping noise on a Nexteer half-shaft. Only one half-shaft was found, part # 26076778, with part label indicating it was built by Nexteer's plant 5, dept. 37, on May 9th.

No Causes!!

- Hint – did they Include:
  - Who found it?
  - When was it identified?
  - How was it detected?
  - How many? Frequency?



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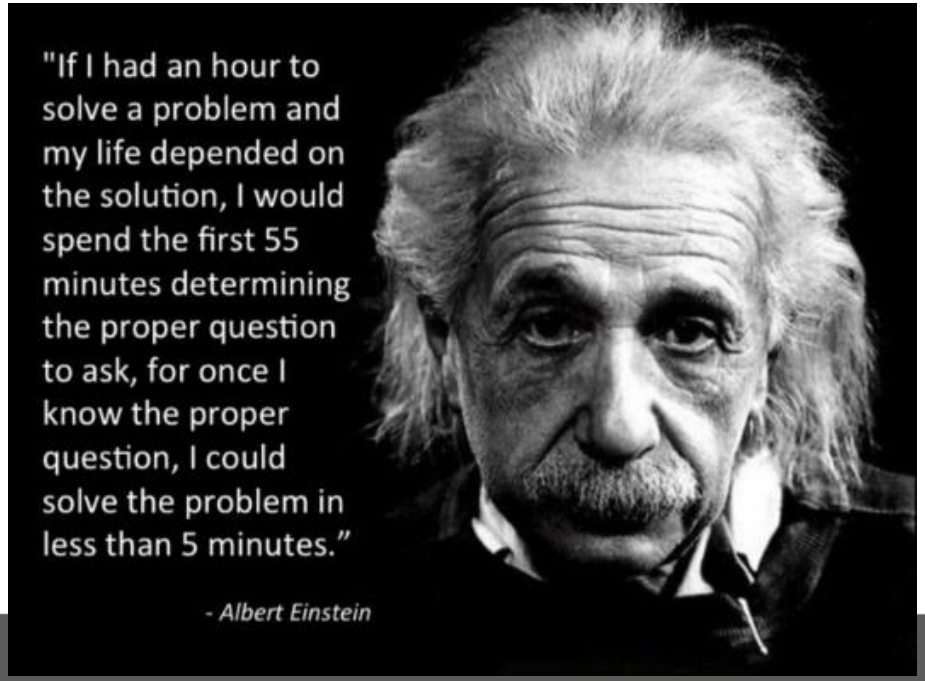
3L5Y – "Why" Guidelines

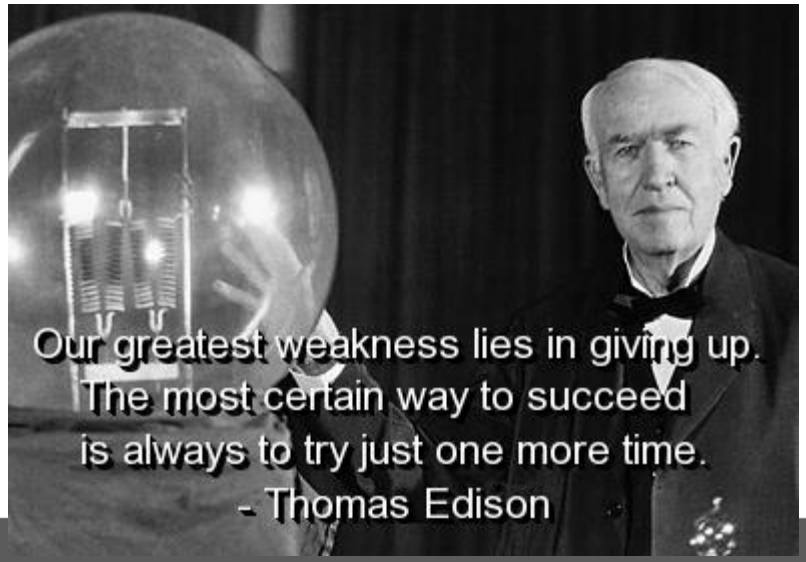
- How many Why's should you ask??
  - Ask "Why" until the root cause is uncovered
    - May be more than 5 Whys or less than 5 Whys
    - If you don't ask enough "Whys", you may end up correcting a "symptom" and not "root cause"
    - A root cause is usually a process, policy, design, or a person. There can be more than one root cause.



3L5Y – “Root Cause” Guidelines

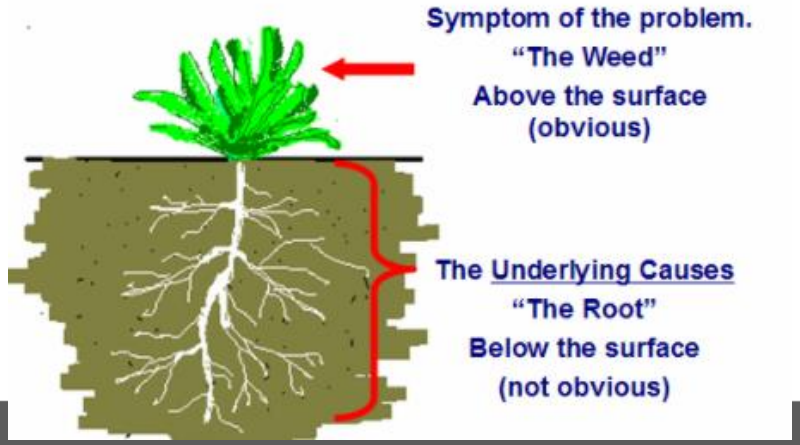
- Root cause can be turned “on” and “off” with the corrective action.
  - Will addressing / correcting the “cause” prevent recurrence?
  - If not what is the next level of cause?

- Walking from the cause back to the problem should make sense when read in reverse using “therefore”



3L5Y – Finding the "Root Cause"

- 5 Why is Interrogative technique used to explore the cause and effect relationships for a particular problem.
- By repeating the question "Why", each answer forms the basis for the next question.
- The final Why is the Root Cause. Ask "WHY" as many times as needed until you find the root cause.
  - Do not stop until you reach a process, policy, or person that seems to be the root cause.
  - You should be able to turn the problem on and off, using the root cause.



3L5Y – Finding "Root Cause" and knowing you are in control

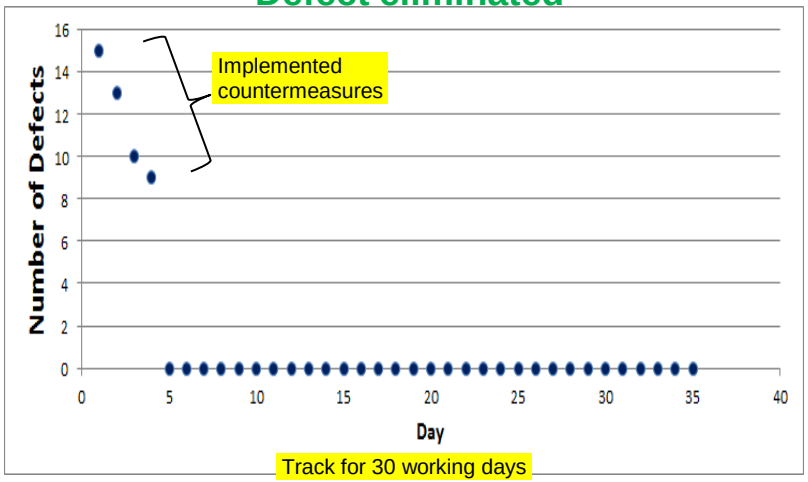
How do I know I have identified the root cause?

Ask:

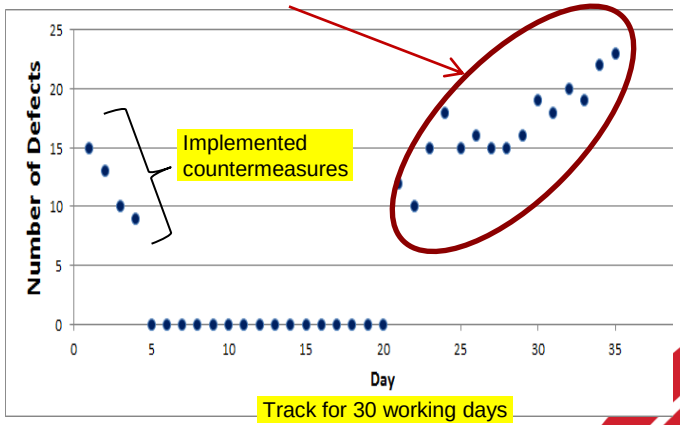
"If I eliminate the Root Cause, will the Problem and all the symptoms disappear?"

Root Cause Found

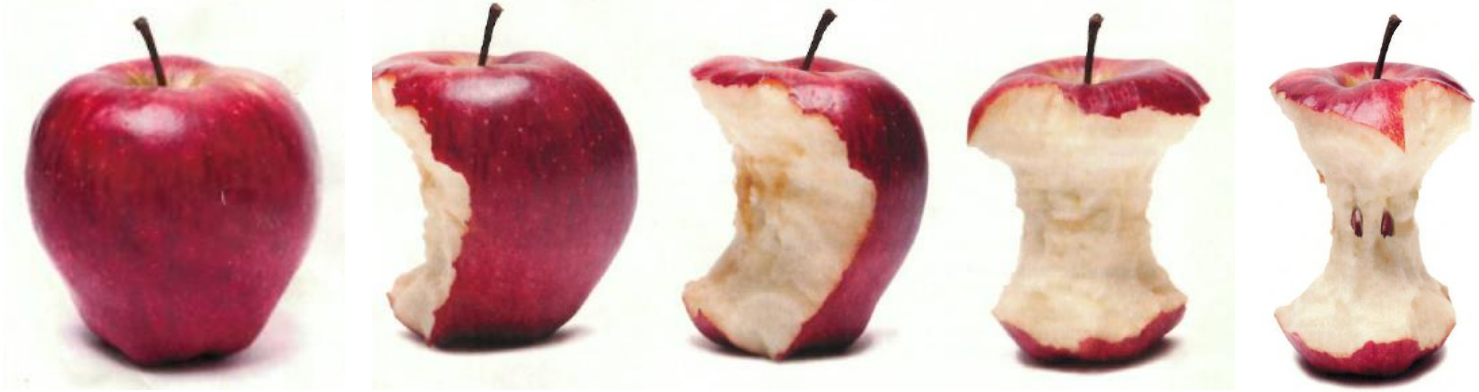
– Defect eliminated



Root Cause Not Found, or, solution went out of control, process not stable, etc..



3L5Y –"Root Cause"– Get at the Core *(American Society of Quality Example)*

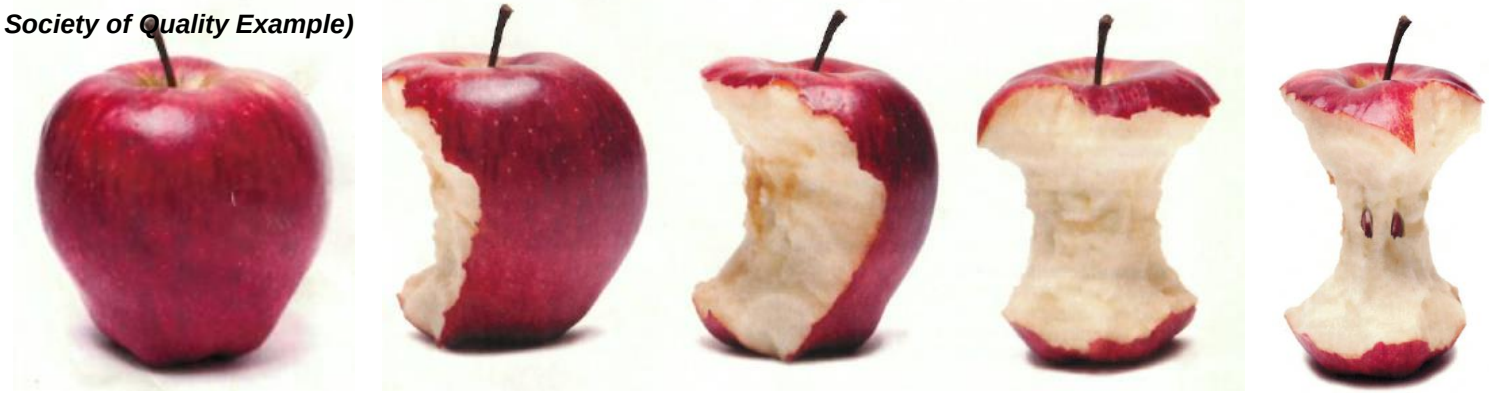


- In manufacturing defect investigations, **human error often is incorrectly identified** as the **root cause** of the defect.
- **Human error** is an inadequate "Root Cause", because it does not address the true reason the failure occurred.
- Retraining employees is often the corrective action. This does **NOT** solve the actual root cause!!! The defect occurs again, because the True Root Cause manufacturing issue was **NOT** found. They did not get to CORE of the Root Cause!

- Ask "Why did the Human error?", to help you identify the true root cause.
  - Humans will always error – no one is perfect.
  - How can you make the manufacturing system more robust to prevent this error?
  - For example, Human visual inspection is only 85% accurate.

3L5Y –"A better Root Cause"– Than Human Error

(American Society of Quality Example)



- After asking "***Why did the Human error***?" you may discover:
- **1. <u>Confusing Procedure:</u>** Poorly written or vague work instructions
- **2. <u>Internal (personal) distractions:</u>** Personal life, illness, injury, disability
- **3. <u>External Distractions:</u>** Poor layout or workflow –frequent interruptions, noisy
- **4. <u>Unaware of Procedure:</u>** Hard for employees to access, poor communication
- **5. <u>Procedural Updates:</u>** Occur too often, to many revisions. Cant keep up.
- **6. <u>Willful Misconduct:</u>** Employee disgruntled or dissatisfied.
- **7. <u>Inadequate Controls:</u>** Unauthorized workarounds, another employees login used. Pages missing from work instructions.
- **8. <u>Missed Step:</u>** Instructions unclear, poor training, poor error proofing
- **9. <u>Assembly line Robustness:</u>** Need better fixture, tool, vision system.

3L5Y – The "3 Legs" of the 5 Why

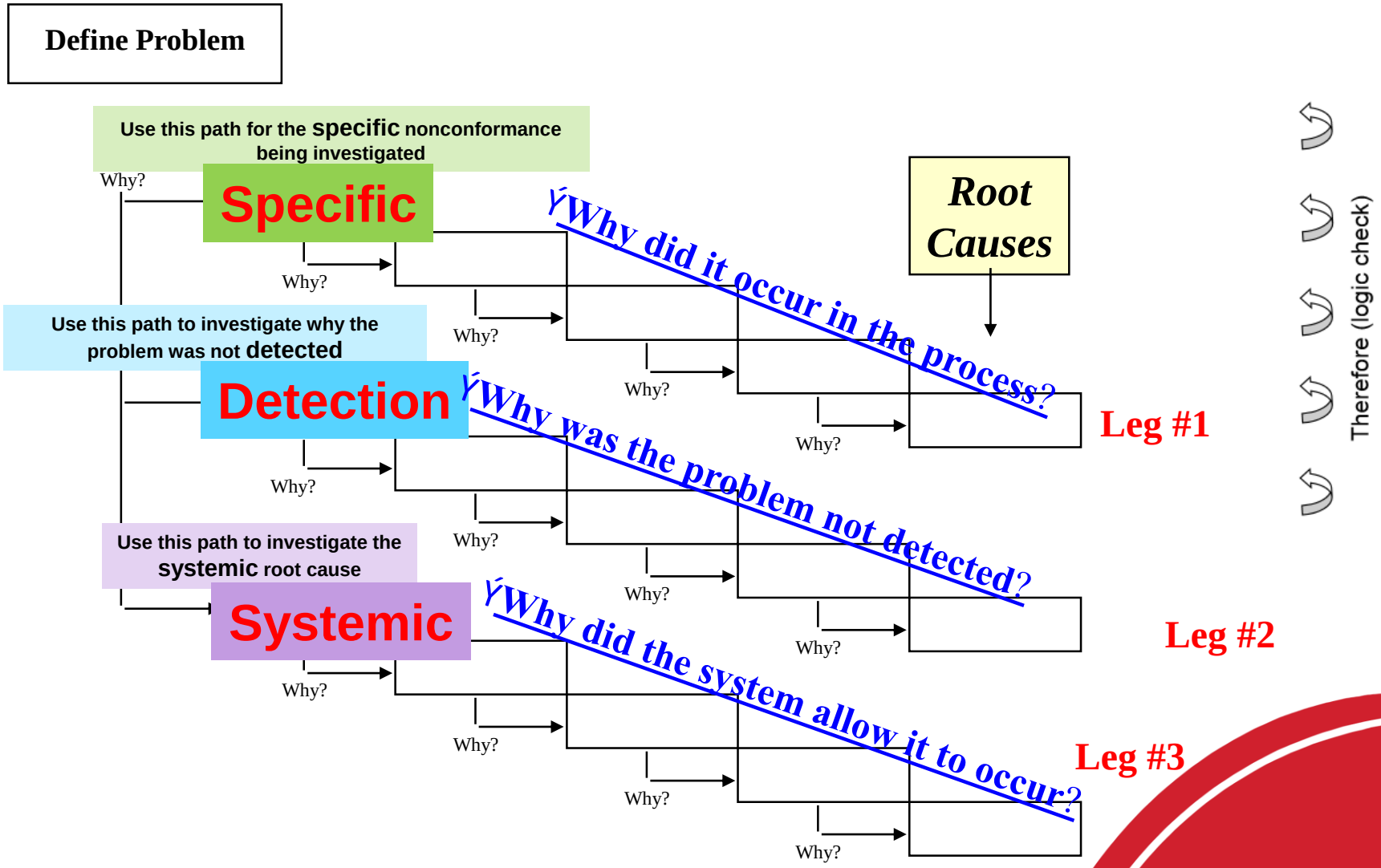
- Nexteer 5 Why includes **3 legs** or questions than need to be addressed

(1). Specific Problem "leg #1" – why did the specific problem happen?

(2). Detection "leg #2" – why did we not detect the specific problem?

(3). Systemic Problem "leg #3" – what was the system breakdown that allowed the specific problem to occur?

3L5Y – Three Legs – How they fit in the problem solving process



3L5Y – Three Legs – Shown in Nexteer's Excel Form

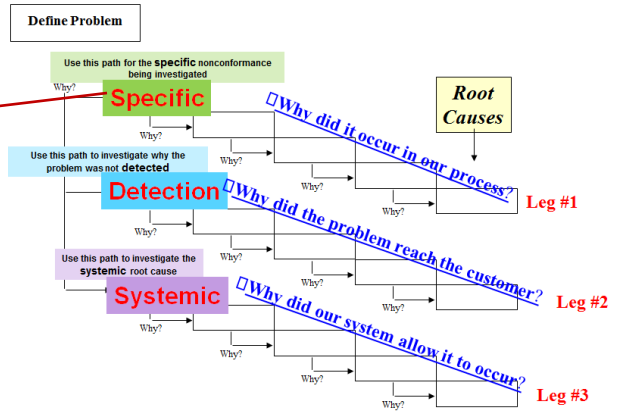
	Nexteer Plant	Part Number	Part Name and /or Process Name	Date of Occurrence	Formal Customer Complaint (FCC), and/or, Product Safety & Compliance Council	Nexteer Plant Tracking Number	OEM Customer	FCC Qty of Pcs in the complaint	Date 3L5Y Submitted
	Intelex # *(if applicable)*	Detailed Problem Definition:							
	PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #	PFMEA Background information			
	Before:				0				
	After:				0				
	3 Legged 5 Why		Picture and Description of Current State		Containment /QA Alert/ Owner / Target Date		Picture and Description of Corrected State		
SPECIFIC Leg #1 – Why did it occur in our process?	Problem Statement:								
	Why did it occur:								
	Why did it occur:				Corrective Actions / Owner / Target Date				
	Why did it occur:								
	Why did it occur:								
	Why did it occur:								
DETECTION Leg #2 –Why did problem reach customer?	Why was it not detected:				Corrective Actions / Owner / Target Date				
	Why not detected:								
	Why not detected:								
	Why not detected:								
	Why not detected:								
	Why not detected:								
SYSTEMIC LEG #3 -Why did system allow problem to occur?	Why did the system allow the problem to occur (what was the weakness in the system):				Corrective Actions / Owner / Target Date				
	Why:								
	Why:								
	Why:								
	Why:								
	Why:								
	OEM Customer Complaint Number (If applicable)		Affected OEM Customer Locations:		Supplier Name/Location:		Nexteer and / or Supplier Contact Name:		
	Supplier Look Across #	Lessons Learned:							

Specific Leg# 1 – Why did it occur in our process?

Detection Leg# 2 – Why did problem reach the customer?

Systemic Leg# 3 – Why did our system allow it to occur?

3L5Y – Specific Problem “leg #1”



- **SPECIFIC Problem “leg #1”**
  - Why did we have the specific non-conformance?
  - How was the defective part or non-conformance created?
  - Root cause is typically related to operations or dimensional issues. For Example:
    - Tooling wear/breaking
    - Set-up incorrect
    - Processing parameters incorrect

3L5Y – Specific Problem "leg #1" - Questions to Ask??

- **Process related questions to ask:**
  - Was the correct process used?
  - Was standardized work followed?
  - Was the person performing the work trained?
  - Has anything changed recently in the process?

- **Product / part related questions**:
  - Was correct part used?
  - Has there been a product change?
  - Are parts handled and stored correctly?

- **Tooling related questions**:
  - Was correct tooling used?
  - Is tool change/maintenance being followed?
  - Are tools in good working condition?

3L5Y – Specific Problem "leg #1" - FMEA

- Is failure mode identified on the FMEA (Failure Mode Effects Analysis)?
  - Failure mode should not be confused with symptom
  - Failure mode is manner in which process fails to meet requirement
  - Information on the FMEA may provide leads on the specific problem leg (occurrence failure modes) and the detection leg (controls)

"If you fail to plan, you are planning to fail!"

– Benjamin Franklin

3L5Y – Specific Problem – Root Cause Examples

- **Specific Problem – Leg #1**
  - Root Cause Examples
    - Parts damaged by shipping – dropped or stacked incorrectly
    - Operator error – poorly trained or did not use proper tools
    - Operator error – performed job in wrong sequence
    - Changeover occurred – wrong parts used
    - Processing parameters changed
    - Excessive tool wear/breakage
    - Machine fault – machine stopped mid-cycle

3L5Y – Specific Problem – Root Cause Examples

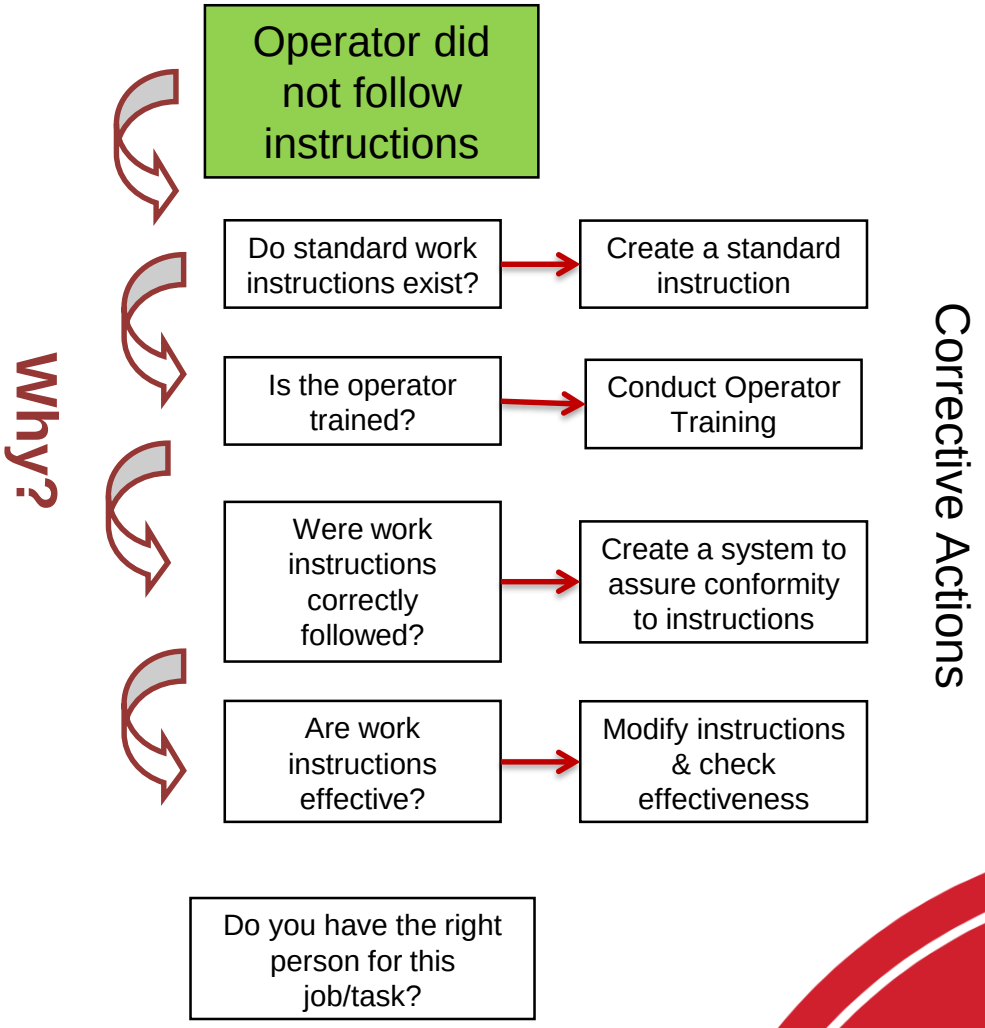
What if root cause is?

Operator did not follow instructions

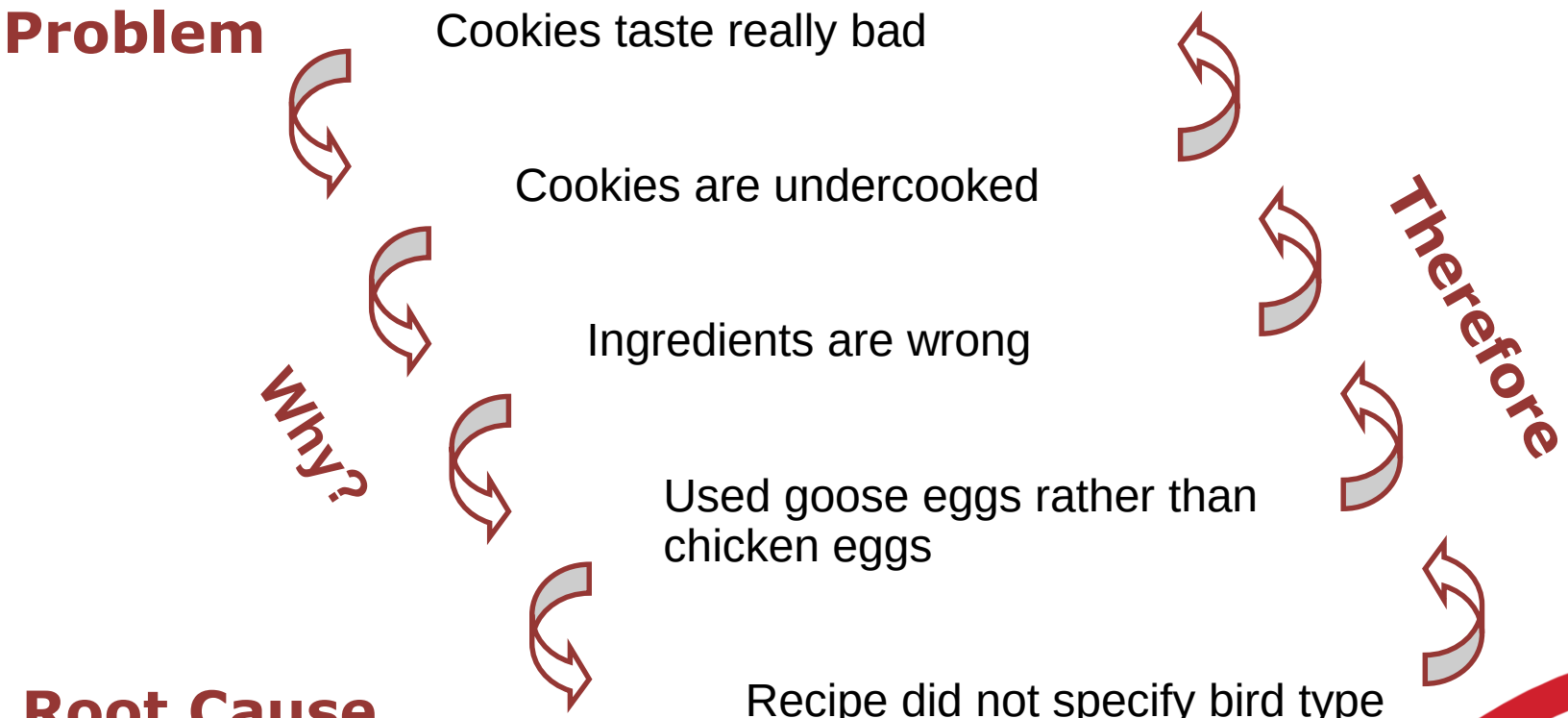
Do we stop here?

3L5Y – Specific Problem – Root Cause Examples

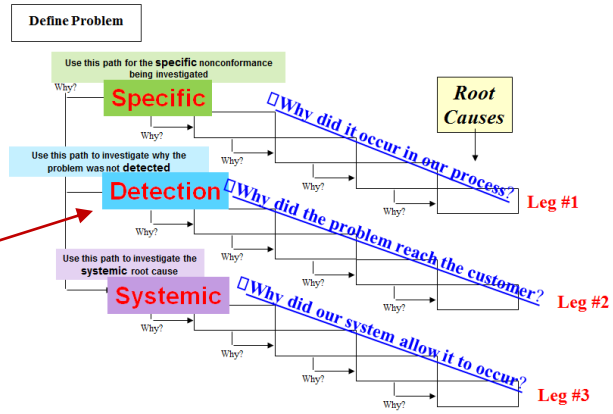
Or do we attempt to find the "real" root cause?



3L5Y – A simple example – Specific Leg #1



3L5Y – DETECTION "leg #2"



DETECTION "leg #2":

- Why did the problem reach the customer?
- Why did we not detect the problem?
  - As noted by the customer or
  - Specific non-conformance
- How did the controls fail?

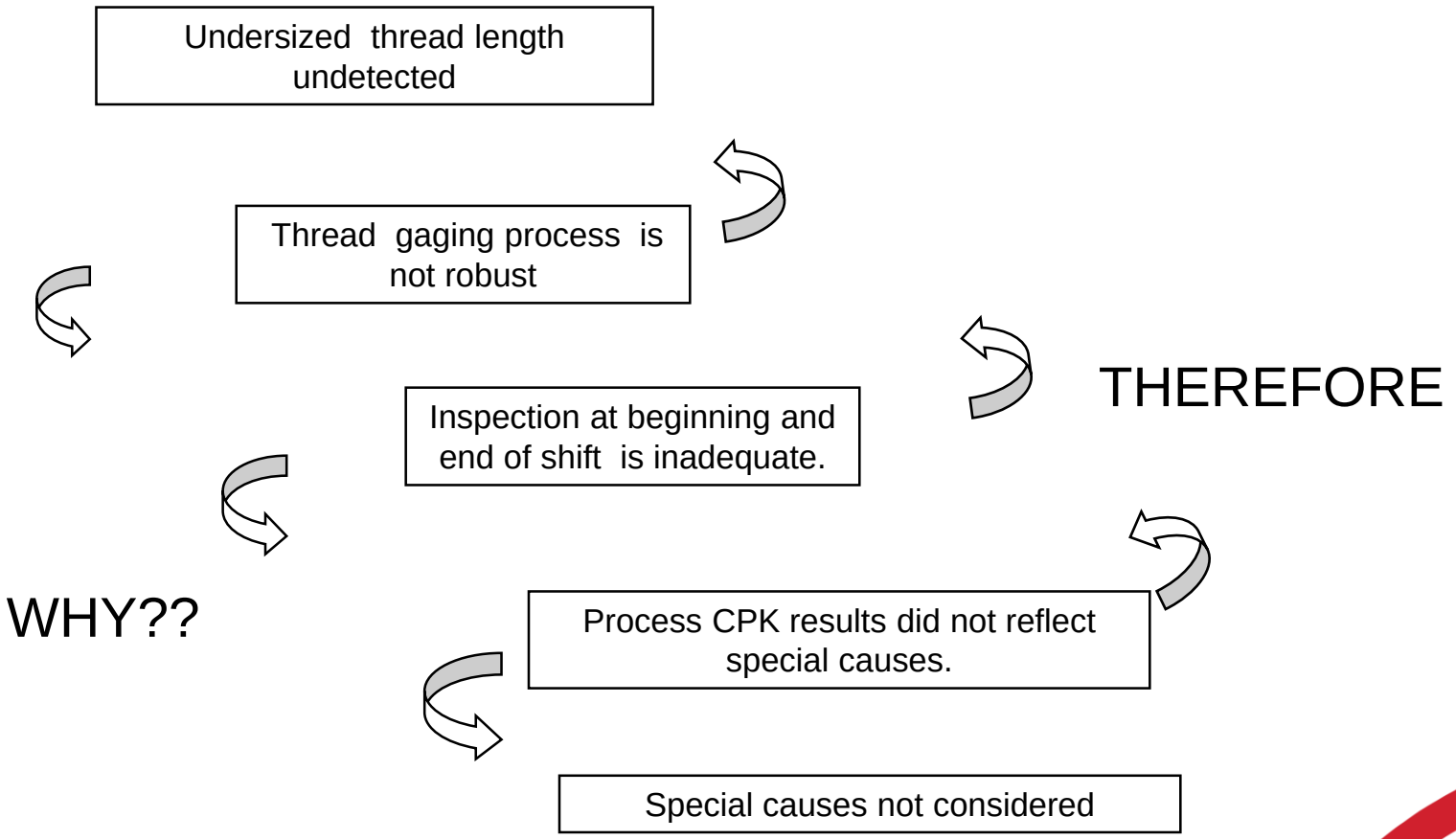
- Root Cause typically related to the inspection system
  - Error-proofing not effective
  - No inspection/quality gate
  - Measurement system issues
  - Detection system or logic changes
  - Parts too dirty

3L5Y – DETECTION "leg #2"

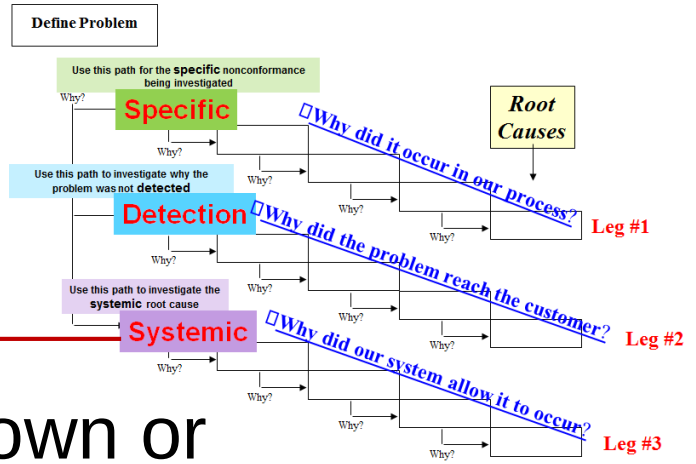
- **DETECTION**

  - **Example Root Causes**
    - No detection process in place – cannot be detected in our plant
    - Defect occurs during shipping
    - Detection method failed – sample size and frequency inadequate
    - Error proofing not working or bypassed
    - Gage not calibrated
    - Master was worn out
    - PPAP was not properly done.
    - Parts labeled incorrectly

3L5Y – A Nexteer example – DETECTION Leg #2



3L5Y – SYSTEMIC - Leg # 3



- **SYSTEMIC "Leg #3"**
  - What was the systemic breakdown or weakness in the process that allowed the cause of specific non-conformance to occur?
  - Why did the possibility exist for this failure to happen?
  - Typically traceable to, or, controllable by, support people
    - Management, Quality, Engineering, etc.

3L5Y – SYSTEMIC - Leg # 3

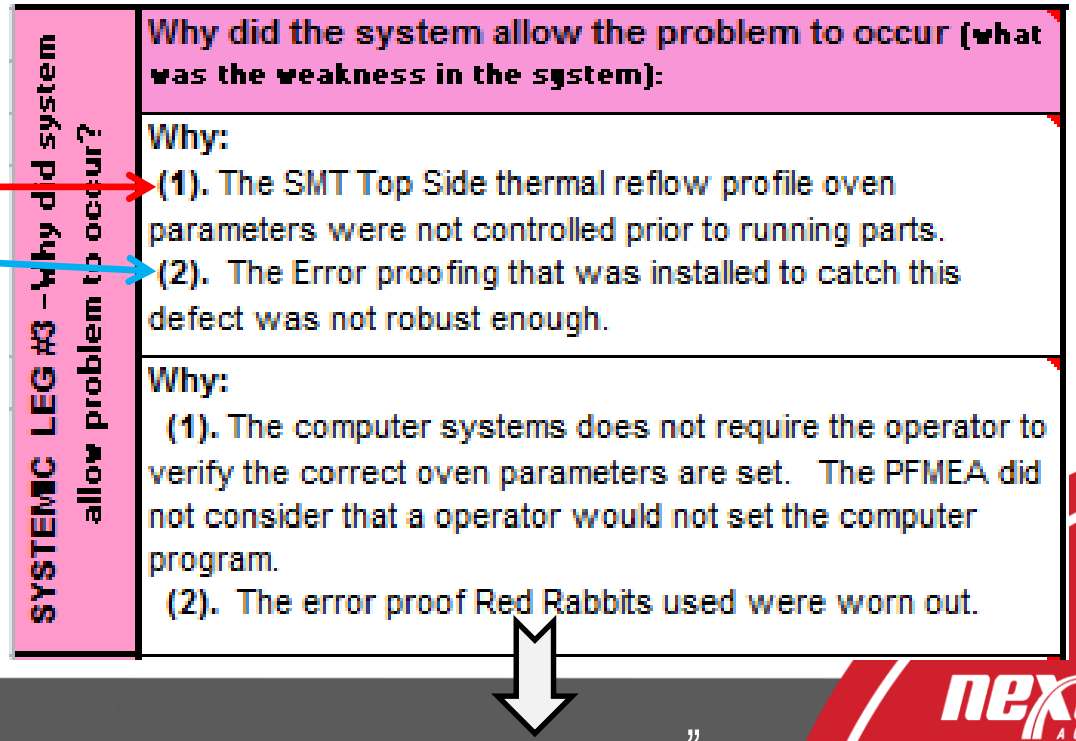
- Questions to consider on **Systemic** Leg #3
  - Was the failure mode identified in PFMEA?
  - Was new product/process planning process followed?
  - Was risk of failure mode occurring predicted properly?
  - Was risk of not detecting the failure mode predicted properly?
  - Is the design of the product robust as it relates to failure modes of root causes?

3L5Y – SYSTEMIC - Leg # 3 – First Why

- The **first WHY** of the **SYSTEMIC** leg #3, **is** the Root Cause from the **SPECIFIC** problem leg #1.
- **In Addition,** if a detection or containment system was in place but it failed in **DETECTION** leg #2, you should include a **second WHY** in **SYSTEMIC** leg #3.
- *The example below shows a situation where you use both Root Causes from the Specific leg #1, and Detection leg #2, for the first WHY's in Systemic leg #3.*

Example:
Root Cause from both the **Specific** legs and **Detection** legs:

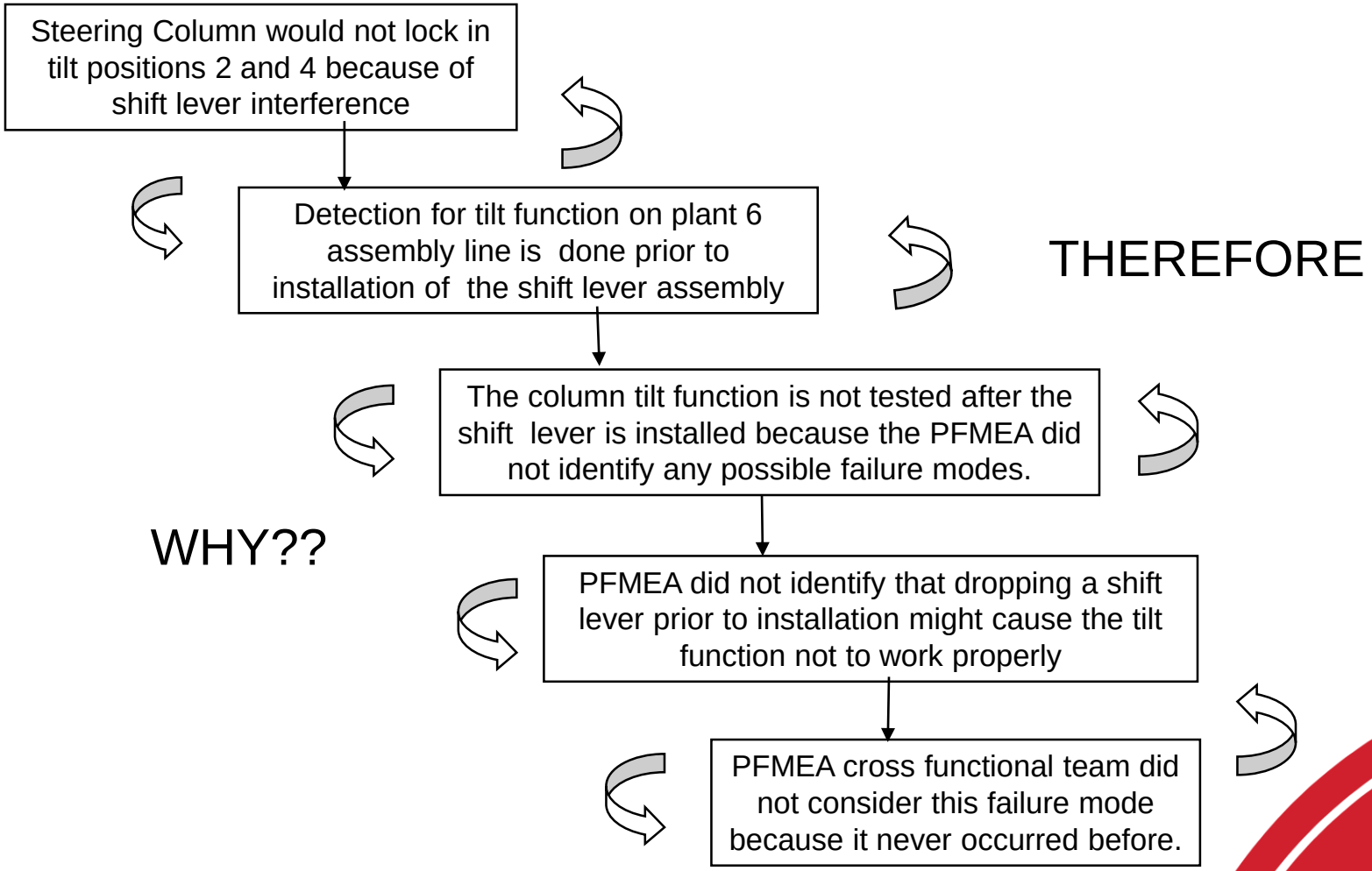
Are used for **first Why** in the Systemic leg: numbered -> 1 and 2.



3L5Y – SYSTEMIC - Leg # 3 – Root Cause Examples

- **SYSTEMIC Root Cause** Examples:
  - Failure mode not on PFMEA
    - Believed failure mode had zero potential for occurrence
    - Failure mode not considered
  - New process not properly evaluated
  - Process was changed creating a new failure mode
  - Quality planning issues or quality system failures
    - Rework/repair not considered in process design
    - Lack of effective Preventive Maintenance system
    - Process planning – all failure modes not considered
    - Not identified during APQP

3L5Y – A Nexteer example – SYSTEMIC Leg #3

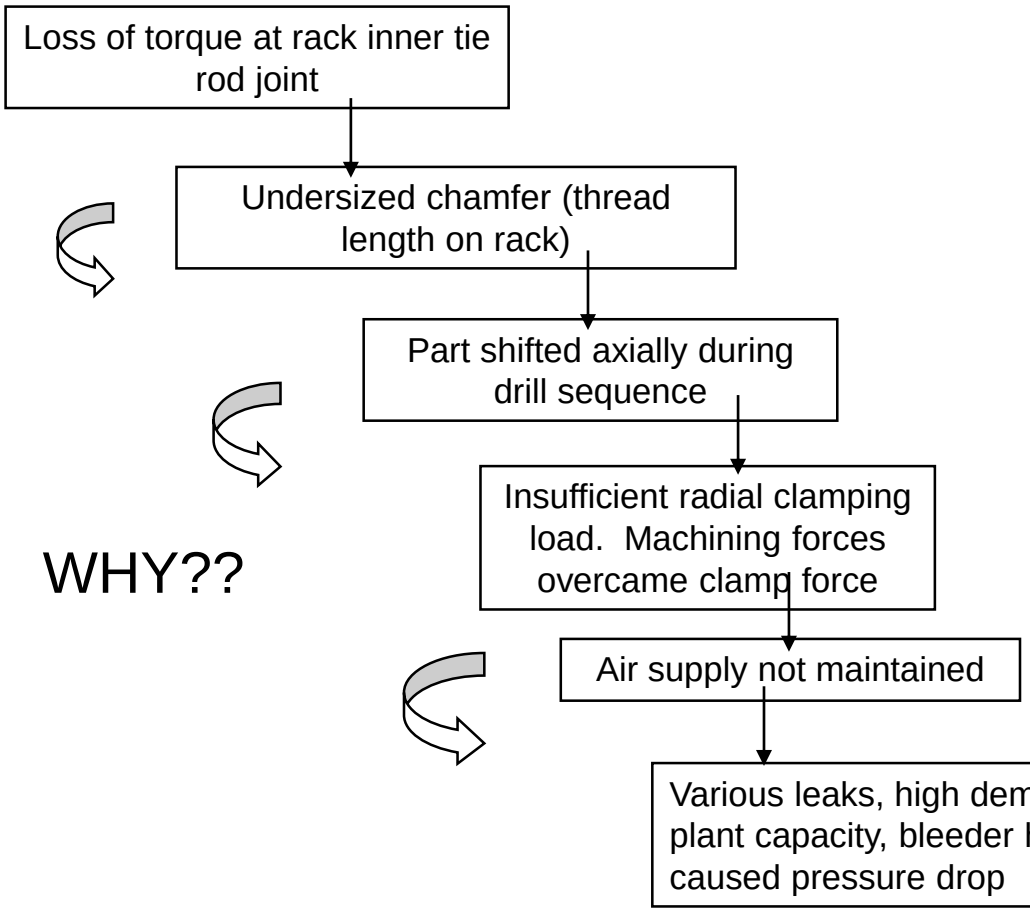


3L5Y – CORRECTIVE ACTIONS

- Corrective action identified for each root cause
- Corrective actions must be feasible, within span of control
- **MUST** Include owner/person responsible and implementation date
- Consider and include documentation updates and training as appropriate
  - **Note: Customer approval may be required for implementation of corrective action if it results in a process change**

3L5Y – Specific Problem CORRECTIVE ACTIONS example

Specific

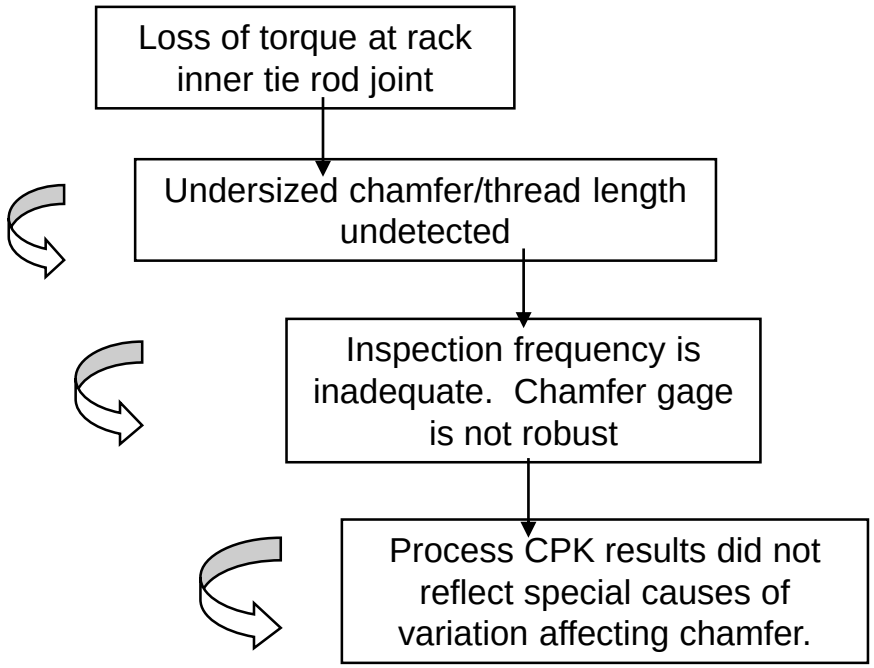


•Corrective Action:

- •Reset alarm limits to sound if <90 PSI.
  - •Smith 10/12/17
- •Disable machine if <90 PSI.
  - •Jones 9/28/17
- •Dropped feed on drill cycle to .0058 from .008.
  - •Davis 10/10/17
- •Clean collets on Kennefec @ PM frequency
  - •Smith 10/12/17
- •Added dedicated accumulator (air) for system or compressor for each Kennefec
  - •Smith 10/12/17
- •Verify system pressure at machines at beginning , middle, and end of shift
  - •Smith 10/12/17
- •Monitor air pressure for 30 days to assure corrective actions effective.
  - •Fitzko 11/12/17

3L5Y – Detection CORRECTIVE ACTIONS example

Detection



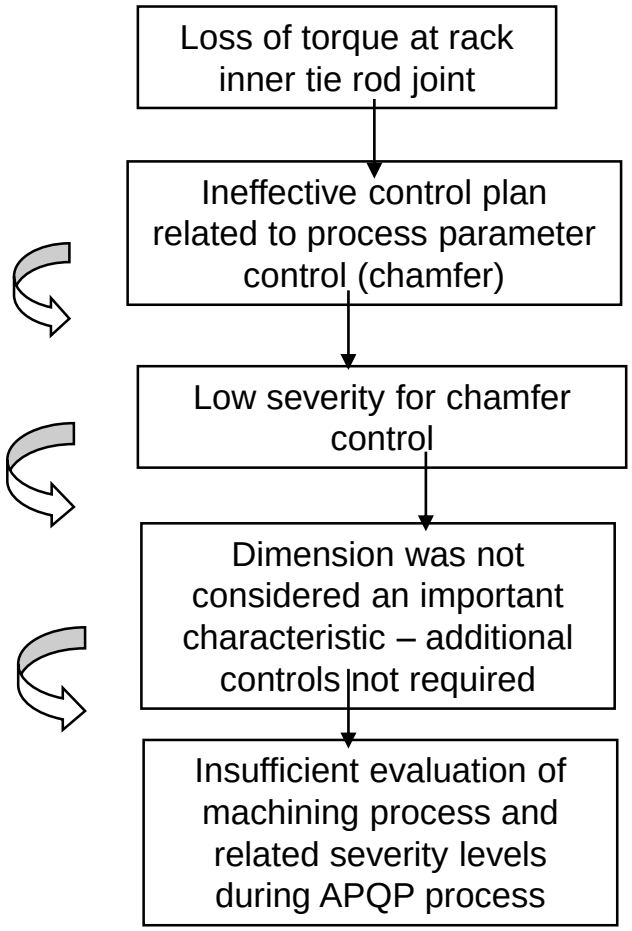
WHY??

Corrective Action:

- Implement 100% sort for chamfer length and thread depth.
  - Smith 9/26/17
- Create & maintain inspection sheet log to validate
  - Davis 8/22/17
- Redesign chamfer gage to make more effective
  - Jones 11/30/17
- Increase inspection frequency at machine from 2X per shift to 2X per hour
  - Johnson 10/14/17
- Review audit sheets to record data from both ends on an hourly basis
  - Davis 10/4/17
- Conduct machine capability studies on thread depth
  - Jones 9/22/17
- Perform capability studies on chamfer diameters
  - Ancel 10/14/17
- Repair/replace auto thread checking unit to include thread length. *Ancel 10/14/17
-
  - 10/18/17

3L5Y – Systemic CORRECTIVE ACTIONS example

Systemic



WHY??

Corrective Action:

- Design record, FMEA, and Control Plan to be reviewed/upgraded by Quality, Manufacturing Engineering. R. Smith 12/3/17
- Update control plan to reflect 100% inspection of feature. R. Jones 12/5/17
- PM machine controls all utility/power/pressure. D. Ancel 12/10/17
- Implement layered audit schedule by Management for robustness/compliance to standardized work. F. Bolger 12/16/17

Lessons Learned:

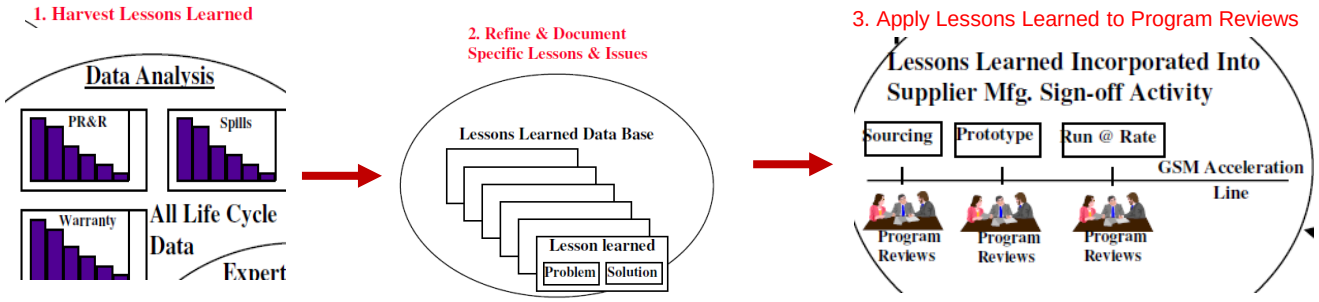
- PFMEA severity should focus on affect to subsequent internal process (immediate customer) as well as final customer
- Measurement system and gage design standard should be robust and supported by R & R studies
- Evaluate the affect of utility interruptions to all machine processed (air/electric/gas)

3L5Y – Lessons Learned

- Lessons Learned
  - What information should be shared with other plants, departments, products, or processes?
  - Consider similar/same products, processes, and equipment
  - State lessons learned in a manner that would make sense to someone not familiar with the specific cause or issue
  - Should be specific, and avoid being to general.

3L5Y – Lessons Learned - Examples

- **Lessons Learned examples:**
  - Welding operations – boundary samples of what is acceptable and what is not are needed
  - Operation of critical machine controls (i.e. diverters) must be verified at an appropriate frequency
  - Operator work instructions must include steps to be taken after machine wreck/smash-up



3L5Y – Look Across

- Nexteer Suppliers **MUST** have a "Look Across" process in place.

  - Ensure lessons learned are shared across all supplier's plants and with external suppliers.
  - Incorporate lessons learned into a common BOP (Bill Of Process) and BOD (Bill of Design). Include in PFMEA's.
  - New and previous Lessons learned records should be stored in a database. Have a number tracking system.
  - Should have a Look Across procedure.

3L5Y – Summary of Key Points

- When do you use it? –Use for formal, informal, and internal issues.
- Use a cross-functional team
- Never jump to conclusions
- Ask “WHY” until you can turn problem off *(you found the root cause).*
- Use the “therefore” test for reverse path
- Strong problem definition as the customer sees it
- **Specific Leg** – Typically applies to people doing the work in operations
- **Detection Leg** – Typically applies to poor detection and controls
- **Systemic Leg** - Typically applies to management, quality, engineering
  - Remember, start with root cause from the specific leg
- Corrective actions must have the due date and owner
- Documents lessons learned and look across
- Supports fast response

Specific - Why did it occur in our process?

Systemic - Why did our system allow it to occur?

Detection - Why did the problem reach the customer?

3L5Y – Group Exercise Example

Group Exercise

Review a 5 Why using what you have learned

- Has probable root cause been determined for:
  - Specific issue
  - Lack of detection
  - Systemic issue
- If not, what questions would you ask?
- Do corrective actions address root cause?
- Have Lessons Learned been noted? Can another plant learn from this?
- If any above answers are “no”, what recommendations would you make to the team working on the 5 Why?

*** See page 68 in the section B training, for a “Bad” example 3L5Y, and, a corrected “Good” version of the same 3L5Y.*

Part B Training – How to fill out Nexteer's 3L5Y Excel Form

Part B – How to Fill Out Nexteer's 3L5Y Excel Form:

Why did Nexteer Update the 3L5Y Excel form?

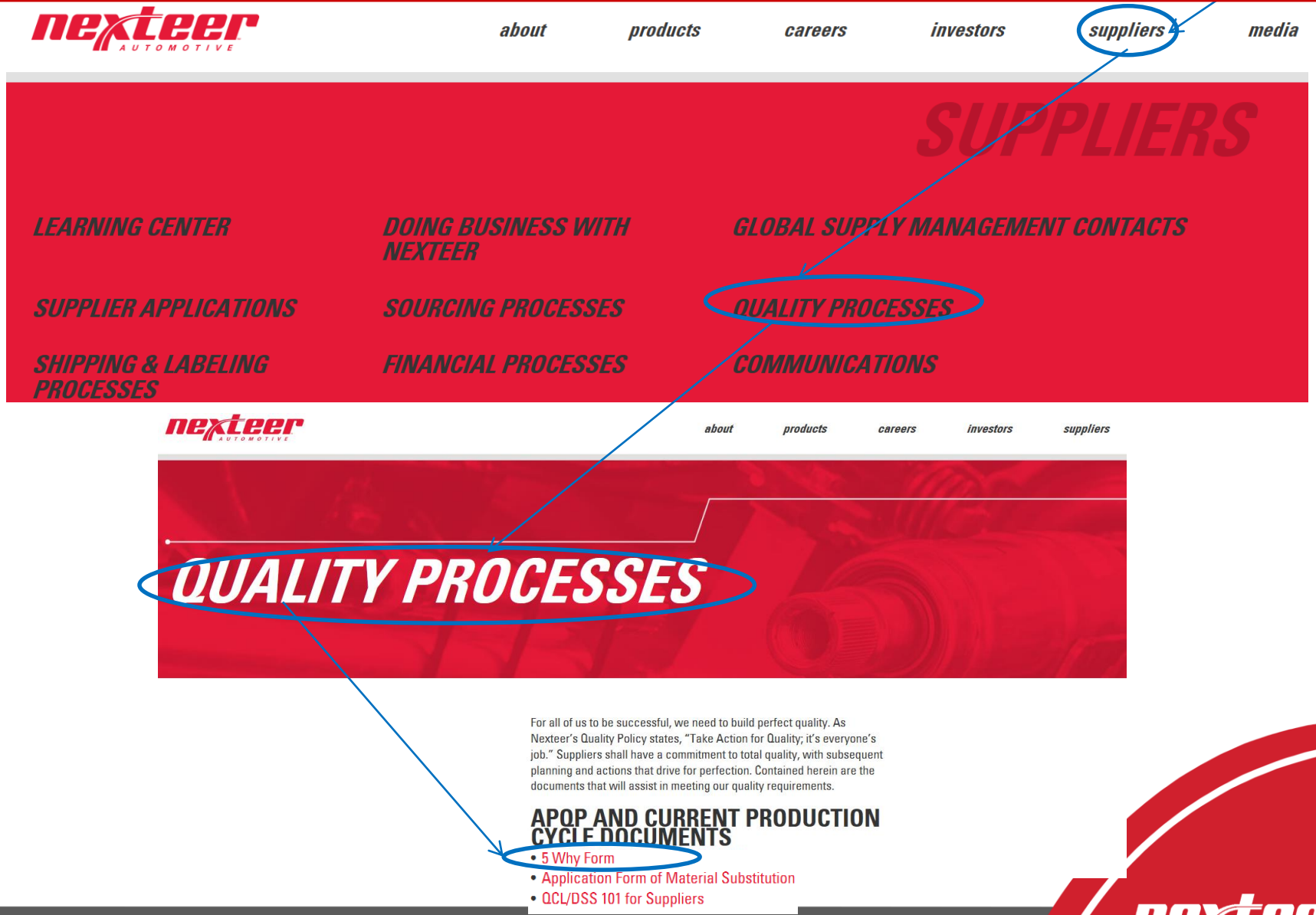
- The purpose of the 3L5Y Excel worksheet training is to standardize a global procedure and method for filling out 3L5Y Excel forms correctly.
- In the past, many 3L5Y's were filled out incorrectly, or, missing information. This resulted in 2 or 3 iterations before getting it correct.
- The new 3L5Y Excel form has "Pop-Ups" that guide the user as they are filling out the form.

Contents–

- Where to find the Excel form
- What is in each Excel Worksheet tab
- 1 page summary "cheat sheet"
- Leg #1 – Specific Problem - Containment & Corrective Actions
- Leg #2 – Detection – Corrective Actions
- Leg #3 - Systemic – Corrective Actions
- Other items to fill out on Excel form

Nexteer Supplier Quality: *"We drive continuous improvement in everything we touch and do"*

3L5Y Excel File located on Nexteer.com under Suppliers



3L5Y Excel File – Contains 11 Worksheets

- This Training will review the **5 added** Worksheet tabs in Nexteer's **Excel 3L5Y**

Worksheet #1 added

Worksheet #2 added

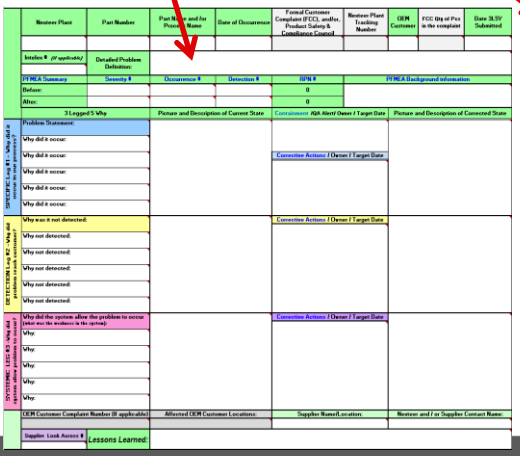
Worksheet #3 added

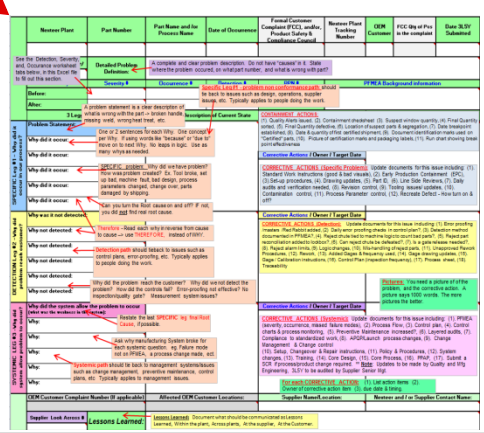
Worksheet #4 added

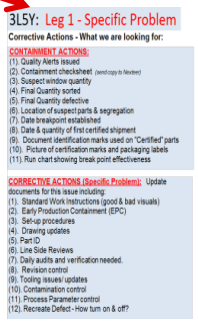
Worksheet #5 added

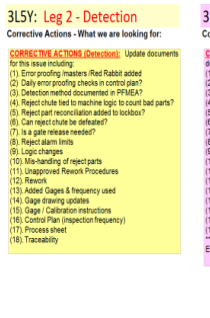
Old worksheets describing the PFMEA

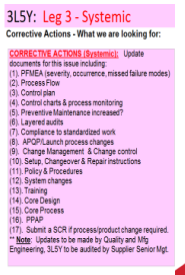
3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

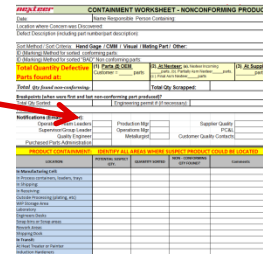












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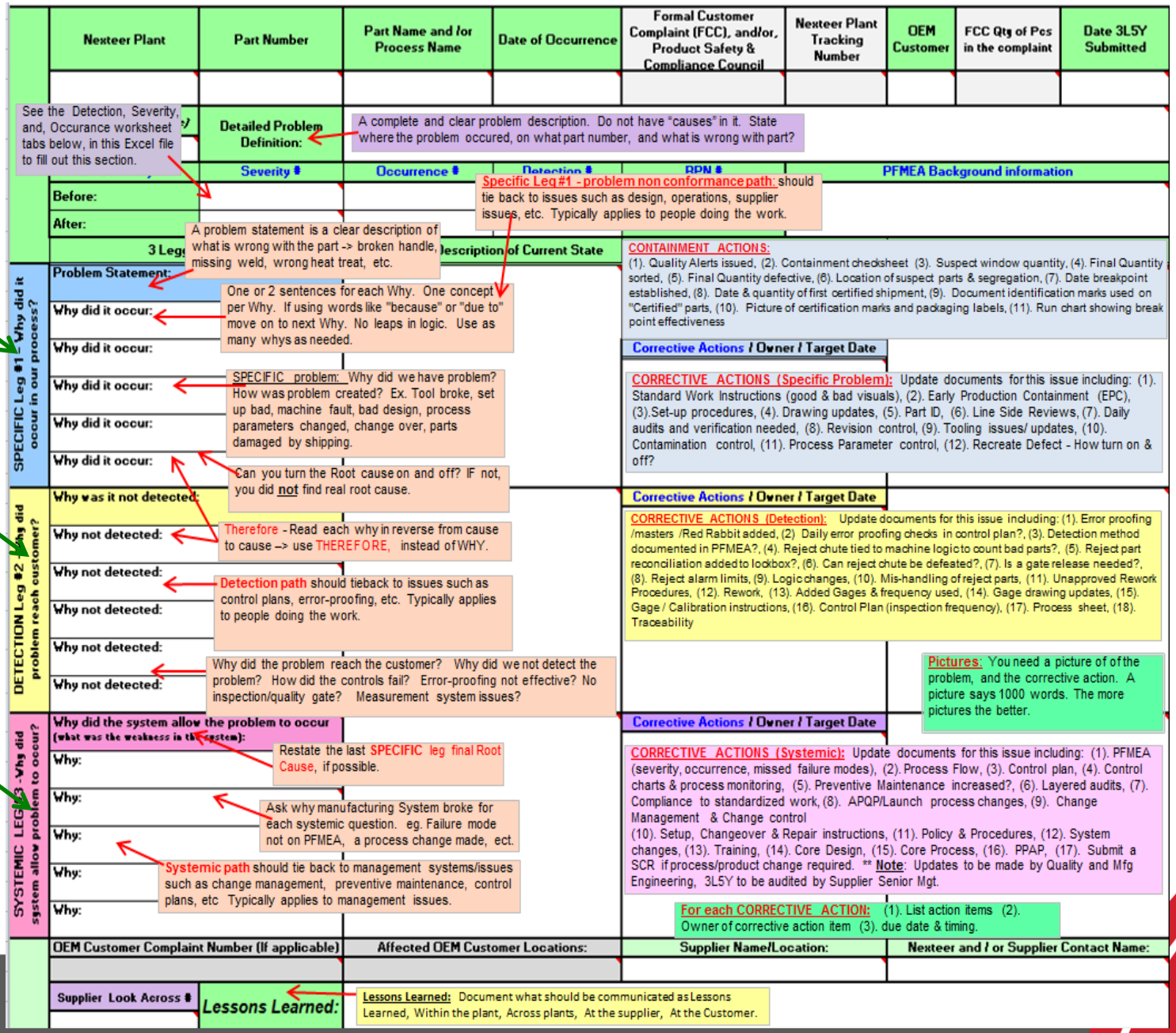
3L5Y Excel File –> 1 pg. summary "Cheat Sheet" (Worksheet #1)



- This is a 1 page summary showing how to fill out a 3L5Y.
- The next few pages will show an enlargement of each of the "corrective action" sections, and how to fill them out.

Why Do We Need a “Cheat Sheet”?

Bad 3L5Y Example

Poor problem statement, and many items not filled out.

The “After” Risk Priority Number (RPN) missing

Poor Containment, and, not enough Corrective actions

3L5Y’s did not dig deep enough. Stopped half way.

Not enough pictures. No after pictures

Plant	Part Number	roduct/Process Nam	Date of Occurrence	Look Across #	Type of Lunk Across (Warranty or WFCC):	Customer	Plant Tracking number	Date 3L5Y Written
7	38003529		2/15/2016		Customer Complaint	Wentzville		

Problem Definition: Bolts loose

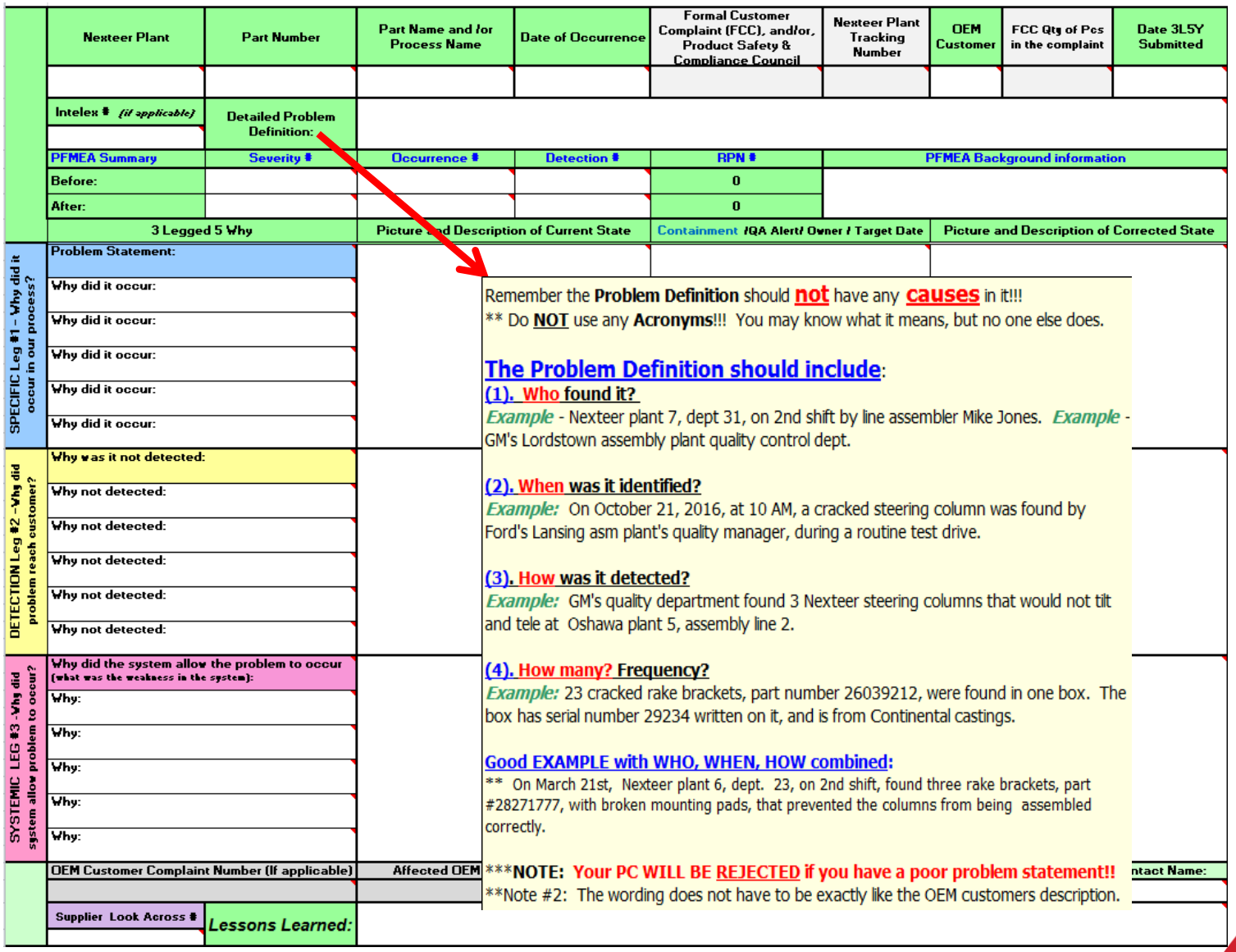
CN #, If Applicable:	PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #
CN 401277 CN 403325	Before:	7	3	3	63
	After:				

3 Legged 5 Why	Picture of Current State	Corrective Actions / Owner / Target Date	Picture of corrected state
Problem Statement: Wentzville Assembly received a 680 [illegible] with loose valve cover bolts.		**Containment Actions** Quality Alert 7-16-922 Posted for operator awareness and containment certification. Complete Date: 2/15/16 & 3/4/16 Y. Pruitt	
Why did it occur: The bolts were not torqued.		Containment Worksheet **Corrective Actions / Owner / Target Date**	
Why was it not detected: Gear returned for loose bolts.		Layered Audit Updated LA for GL,TL,QE **Complete Date: 6.3.16 Y. Pruitt**	
Why not detected: A rejected gear was allowed to enter the unload station.		Added Photo Eye with back check detection to prevent any type of reject from being sent around the line. **Complete Date: 6-3-16 C. Cameron**	
Why not detected:			
Why not detected:			
Systemic root cause: Gear returned for loose bolts		OCP34400126 Updated OCP with new documents **Complete Date: 6.13.16 C. Cameron**	
Systemic root cause: Downstream pallet tracking switch was faulted in “good” position.			
Systemic root cause:			
Systemic root cause:			

Customer Problem Case Number	Affected Customer Locations:	Supplier Location:	Contact Name:
N/A	Wentzville Assembly	Nexteer Plant 7	Yolanda Pruitt

Lessons Learned Follow Teardown Procedure

3L5Y Excel File – Pop Up Instructions on New 3L5Y Blank Master

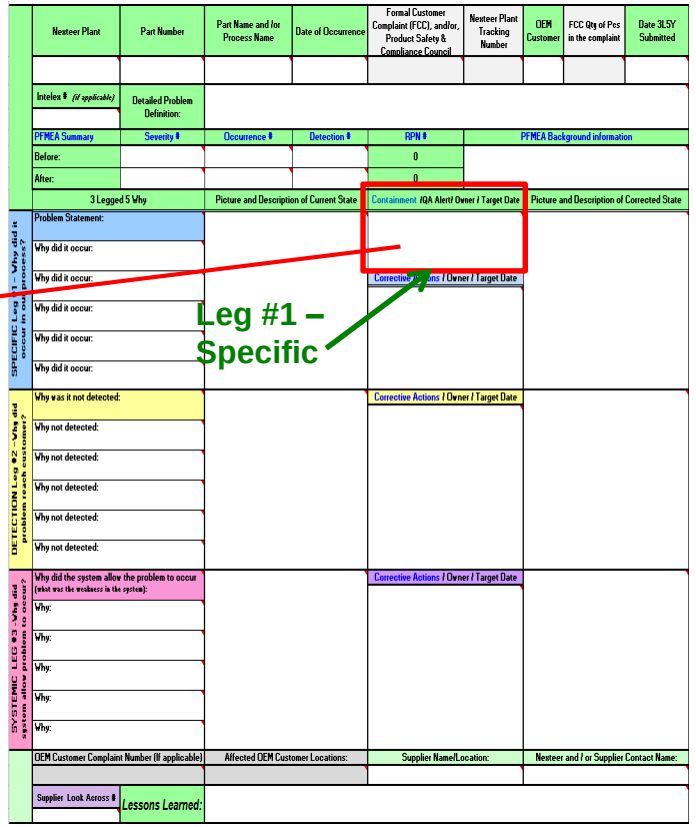


- Example "Pop-Up" Instruction
- Hover over any box in the 3L5Y "Blank Master" and instructions on how to fill out that box will "pop up"

3L5Y Excel File –> Leg 1 –Containment Actions (Worksheet #2)

CONTAINMENT ACTIONS:

(1). Quality Alerts issued
(2). Containment checksheet *(send copy to Nexteer)*
(3). Suspect window quantity
(4). Final Quantity sorted
(5). Final Quantity defective
(6). Location of suspect parts & segregation
(7). Date breakpoint established
(8). Date & quantity of first certified shipment
(9). Document identification marks used on "Certified" parts
(10). Picture of certification marks and packaging labels
(11). Run chart showing break point effectiveness



➢ For LEG 1 – Specific Problem - CONTAINMENT:

- Document that you did all 11 items shown in the chart above, if they apply to your problem
- Expand the 3L5Y to 2 or 3 pages if needed, or add a worksheet tab

3L5Y Excel File – CONTAINMENT Worksheet Example

Nexteer Form #: 15-1-5-XXX Form Revision date: September 20, 2017

CONTAINMENT WORKSHEET - NONCONFORMING PRODUCT

Date:	Name Responsible Person Containing:				
Location where Concern was Discovered:					
Defect Description (including part number/part description):					
Sort Method / Sort Criteria:	Hand Gage:	CMM:	Visual:	Mating Part:	Other:
ID (Marking) Method for sorted conforming parts:					
ID (Marking) Method for sorted "BAD" Non conforming parts:					
Total Quantity Defective Parts found at:	(1). Parts @ OEM Customer = _____ parts	(2). At Nexteer: (a). Nexteer Incoming _____parts, (b). Partially Asm Nexteer_____parts, (c). Final Asm Nexteer_____parts		(3). At Supplier _____parts	
Total Qty non-conforming parts returned to supplier:		*Total Qty non-conforming parts scrapped at Nexteer:*			
Total Qty of Good + Bad parts returned to supplier		*Total Qty of Good + Bad parts scrapped at Nexteer*			
Breakpoints (when were first and last non-conforming part produced)?					
Total Qty Sorted:		Engineering permit # (if necessary):		Hold Tag #'s:	

Notifications (Email or Other):

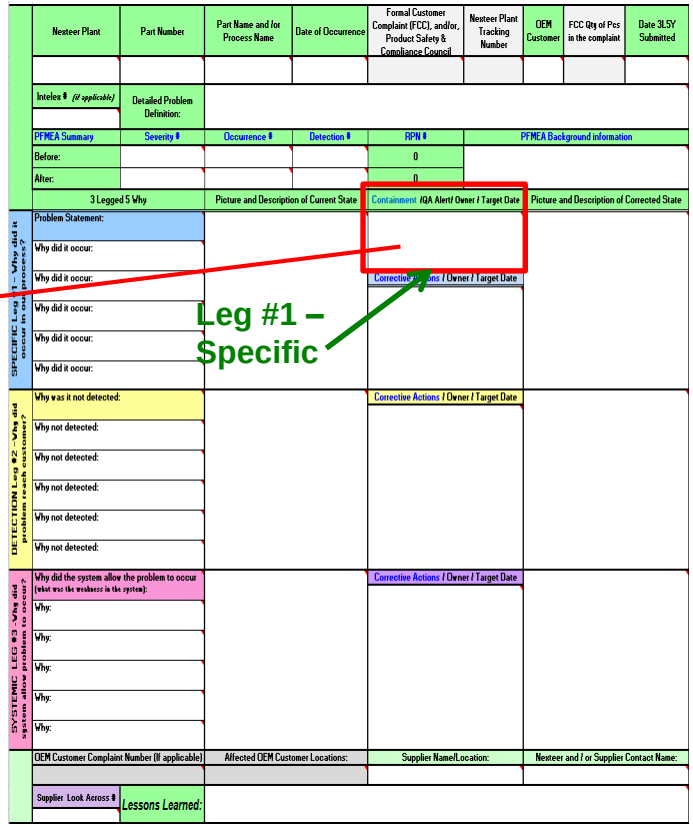
Operators/ Team Leaders		Production Mgr		Supplier Quality	
Supervisor/Group Leader		Operations Mgr		PC&L	
Quality Engineer		Metallurgist		Customer Quality Contacts	
Purchased Parts Administration					

PRODUCT CONTAINMENT: IDENTIFY ALL AREAS WHERE SUSPECT PRODUCT COULD BE LOCATED

LOCATION	POTENTIAL SUSPECT QTY.	QUANTITY SORTED	NON - CONFORMING QTY FOUND?	Comments
In Manufacturing Cell:				
In Process containers, loaders, trays				
In Shipping:				
In Receiving:				
Outside Processing (plating, etc)				
WIP Storage Area				
Laboratory				
Engineers Desks				
Scrap bins or Scrap areas				
Rework Areas				
Shipping Dock				
In Transit:				
At Heat Treater or Painter				
Induction Hardeners				
Staging Areas (Incoming / Outgoing)				
Service Parts Operations				
Repair or teardown area				
Pilot Build Areas				
Containment / Hold Areas				
Between Departments				
Between Plants				
At warehouse or Distrabution center				
At Service Parts				
At Suppliers or sequencers				
At Nexteer				
At OEM Customer				
GP-12 Area				
Teardown				
Update Documents:	Post Quality Alert ☐		Layered Process Audit Sheets necessary ☐	

List other deparments or plants that are possibly at risk and include who was notified?

Signatures: Originator Manufacturing Supervisor Quality Engineer



Leg #1 – Specific

- Attach a Containment Worksheet similar to the one above.

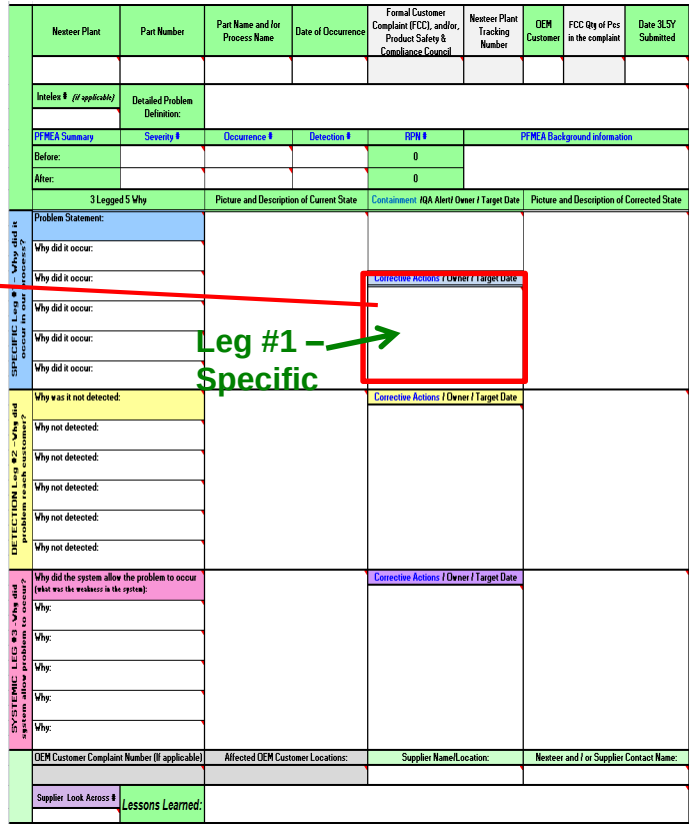
3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

Nexteer Supplier Quality: *"We drive continuous improvement in everything we touch and do"*

3L5Y Excel File –> Leg 1 –Corrective Actions (Worksheet #2)

CORRECTIVE ACTIONS (Specific Problem): Update documents for this issue including:

(1). Standard Work Instructions (good & bad visuals)
(2). Early Production Containment (EPC)
(3). Set-up procedures
(4). Drawing updates
(5). Part ID
(6). Line Side Reviews
(7). Daily audits and verification needed.
(8). Revision control
(9). Tooling issues/ updates
(10). Contamination control
(11). Process Parameter control
(12). Recreate Defect - How turn on & off?



- **For LEG 1 – Specific Problem – CORRECTIVE ACTIONS:**
  - Document that you did all 12 items shown in the chart above, if they apply to your problem.
  - Expand the 3L5Y to 2 or 3 pages if needed, or, add a worksheet tab.
  - For each **CORRECTIVE ACTION**: (1). List action items (2). Owner of corrective action item (3). due date & timing.

3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

Nexteer Supplier Quality: *"We drive continuous improvement in everything we touch and do"*

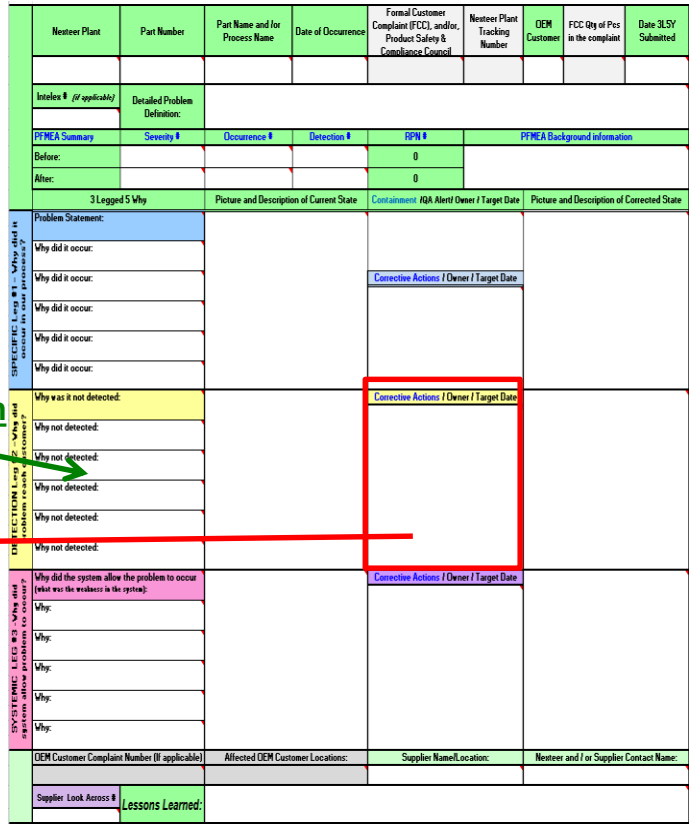
3L5Y Excel File –> Leg 2 – DETECTION Corrective Actions (Worksheet #2)

CORRECTIVE ACTIONS (Detection):

Update documents for this issue including:

(1). Error proofing /masters /Red Rabbit added
(2) Daily error proofing checks in control plan?
(3). Detection method documented in PFMEA?
(4). Reject chute tied to machine logic to count bad parts?
(5). Reject part reconciliation added to lockbox?
(6). Can reject chute be defeated?
(7). Is a gate release needed?
(8). Reject alarm limits
(9). Logic changes
(10). Mis-handling of reject parts
(11). Unapproved Rework Procedures
(12). Rework
(13). Added Gages & frequency used
(14). Gage drawing updates
(15). Gage / Calibration instructions
(16). Inspection Frequency
(17). Process sheet
(18). Traceability

Leg #2 -Detection
How and why were non conforming parts not identified or contained?



For LEG 2 - the DETECTION leg –CORRECTIVE ACTIONS:

- Document that you did all 18 items shown in the chart above if they apply
- Expand the 3L5Y to 2 or 3 pages if needed, or add a worksheet tab
- For each **CORRECTIVE ACTION**: (1). List action items (2). Owner of corrective action item (3). due date & timing.

3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

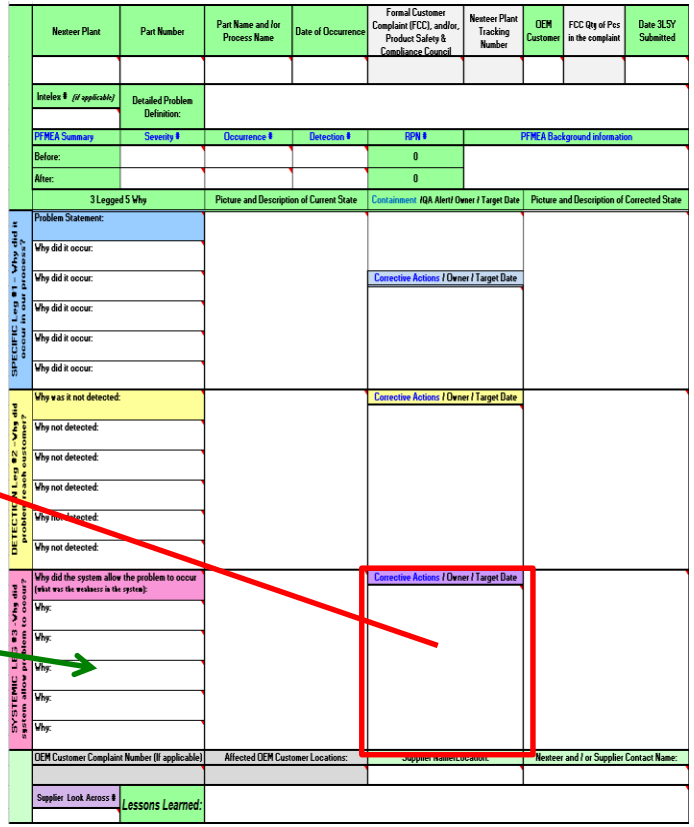
3L5Y Excel File –> Leg 3 – SYSTEMIC Corrective Actions (Worksheet #2)

CORRECTIVE ACTIONS (Systemic): Update documents for this issue including:

(1). PFMEA (severity, occurrence, missed failure modes)
(2). Process Flow
(3). Control plan
(4). Control charts & process monitoring
(5). Preventive Maintenance increased?
(6). Layered audits
(7). Compliance to standardized work
(8). APQP/Launch process changes
(9). Change Management & Change control
(10). Setup, Changeover & Repair instructions
(11). Policy & Procedures
(12). System changes
(13). Training
(14). Core Design
(15). Core Process
(16). PPAP
(17). Submit a SCR if process/product change required.

** **Note**: Updates to be made by Quality and Mfg Engineering, 3L5Y to be audited by Supplier Senior Mgt.

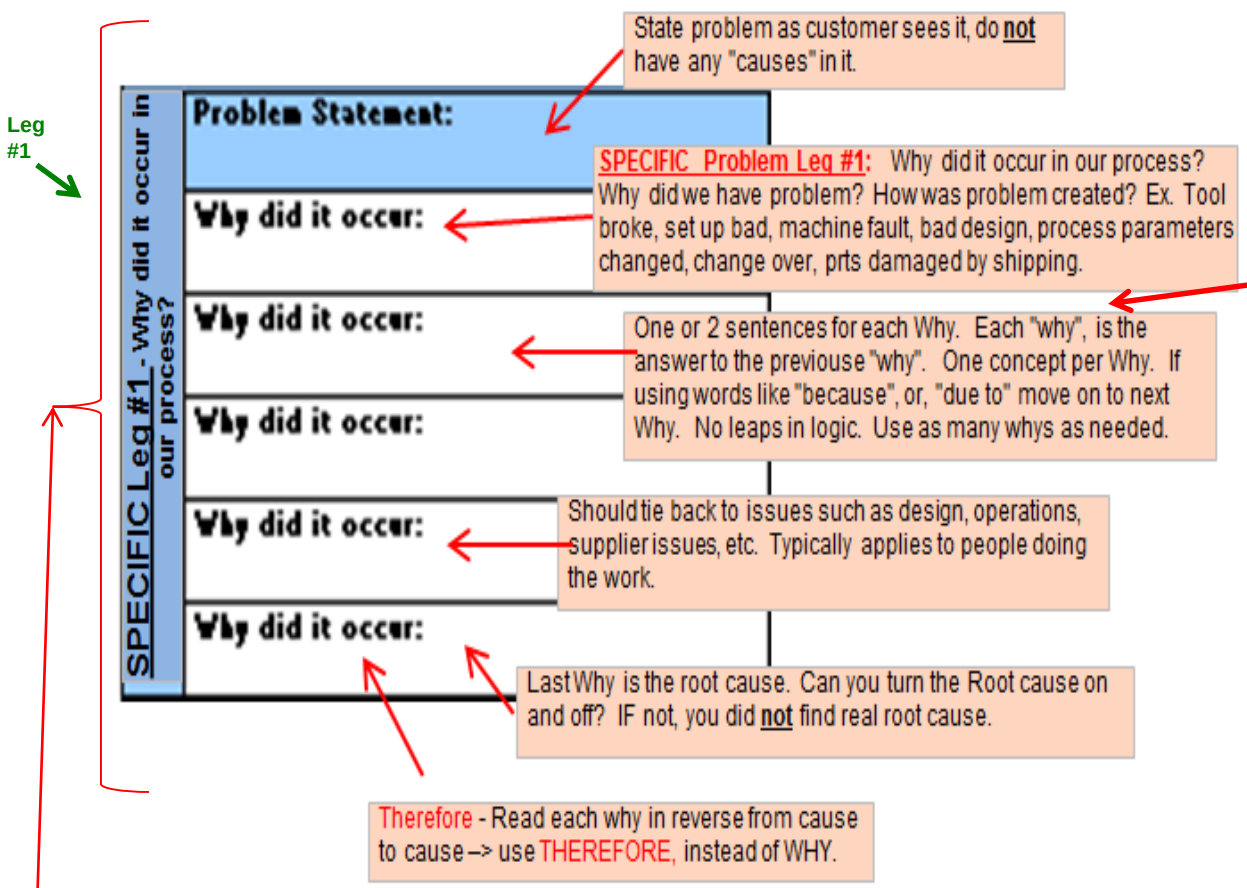
Leg #3 -Systemic
What failed in quality system to allow this to occur?

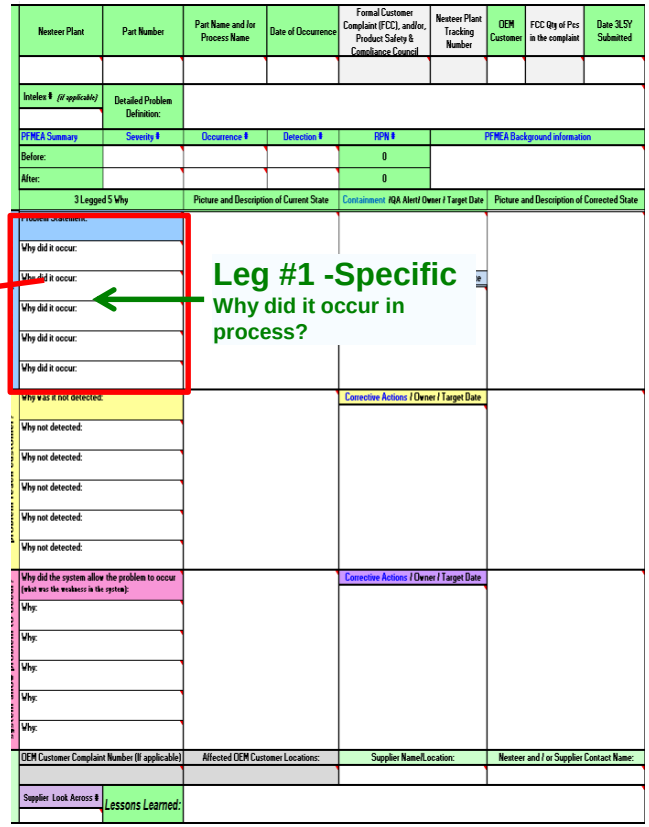


➢ **For** LEG #3 - the SYSTEMIC leg, Corrective Actions:

- Document that you did all 17 items shown in the chart above if they apply
- Expand the 3L5Y to 2 or 3 pages if needed, or add a worksheet tab
- For each **CORRECTIVE ACTION**: (1). List action items (2). Owner of corrective action item (3). due date & timing.

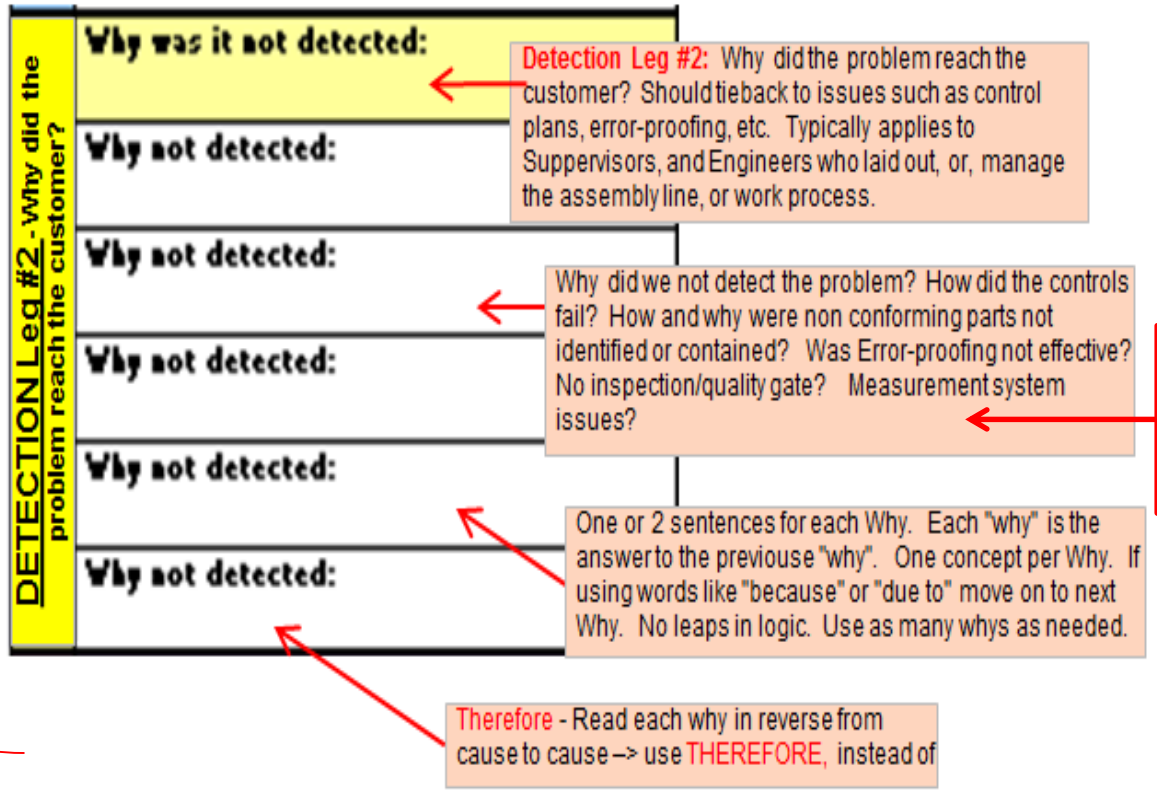
3L5Y Excel File – Leg #1 Cheat Sheet Summary – Specific Leg

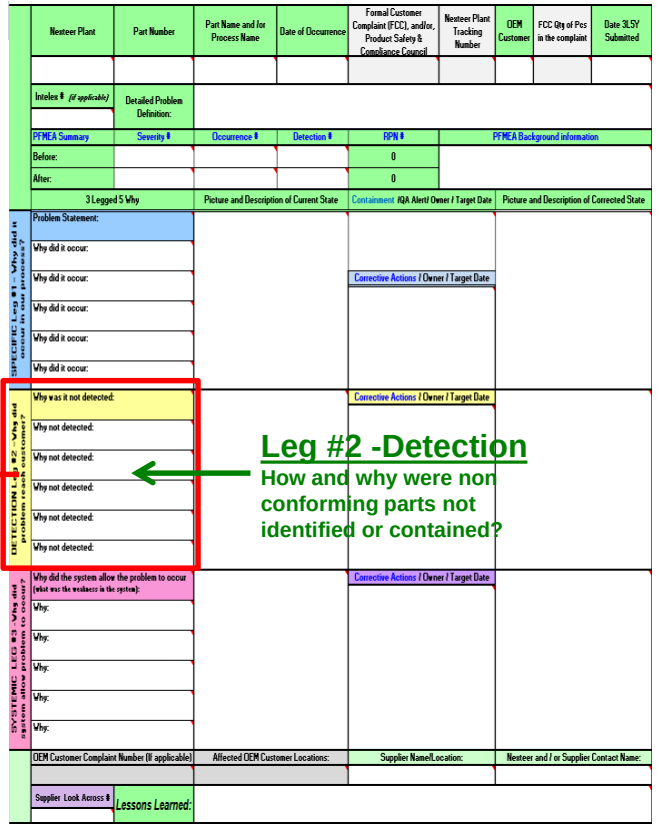




- The Specific Leg #1 of the 3L5Y should have good flow, and, can be read forewords and backwards.
- There should be enough detail, supported by photos, to describe the issue quickly to someone who is not familiar with the issue.
- Use as many Why's as needed - Keep asking "Why" until you get to root cause. Insert as many whys as needed.

3L5Y Excel File – Leg #2 Cheat Sheet Summary – Detection Leg



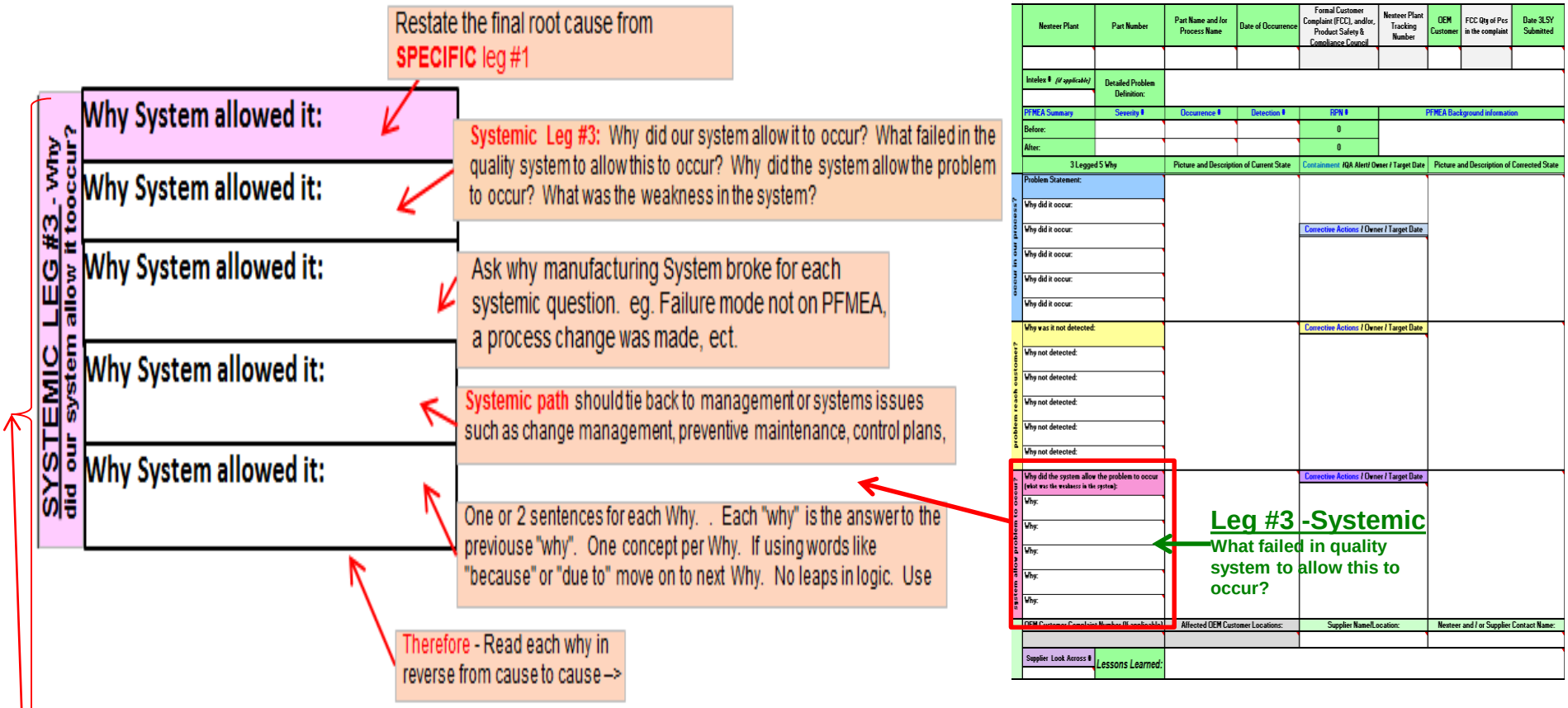


Leg #2 -Detection
How and why were non conforming parts not identified or contained?

- The Detection Leg #2 of the 3L5Y should have good flow, and, can be read forewords and backwards.
- Concentrate on why the problem was not detected. Did controls fail, poor error proofing, poor measurement systems?

3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

3L5Y Excel File – Leg #3 Cheat Sheet Summary – Systemic Leg

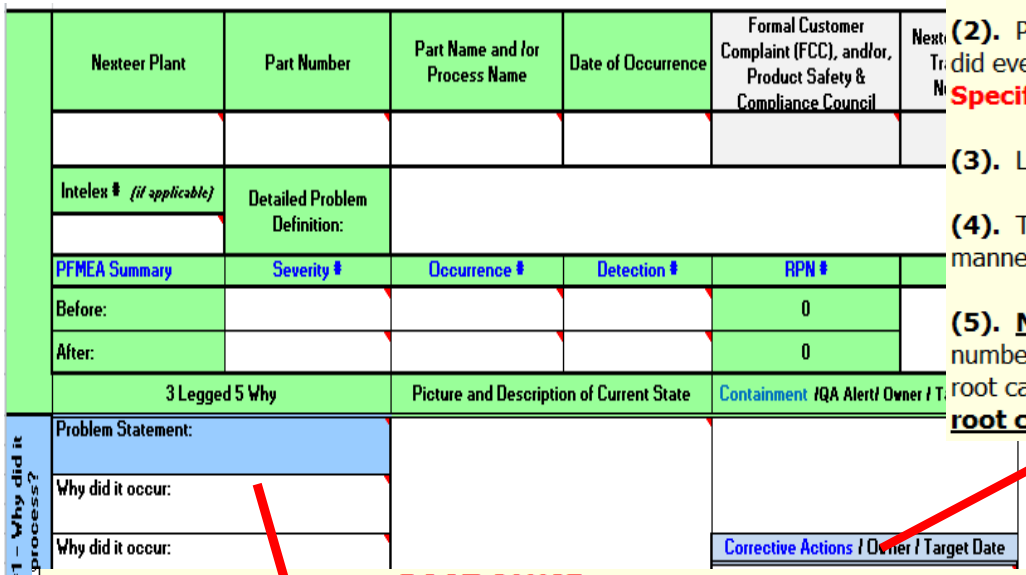


- The Systemic Leg #3 of the 3L5Y should have good flow, and, can be read forewords and backwards.
- Concentrate on how the system broke down – failure mode not on PFMEA, unauthorized change made, preventive maintenance inadequate, ect. Typically a management issue.

3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Quality Alert | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

3L5Y Excel File – How to Handle problems with Multiple Root Causes

- The Pop Ups below explain how to handle problems with multiple root causes, and corresponding corrective actions.
- The next page will give an example of a multiple root cause numbering method – use if at one site.
- Use multiple 3L5Y's if problem is at multiple sites.



The Corrective Actions "Specific" should include all the following that apply to your 3L5Y:

(1). List all Actions taken to fix the problem

(A). Each action should have the owners name and target completion date.

(2). Please look at the **"Cheat Sheet Details"** worksheet tab to make sure you did everything that apply to your 3L5Y listed under **"Corrective Actions - Specific"**

(3). List everything you updated - work instructions, drawings, etc.

(4). The corrective actions must be irreversible and implemented in a timely manner.

(5). Note: If your problem has more than one root cause, with each root cause numbered, then the **corrective action numbering system** should match the root cause numbering system. See Nexteer's training for example of **multiple root cause** and corresponding **corrective action** numbering system.

(1). The last 5Why is your ROOT CAUSE.

(2). Can you turn the root cause on and off? If not, you did not find the real root cause.

(3). More than One Root Cause? If you have multiple root causes **all at Nexteer**, then you can number the root causes, and only fill out one 3L5Y. See Nexteer training manual for handling multiple root causes within Nexteer.

(4). If you have multiple root causes, that have occured across different organizations, then multiple 3L5Y's are needed. See Nexteer training manual.

(a). Create a 3L5Y Excel worksheet tab for each Root Cause.

(b). Label the worksheet tabs "3L5Y Nexteer", and "3L5Y Supplier #1". Ask the Nexteer Quality Engineers, or, SQE's for advice if you have any questions.

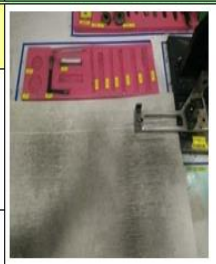
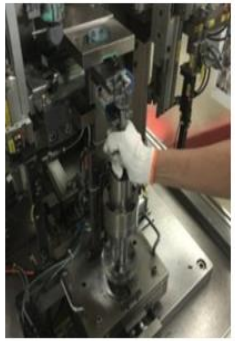
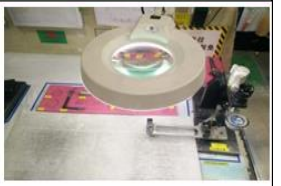
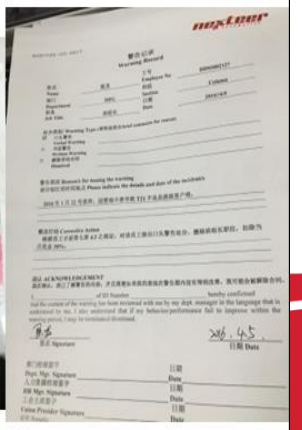
3L5Y Excel File – Problems with Multiple Root Causes - Numbering Example

Nexteer Plant	Part Number	Part Name and/or Process Name	Date of Occurrence	Formal Customer Complaint (FCC), and/or, Product Safety & Compliance Council (PSCC)	Nexteer Plant Tracking Number	OEM Customer	FCC Qty Pcs found at OEM	Date 3L5Y Submitted
Nexteer Plant 8- Saginaw, MI	38202929	I-Shaft Yoke Asm / Yoke Stake Operation	1/22/2016	32455	FCC	Ford - Lansing Asm	1	06Jun2016

Intelex # / eQMS CA #	Problem Definition:
1234567	On March 30, 2016, Ford's Lansing Assembly plant 2, on second shift, found one Bronco steering column with a missing stake on the I-shaft yoke. The I-shaft felt loose to the Ford assembly line operator, and almost came appart in his hands. The I-shaft asm was returned to Nexteer's Plant 8, in Saginaw, MI, along with a formal complaint.

CN #, if applicable	PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #	PFMEA Background information
NA	Before:	9	3	3	81	The PFMEA has been reviewed and updated by a cross functional team involving both Nexteer and Ford personel.
	After:	9	4	4	144	

DETECTION Leg #2 -Why did problem reach customer?

3 Legged 5 Why	Picture and Description of Current State	Containment /QA Alert/ Owner / Target Date	Picture and Description of Corrected State
Why was it not detected: OP10 T21 missed the yoke staking **Why was it not detected:** 1. There was no detection in place to detect miss operation or missing stake 2. Operator running visual check on GP12 didn't detect missing stake on this part **Why not detected:** 1. The Chery T21 shaft has paint coat and the standard traceability via label could not be used, and the CCD (camera) was not implemented on this application 2. Records show that the Operator was caught being distracted during his work. Additionally, it was noticed that the light intensity was not optimum at the GP12 station. **Why not detected:** 2. Team leader didn't take actions when the operator was first found not performing his job adequately	 	**Corrective Actions / Owner / Target Date** 1.1. Add the program to print the label of T21 after OP10 yoke press result is OK, If result is not OK, there is no label be printed - Erwin Zhu, 4/6/2016 finished. 1.2. Add the error proofing on station OP50B to scan the label on solid shaft yoke ASM for cycle permission, if there is no label or the label result is not OK, the machine can not start with red light to warm opreator - Erwin Zhu, 4/6/2016 finished. 2.1. Add high light equipment, see the right picture - Bin Zhou, 2016.3.30 2.2. The operator who didn't follow GP12 Standard Work Instruction was sanctioned. The team leader was also sanctioned because of ineffective management of operator, See the Suzhou HR's announcement. Jinjin Liu 2016.4.5 2.3. Select the best operators onto severity 9/10 check stations. Jinjin Liu 2016.3.15	  

Example: multiple Root Causes numbered -> 1 and 2.

Example: corresponding corrective actions numbered 1.1, 1.2, AND 2.1, 2.2.

3L5Y Excel File – PFMEA Summary & Lessons Learned

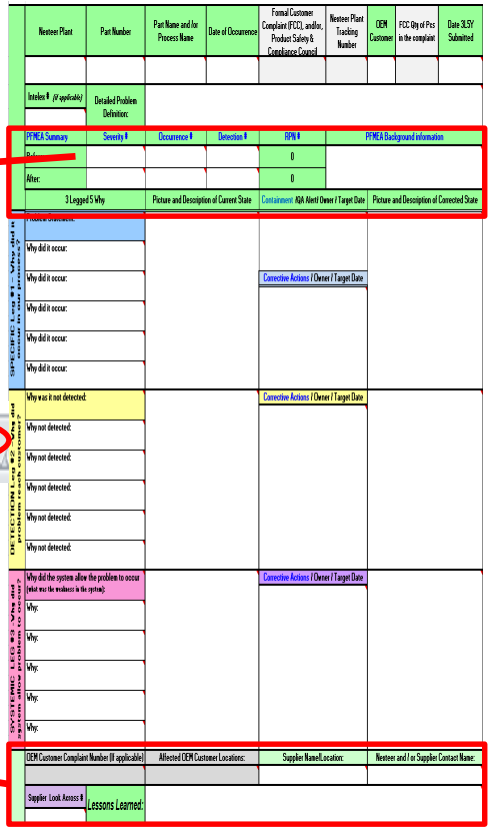
PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #	PFMEA Background information
Before:				0	
After:				0	

See the Detection, Severity, and, Occurrence worksheet tabs below, in this Excel file to fill out this section.

3L5Y - Blank Master | 1 Pg - Cheat Sheet | Cheat Sheet Details | Containment Worksheet | Supporting Documents | Detection | Severity | Occurrence | Product Severity Rank | Revision tracker

OEM Customer Complaint Number (If applicable)	Affected OEM Customer Locations:	Supplier Name/Location:	Nexteer and / or Supplier Contact Name:

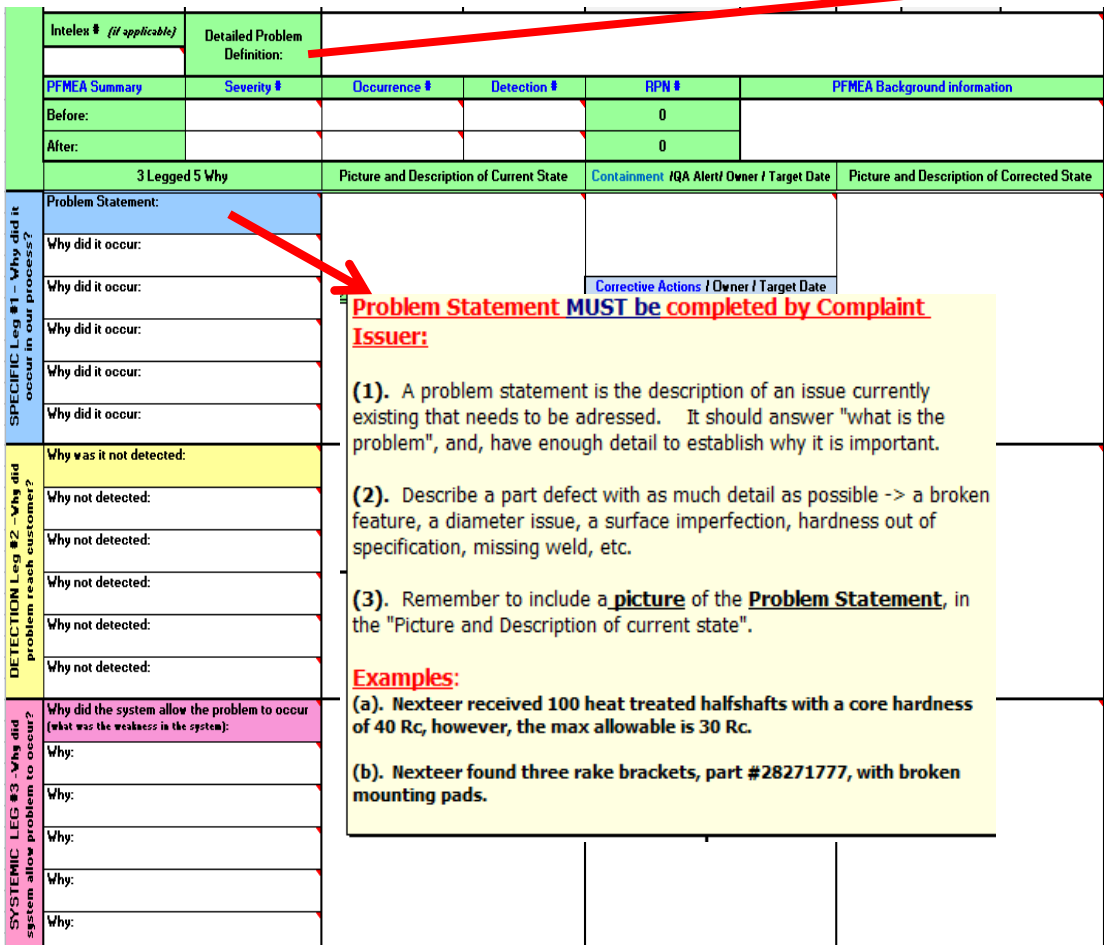
Supplier Look Across #	Lessons Learned:
	Lessons Learned: Document what should be communicated as Lessons Learned, Within the plant, Across plants, At the supplier, At the Customer.



- PFMEA Summary values should meet AIAG requirements and a Risk Priority Number (RPN) should be calculated *(see PFMEA Worksheet tabs).*
- Write a logical Lessons Learned statement for the issue. For Nexteer users, your lessons learned may be updated by a APQP and placed into Nexteer's eQMS system.

3L5Y Excel File – Pop Up's – Problem Definition vs Problem Statement

- Both the Problem Definition, and, the Problem Statement, should be filled out by the complaint issuer. If not, please contact the complaint issuer to help you fill them out. Regardless of who fills them out, they must meet Nexteer guidelines, or your 3L5Y will be rejected.



Problem Statement MUST be completed by Complaint Issuer:

(1). A problem statement is the description of an issue currently existing that needs to be adressed. It should answer "what is the problem", and, have enough detail to establish why it is important.

(2). Describe a part defect with as much detail as possible -> a broken feature, a diameter issue, a surface imperfection, hardness out of specification, missing weld, etc.

(3). Remember to include a **picture** of the **Problem Statement**, in the "Picture and Description of current state".

Examples:

(a). Nexteer received 100 heat treated halfshafts with a core hardness of 40 Rc, however, the max allowable is 30 Rc.

(b). Nexteer found three rake brackets, part #28271777, with broken mounting pads.

Remember the **Problem Definition** should **not** have any **causes** in it!!!
** Do **NOT** use any **Acronyms**!!! You may know what it means, but no one else does.

The Problem Definition should include:

(1). Who found it?
Example - Nexteer plant 7, dept 31, on 2nd shift by line assembler Mike Jones. *Example* - GM's Lordstown assembly plant quality control dept.

(2). When was it identified?
Example: On October 21, 2016, at 10 AM, a cracked steering column was found by Ford's Lansing asm plant's quality manager, during a routine test drive.

(3). How was it detected?
Example: GM's quality department found 3 Nexteer steering columns that would not tilt and tele at Oshawa plant 5, assembly line 2.

(4). How many? Frequency?
Example: 23 cracked rake brackets, part number 26039212, were found in one box. The box has serial number 29234 written on it, and is from Continental castings.

Good EXAMPLE with WHO, WHEN, HOW combined:
** On March 21st, Nexteer plant 6, dept. 23, on 2nd shift, found three rake brackets, part #28271777, with broken mounting pads, that prevented the columns from being assembled correctly.

***NOTE: Your PC WILL BE REJECTED if you have a poor problem statement!!
**Note #2: The wording does not have to be exactly like the OEM customers description.

3L5Y Excel File – FCC, PSCC, Supplier Look Across Requirements

NEXTEER USER ONLY: IF this is a Formal Customer Complaint (FCC), or, Product Safety & Compliance Council (PSCC) issue:

(1). please enter the tracking number.
(2). State if FCC and/or PSCC
(3). PSCC are issues that have a severity of 9 or 10, and other safety requirements (refer to PSCC manager).
(4). See **Nexteer procedure G1789** for more details.

Note: If more than 8 pcs are rejected by an OEM customer, you must contact Nexteer's Corporate Quality Administrator to schedule a review.

Nexteer Internal Users Only:

This Box is For FCC complaints only:
(1). How many defective parts were reported in the **OEM formal complaint ?**

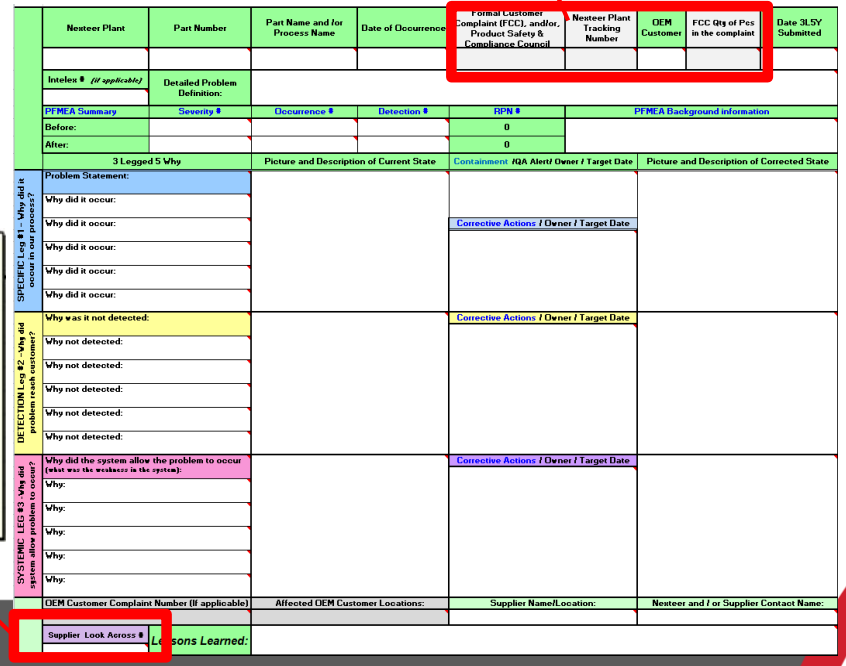
(2). NOTE: *The total number found at the OEM could be different from the total number "Officially Reported" in the official customer complaint.*

Formal Customer Complaint (FCC), and/or, Product Safety & Compliance Council (PSCC)	Nexteer Plant Tracking Number	OEM Customer	FCC Qty of Pcs in the complaint

Suppliers Only: IF you have a Look Across numbering or tracking system, enter your look across number here.

Internal Nexteer Users - you do not need to fill this out.

(1). A look across number, or, eQMS CA #- Corrective Action (CA) number will be assigned to this 3L5Y by a APQP engineer after the 3L5Y is submitted.



Nexteer Supplier Quality: *"We drive continuous improvement in everything we touch and do"*

Results of using Cheat Sheet -> A Good 3L5Y

Bad 3L5Y Example

Poor problem statement, and many items not filled out.

The "After" Risk Priority Number (RPN) missing

Poor Containment and not enough Corrective actions

3L5Y's did not dig deep enough. Stopped half way.

Not enough pictures. No after pictures

Plant	Part Number	Product/Process Nam	Date of Occurrence	Look Across #	Type of Look Across (Warranty or WFCC):	Customer	Plant Tracking number	Date 3L5Y Written
7	38003529		2/15/2016		Customer Complaint	Wentzville		

Problem Definition: Bolts loose

CN #, If Applicable:	PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #
CN 401277 CN 403325	Before:	7	3	3	63
	After:				

3 Legged 5 Why | Picture of Current State | Corrective Actions / Owner / Target Date | Picture of corrected state

Problem Statement: Wentzville Assembly received a 680 gear with loose valve cover bolts.

Why did it occur: The bolts were not torqued.

Why was it not detected: Gear returned for loose bolts.

Why not detected: A rejected gear was allowed to enter the unload station.

Why not detected:

Why not detected:

Systemic root cause: Gear returned for loose bolts

Systemic root cause: Downstream pallet tracking switch was faulted in "good" position.

Systemic root cause:

Systemic root cause:

Containment Actions

Quality Alert 7-16-022

Posted for operator awareness and containment certification. Complete Date: 2/15/16 & 3/4/16 Y. Pruitt

Containment Worksheet

Corrective Actions / Owner / Target Date

Lessons Learned Updated LA for GLTL9E

Complete Date: 6.3.16 Y. Pruitt

Added Photo Eye with back check detection to prevent any type of reject from being sent around the line.

Complete Date: 6-3-16 C. Cameron

OCP34400126 Updated OCP with new documents

Complete Date: 6.13.16 C. Cameron

Customer Problem Case Number	Affected Customer Locations:	Supplier Location:	Contact Name:
N/A	Wentzville Assembly	Nexteer Plant 7	Yolanda Pruitt

Lessons Learned: Follow Teardown Procedure

Good 3L5Y Example

Everything filled out

PFMEA updated, after RPN# lower than before RPN#

Good Containment and Corrective actions

Good whys on all 3 legs

Good Pictures before and after

Plant	Part Number	Product/Process Nam	Date of Occurrence	Look Across #	Type of Look Across (Warranty or WFCC):	Customer	Plant Tracking number	Date 3L5Y Written
7	38003529	680 Integral Gear	2/15/2016		Customer Complaint	Wentzville	7-61198	2/22/2016

Problem Definition: Customer received a 680 gear assembly with loose bolts on valve housing

CN #, If Applicable:	PFMEA Summary	Severity #	Occurrence #	Detection #	RPN #
CN 401277 CN 403325	Before:	7	3	3	63
	After:	8	2	2	32

Updated to include mis-routed pallet as a potential cause of loose bolts.

3 Legged 5 Why | Picture of Current State | Corrective Actions / Owner / Target Date | Picture of corrected state

Problem Statement: Wentzville Assembly received a 680 gear with loose valve cover bolts.

Why did it occur: The bolts were not torqued.

Why did it occur: A gear was correctly routed to the reject loop for a bolt torque failure. However, was manually routed by an operator to the wrong station. (Operator pushed the wrong button in the reject loop)

Why did it occur: Controls failed allowing a part routed part to go to the unload.

Why did it occur: Downstream pallet tracking switch failed in "good" position.

Why was it not detected: Gear returned for loose bolts.

Why not detected: A rejected gear was allowed to enter the unload station.

Why not detected: Reject loop had no method to detect faulty controls, which verify proper pallet tracking.

Why not detected:

Why not detected:

Systemic root cause: Gear returned for loose bolts

Systemic root cause: Downstream pallet tracking switch was faulted in "good" position.

Systemic root cause: There was no EP defined to verify controls and pallet tracking.

Systemic root cause:

Systemic root cause:

Containment Actions

Quality Alert 7-16-022

Posted for operator awareness and containment certification. Complete Date: 2/15/16 & 3/4/16 Y. Pruitt

Original Certification marking on (4) bolts: 2/15/16. Certification marking changed to all (8) bolts: 3/4/16.

Contained a total of 348 gear assemblies and found zero defects: 2/15/16.

Containment Worksheet

Corrective Actions / Owner / Target Date

Maintenance replaced defective [illegible] RFID reader. Complete Date: 5.31.16

SWI34401057 Create Standard Work Instructions for Teardown Loop. Complete Date: 6.13.16 M. Complete Date: 6.14.16 J. Popour, Chris H.

Document Signoff

Lessons Learned Updated LA for GLTL9E Complete Date: 6.3.16 Y. Pruitt

Added Photo Eye with back check detection to prevent any type of reject from being sent around the line. Complete Date: 6-3-16 C. Cameron

AUM34400074 Enhanced Final Inspection Instructions. Complete Date: 3.4.16 Y. Pruitt

OCP34400126 Updated OCP with new documents. Complete Date: 6.13.16 C. Cameron

PFH-HPS1586-17 PFMEA updated with new Photo Eye Detection. Complete Date: 6.7.16 Cross Functional Team

EPS34400379 Created Red Rabbit & Error Proof Instructions. Complete Date: 6.13.16 C. Cameron

AUM34400600 Complete Date: 6.13.16 Y. Pruitt

NPES Verification Target Date: 7.15.16 Y. Pruitt

Bolts Securely Torqued Paint Mark required on all 8 bolts

Valve Cover not properly aligned with Housing

Customer Problem Case Number	Affected Customer Locations:	Supplier Location:	Contact Name:
N/A	Wentzville Assembly	Nexteer Plant 7	Yolanda Pruitt

Lessons Learned: Follow Teardown Procedure inside Loop to prevent suspect parts from escaping our process

Summary of New Items on the updated 3L5Y Excel File

- A one page 3L5Y “Cheat Sheet”, that will be a fast easy reference sheet to make sure you filled everything out. Pop up comments added to the 3L5Y Excel sheet will also help users to fill it out correctly.
- A worksheet tab called “Containment Worksheet”. Users can use this generic form, or, replace it with the form they used for containment.
- A worksheet tab called “Supporting Documents”, that the user may want to include to support your problem solving efforts.
  - Additional Pictures of corrections made, DOE’s, Component Swap results, Error proofing added, Die Changes made, etc, etc.
- You can contact Nexteer’s Quality, I&CIM, or GSM departments if you have any questions about filling out the 3L5Y

3L5Y – Resources and References

- Procedure G1738 – Corrective and Preventive Action
  - Describes the Nexteer Problem Solving Process requirements
  - Guidelines for when to use 5 Why Analysis
  - 5 Why Training material
  - Flow diagram of Look Across process
- Nexteer Business System Manual
  - Section 5 – Problem Solving
- Nexteer's Look Across process is described in:
  - Process Map 15-1-3-7 Lessons Learned & Look
- Global Supply Management – Supplier Quality – F1043
  - Nexteer.com Supplier portal -Training Material for 5 Why Analysis
- Customer sites (Problem Solving Training)
  - Fiat Chrysler eConnect Supplier Portal
  - Ford – Covisint Portal
  - General Motors – Covisint Portal
- AIAG Problem Solving Guide
- ASQ - American Society of Quality

APPENDIX –

ADDITIONAL 5 WHY EXAMPLE

nexteer AUTOMOTIVE

3L5Y – Finding the "Root Cause"

A good example:

Thomas Jefferson Memorial – Washington, DC, USA

- The National Park Service noticed the Thomas Jefferson Memorial in Washington, D.C., was deteriorating faster than other monuments.
- Park service rangers investigated the problem using a **5 Why** and formed the following chain of causes.

3L5Y – Finding the "Root Cause"

A good example: *(continued)*

- Thomas Jefferson Memorial Example
  - Why does the memorial deteriorate faster?
    - Because it gets washed more frequently
  - Why is it washed more frequently?
    - Because it receives more bird droppings
  - Why are there more bird droppings?
    - Because more birds are attracted to the monument

3L5Y – Finding the "Root Cause"

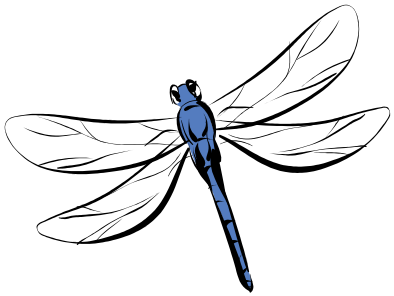
A good example: *(continued)*

- Thomas Jefferson Memorial Example
  - Why are more birds attracted to the monument?
    - Because there are more fat spiders in and around the monument
  - Why are there more spiders in and around the monument?
    - Because there are more tiny insects flying in and around the monument during evening hours
  - Why are there more insects?
    - Because the monument illumination attracts more insects.

3L5Y – Finding the "Root Cause"

A good example: *(continued)*

- Thomas Jefferson Memorial Example
  - The causes could be expanded. They could try to determine why illumination attracts insects. But could a solution to that be within their control?



Probably not

3L5Y – Finding the "Root Cause"

A good example: *(continued)*

- Thomas Jefferson Memorial example
  - So why couldn't they stop and consider one of the previous causes as the root cause and address with corrective action?
    - Bird droppings – coat monument with water resistant substance to allow frequent wash
    - Spiders – use pesticides to remove or experiment with different lighting that is less attractive to insects
  - So why not consider these? Would these be feasible?

Possibly – but there are other causes/actions that should be considered

3L5Y – Finding the "Root Cause"

A good example: *(continued)*

- Thomas Jefferson Memorial Example
  - Park service rangers decided to address the monument illumination as root cause
    - Monument illumination attracts more insects
  - Corrective action
    - Turn on lighting one hour later in the evening
  - Measure of effectiveness
    - Bird dropping problem reduced by 90%!