



# Lean 6-Sigma Program



## CA DEPARTMENT OF TRANSPORTATION

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# *New Products Evaluation Process*

- ❖ **Problem Statement:** The New Product Evaluation Process takes a long time—6 months to 8 years. The long response time affects vendors financially because they are unable to market their products or participate in contracts.
- ❖ **Objective:** To process 95 percent of submittals within 90 days, without impacting the quality of decision or increasing resources.
- ❖ **Project Team:**
  - ❖ *Bill Farnbach— Office Chief, Division of Maintenance.*
  - ❖ *Eric Wendel – New Products Coordinator, DES-METS*
  - ❖ *Don Nguyen-Tan – Executive Engineering Assistant to Division Chief, DES*
  - ❖ *Michael J. Lee – Bridge Preservation Committee Chair, Office of Structure Maintenance Design*
  - ❖ *Hamid Moussavi – Pavement-Related New Products Assessment Committee Chair, Office of Pavement Management*



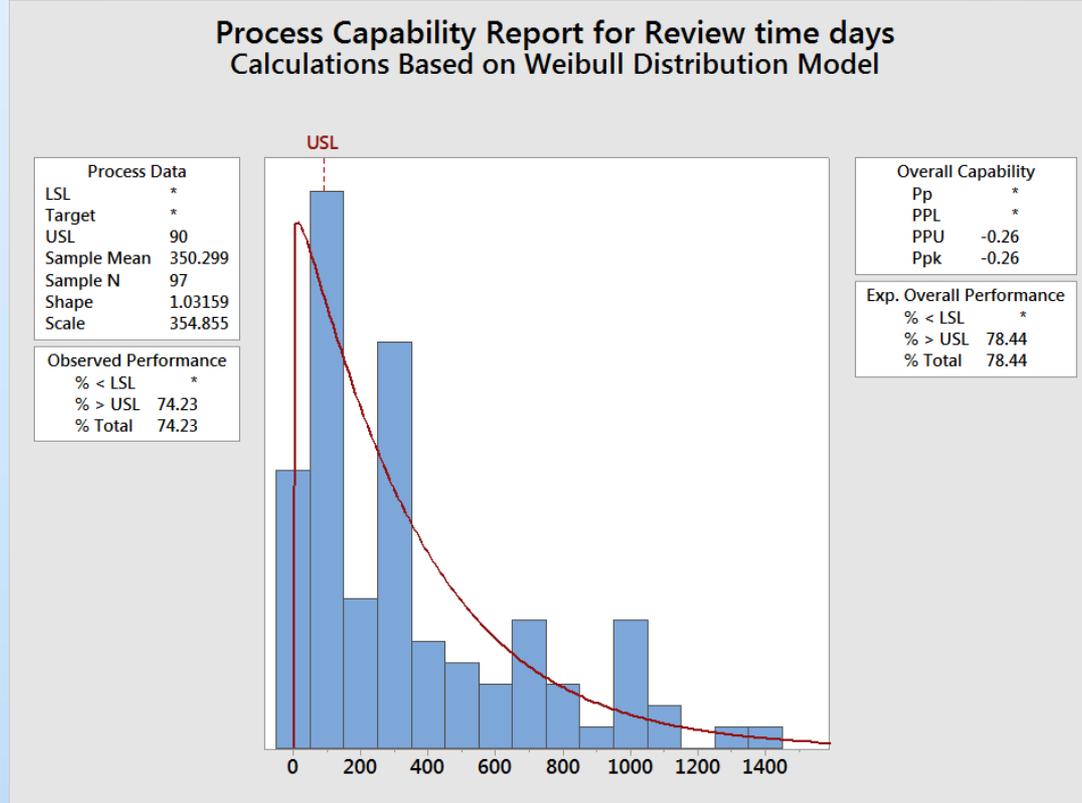
# *New Product*

**Definition:** A fully developed and commercially available product ready for use in the construction, maintenance, and operation of the State's transportation system . . .

Products under development are not New Products.

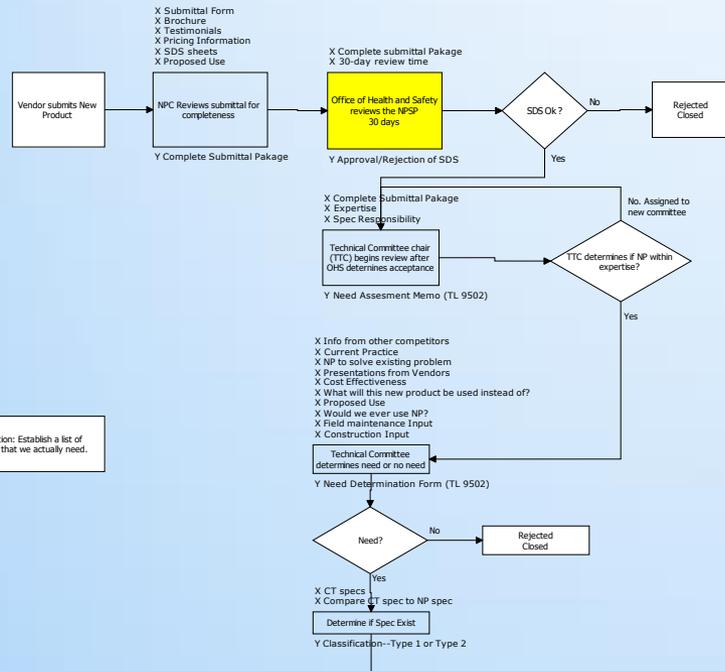


# Baseline Capability



- ❖ Mean = 350 days
- ❖ Max = 1397 days (3.8 years)
- ❖ Expected Defect Rate = 78 %

# Initial Process Map

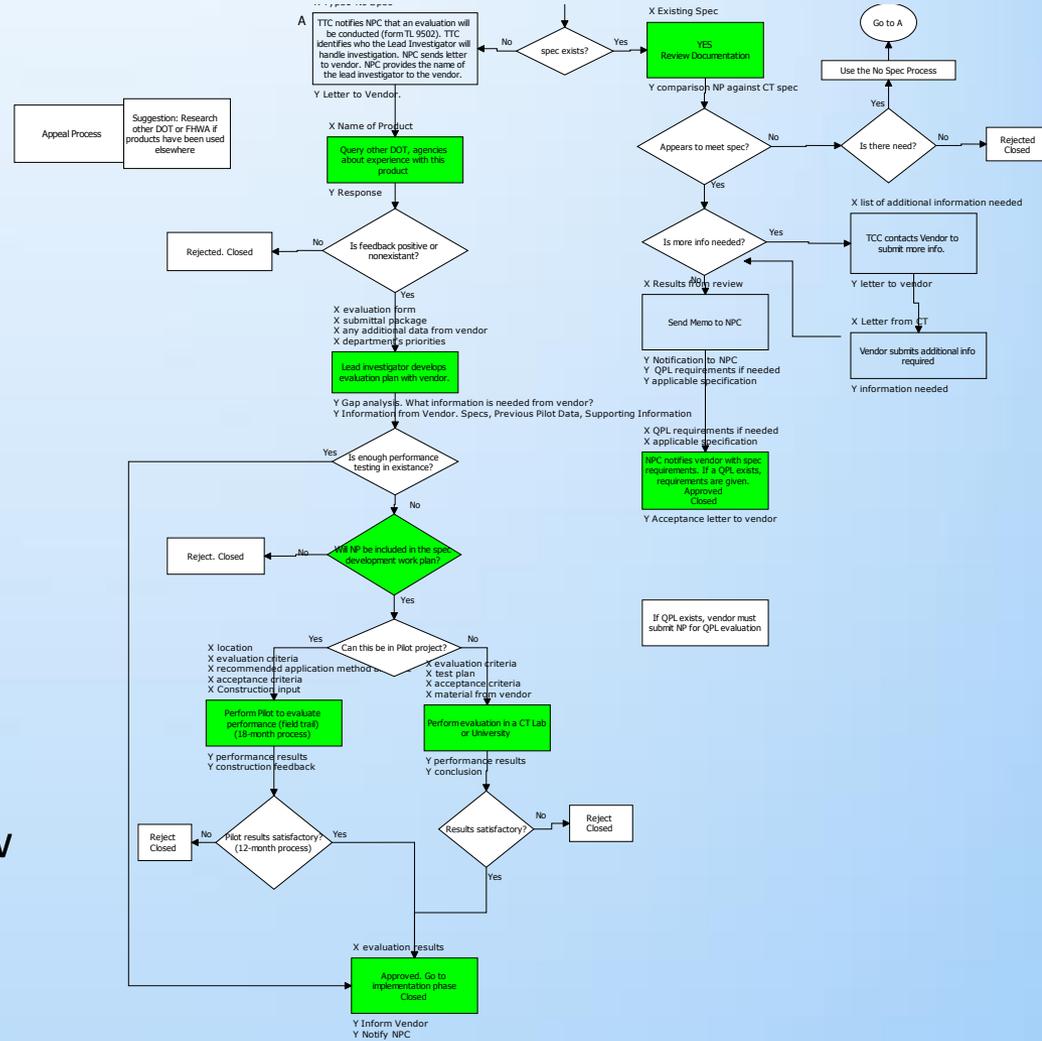


Suggestion: Establish a list of products that we actually need.

- ❖ Value added – green
- ❖ Non-value added (required) – yellow
- ❖ Non-value added – white
  - Need vs No Need review
  - Type 1 vs Type 2 determination

## Type 1-No Spec

## Type 2-Spec



# *Analysis Tools*

- ❖ Fishbone Diagram
- ❖ Box Plots and Dot Plots
- ❖ **Failure Modes and Effects Analysis (FMEA)**
- ❖ Multi-Vari Analysis
- ❖ **Hypothesis Testing – Mood's Median Test**
- ❖ Work In Process (WIP) Analysis



# Key Analytical Finding 1--FMEA

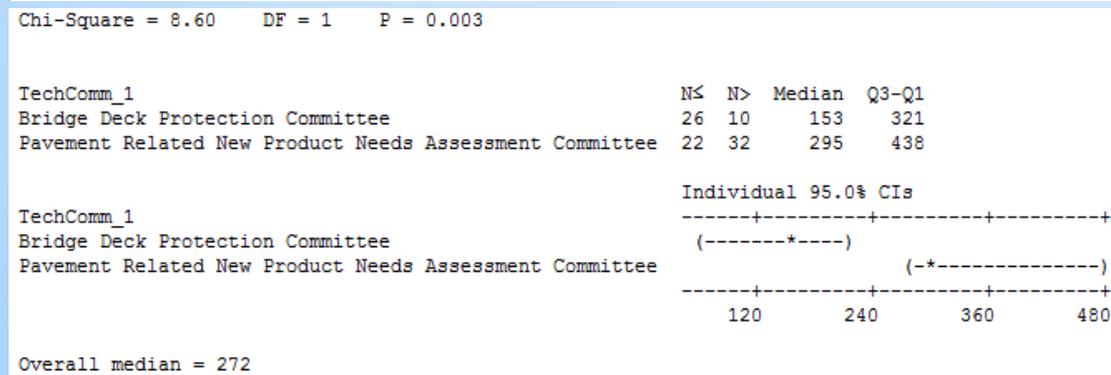
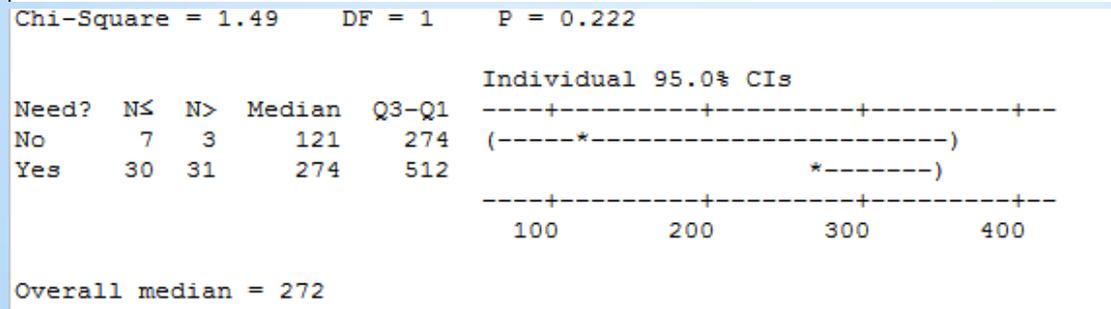
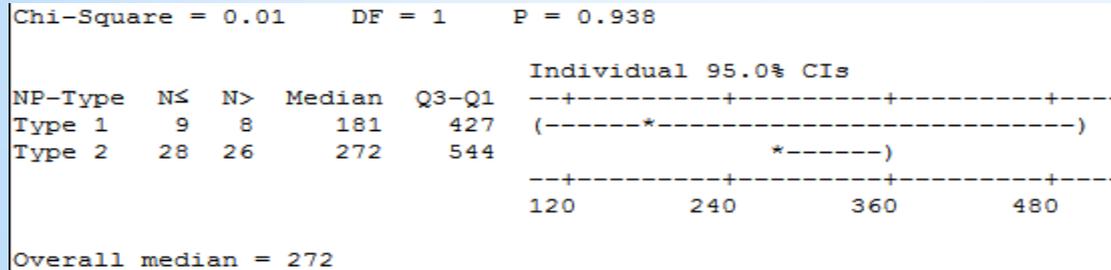
FMEA# New Product Evaluation Process											
Step#	Process Map - Activity	Key Process Input	Potential Failure Mode	Potential Failure Effects	SEV	Potential Causes	OCC	Current Controls	DET	RPN	Actions Recommended
	Type 1 process	Evaluation Criteria	Can't evaluate	delay	10	no criteria	10	None	10	1000	create committee review checklist
		Department's Priorities	Low Priority	delay	10	lack of consensus (between Divisions / Offices / people)	10	none (individual management preference)	10	1000	Department priorities will be set ahead of time.
		Vendor's Information	No testing results	delay	10	testing lab does not send results to TCC	10	none (lack process control)	10	1000	TCC is responsible for entire process, including labs meeting timeframes
					10	Testing Lab lack of priority	10	none (low priority)	10	1000	Relay on submitted test results.
					10	vendor's lack of response	10	none (no time criteria)	10	1000	vendor's will have a specified time frame for submittal of sample. Failure to submit ends
				10	submittal of sample	10	none (no time criteria)	10	1000	Relay on submitted test results. If needed, vendor's will have a specified time frame for submittal of sample. Failure to submit ends evaluation.	
	Type 2	QPL Requirements	can't make decision	delay	9	uncertified lab test results	10	None	10	900	Make QPL (or AML) criteria available to vendors. Vendors submit test results from independent accredited labs.
	Type 1 process	Construction Input	Can't evaluate	delay	10	elimination of pilot project	8	None	10	800	pilot process should not be part of NP evaluation process.
	Need Assessment	Cost Effectiveness	wrong decision	delay	7	No life-cycle cost criteria	10	none	10	700	
	Product Type Determination	Caltrans Specs	wrong type (type 2 and it's a type 1)	delay	10	misinterpretation of specs	6	none	10	600	Submittal form will indicate the specification section product is to be used
	Need Assessment	meeting schedule	infrequent meetings	delay	7	low priority	8	none	10	560	One meeting per year based on new submittal schedule

- ❖ Inconsistent evaluation criteria
- ❖ Not familiar with Caltrans specs
- ❖ Time for vendors to respond is not tracked
- ❖ Vendors not submitting test data
- ❖ Caltrans labs not perform tests timely
- ❖ Caltrans staff priorities



# Key Analytical Finding 2

## Mood Median Tests



- ❖ No processing time difference:
  - Type of product
  - Need assessment
  
- ❖ Processing time difference:
  - Technical Committee

# *Critical X's (root causes of problems)*

❖ **Lack of evaluation criteria**

❖ **Lack of timeframes**

❖ **Low Priorities**



# Improvement Techniques

## ❖ Eliminate Non-Value Added Process Steps

- Predetermined Priorities set by Technical Committees annually.
- Change website to help vendors make a decision before submitting. Provide link to specs and clarify requirements for Authorized Material Lists (AMLs).
- For New Products (as defined in DD-45) require vendors to identify CT spec their product improves or replaces.
- For products to be added to an AML, require vendors to identify the AML.
- No need to submit if product meets current specifications.

## ❖ Modify Requirements for Vendors

- Revise Product Evaluation Submittal form.
- Require vendors to submit test data from independent, accredited laboratories and testers.

## ❖ Revise Product Evaluation Guidelines

- New process maps with timelines.
- Create standard evaluation criteria.

## ❖ Revise Deputy Directive 45

- Show commitment to 90-day evaluation timeframe.
- Clarify Roles and Responsibilities.

## ❖ Revise New Products database

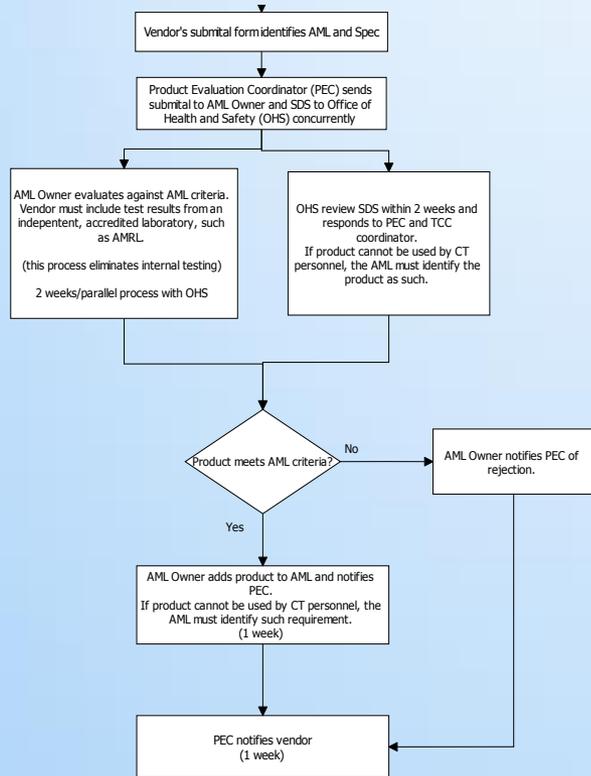
- Track products for AMLs and New Products.
- Generate reports for outstanding submittals, mistake-proof date entries, and keep track of when vendor must respond with additional information.
- Generate Quarterly Reports to show if we are meeting the 90-day target.

## ❖ Training to Technical Committees, AML owners, and others involved in evaluations

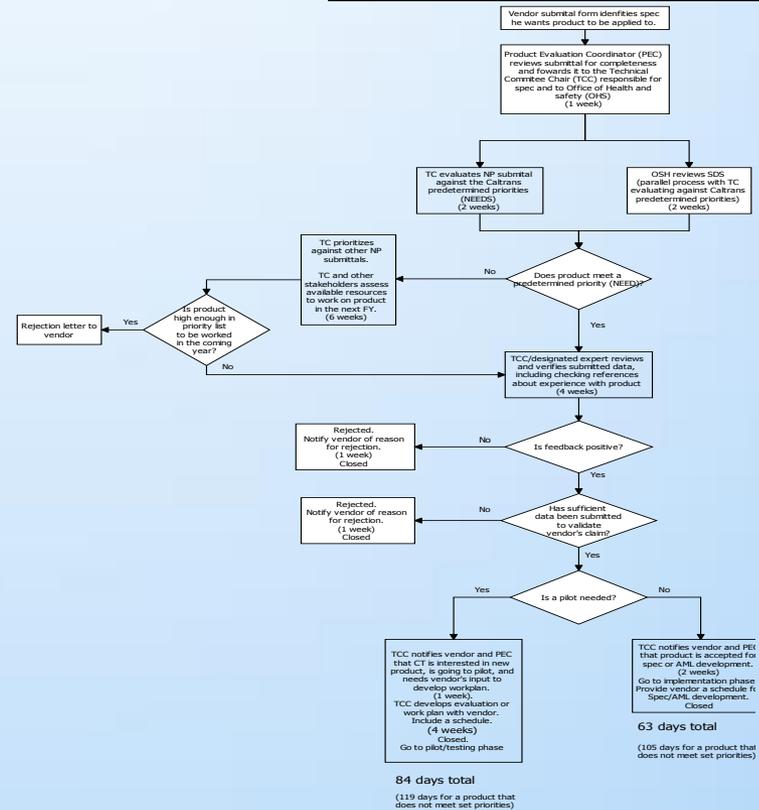


# New Process Maps

## Authorized Material List (AML)



## New Product Evaluation



- ❖ Submittal is sent to the correct AML owner or Technical Committee
- ❖ Require vendors to submit test data from independent certified/accredited laboratories--Caltrans does not need to perform testing.

# Projected Capability Analysis

## Authorized Material List

### *Old Process*

*Mean = 384 days*

*Max = 1032 days (2.8 yrs)*

### *New Process*

*New Timeframe = 30 days*

## New Product

### *Old Process*

Mean = 350 days

Max = 1397 days (3.8 yrs)

### *New Process*

*New Timeframe = 84 days*

*(meets predetermined priorities)*

*New Timeframe = 120 days*

*(does not meet predetermined priorities)*

*Does not include implementation*

- ❖ Projected timeframe using the new processes.
- ❖ New capability analysis will be performed upon implementation in the fall.



# Control Plan

- ❖ Monthly reports to Technical Committee Chairs and their managers.
  - Show details of submittals and their status.
  - Allow time for correcting discrepancies.
- ❖ Quarterly reports to Deputy Directors and their Division Chiefs.
  - Show if target is being met.
- ❖ Make database accessible to Technical Committees and their managers to check status.



# *Additional Benefits*

## ❖ **Customer:**

- Transparency
  - Decisions based on set criteria
  - Keep better track of submittals
- Able to do business with Caltrans more effectively

## ❖ **Public:**

- Innovative materials
  - Produced under safer, more sustainable processes
- Lower costs

## ❖ **Caltrans Benefits:**

- Improved image and credibility
- Broader choices of materials
- Increase opportunity to take advantage of new technology
- Help improve the economy in California



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