FLUKE® Reliability

Exploring the tree of unreliability and what drives downtime

Shon Isenhour

Accelix™
Webinar Series

Shon Isenhour, CMRP, CAMA

Partner, Eruditio

- Engineering graduate of North Carolina State University
- Past National Chairman of the Society of Maintenance and Reliability Professionals (SMRP) and past Vice President of Membership and Programs for the South Carolina Midlands chapter of the American Society for Training and Development (ATD, formerly ASTD) and Past Vice Chairman of World Partners in Asset Management (WPiAM)
- Certified Maintenance & Reliability Professional (CMRP) and Certified Asset Management Assessor (CAMA)
- Experienced in industries such as primary metals, mining, pharmaceuticals, petrochemical, chemical processing and paper

Introductions

FLUKE Reliability

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Training, Consulting, and Magic

iBL

FLUKE Reliability

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POLL QUESTION No. 1

Do you use fault tree or logic tree regularly in your RCA efforts?

(Click only one answer)

- Yes, we use them regularly
- We know what they are, but don’t use them
- What is a fault tree?

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Outline

Tree Tools

5 Levels

Diamond

Systemic and Latent

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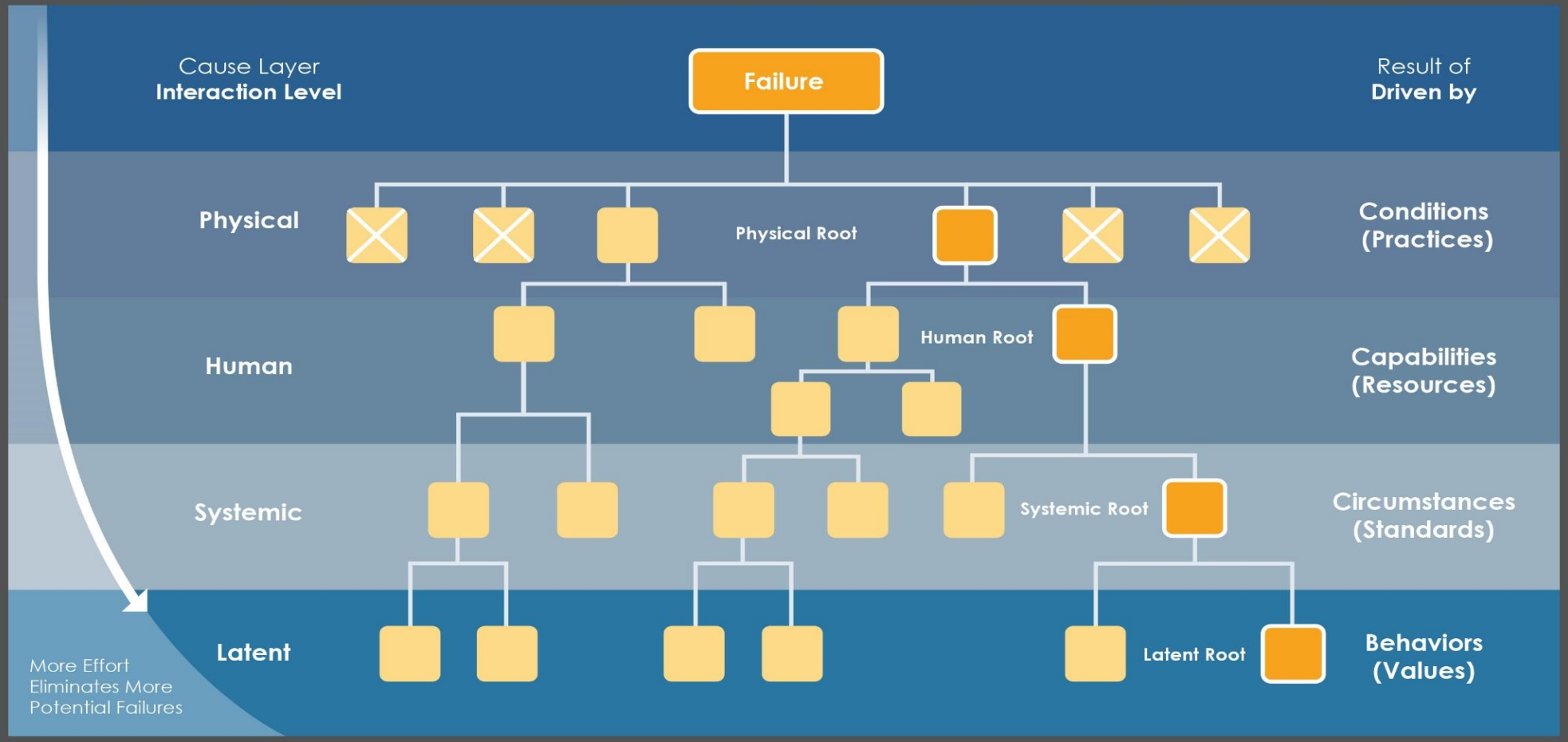
Root Cause Analysis



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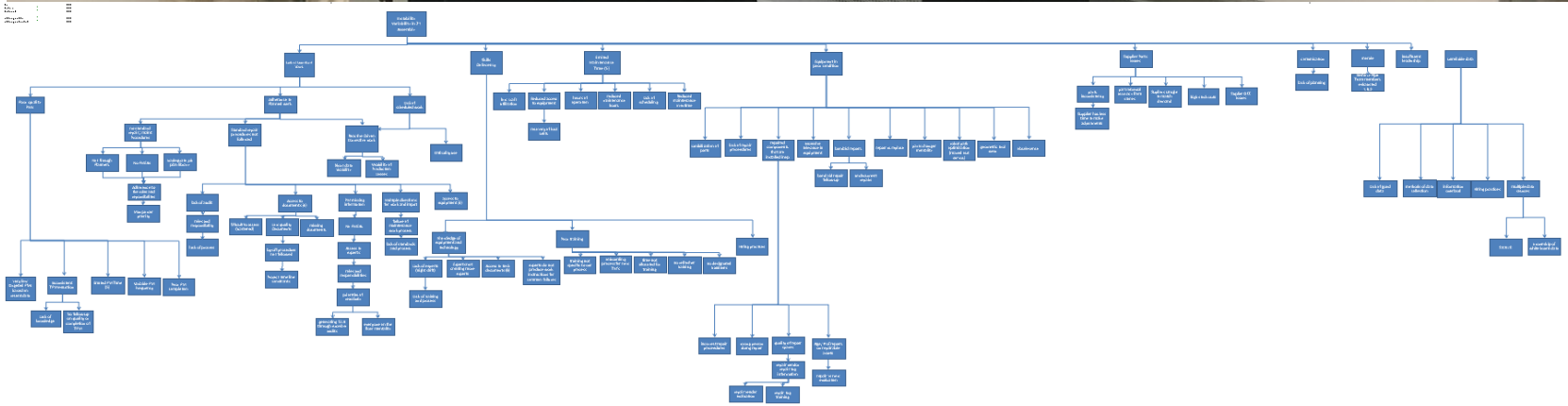
Real …



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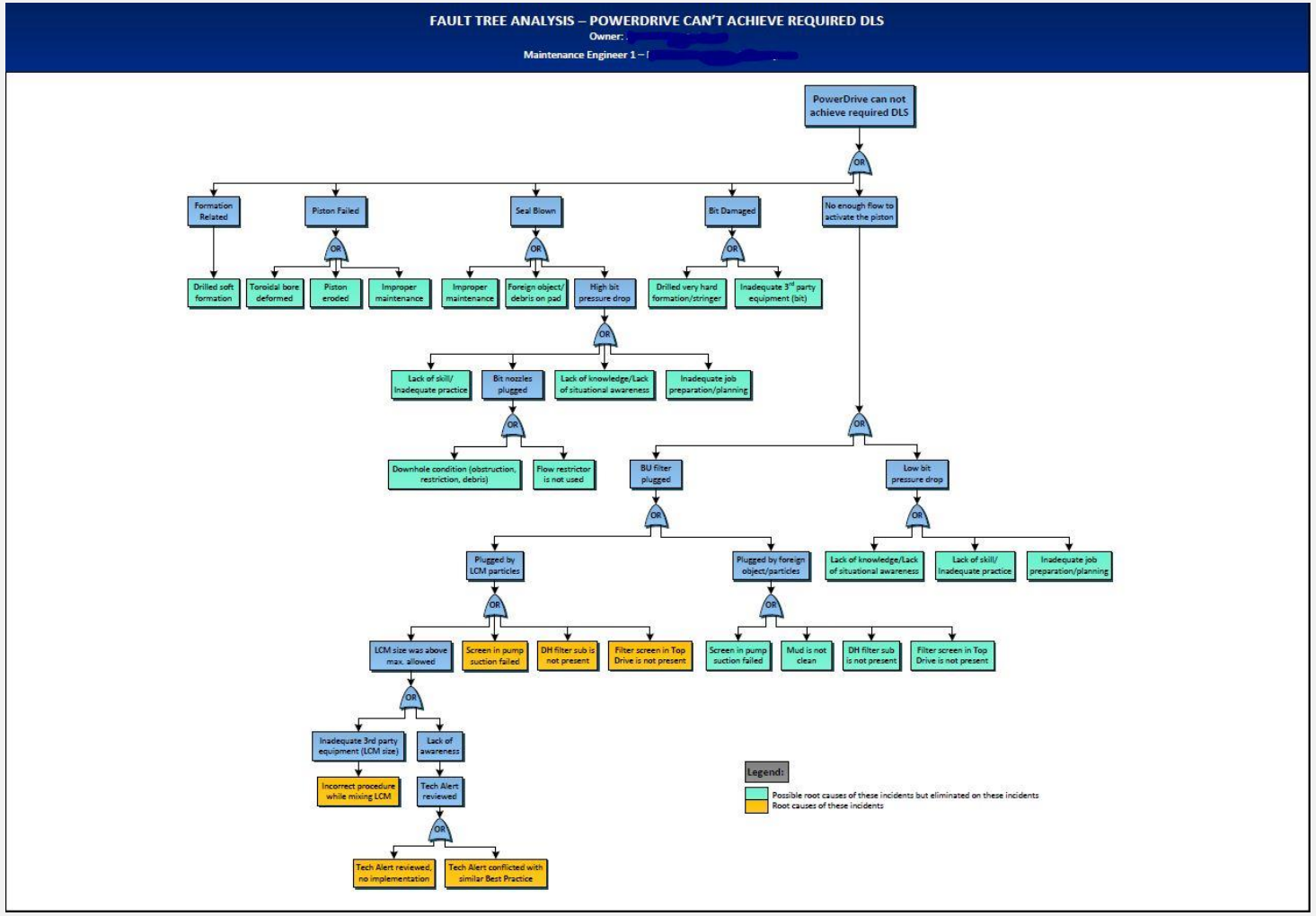
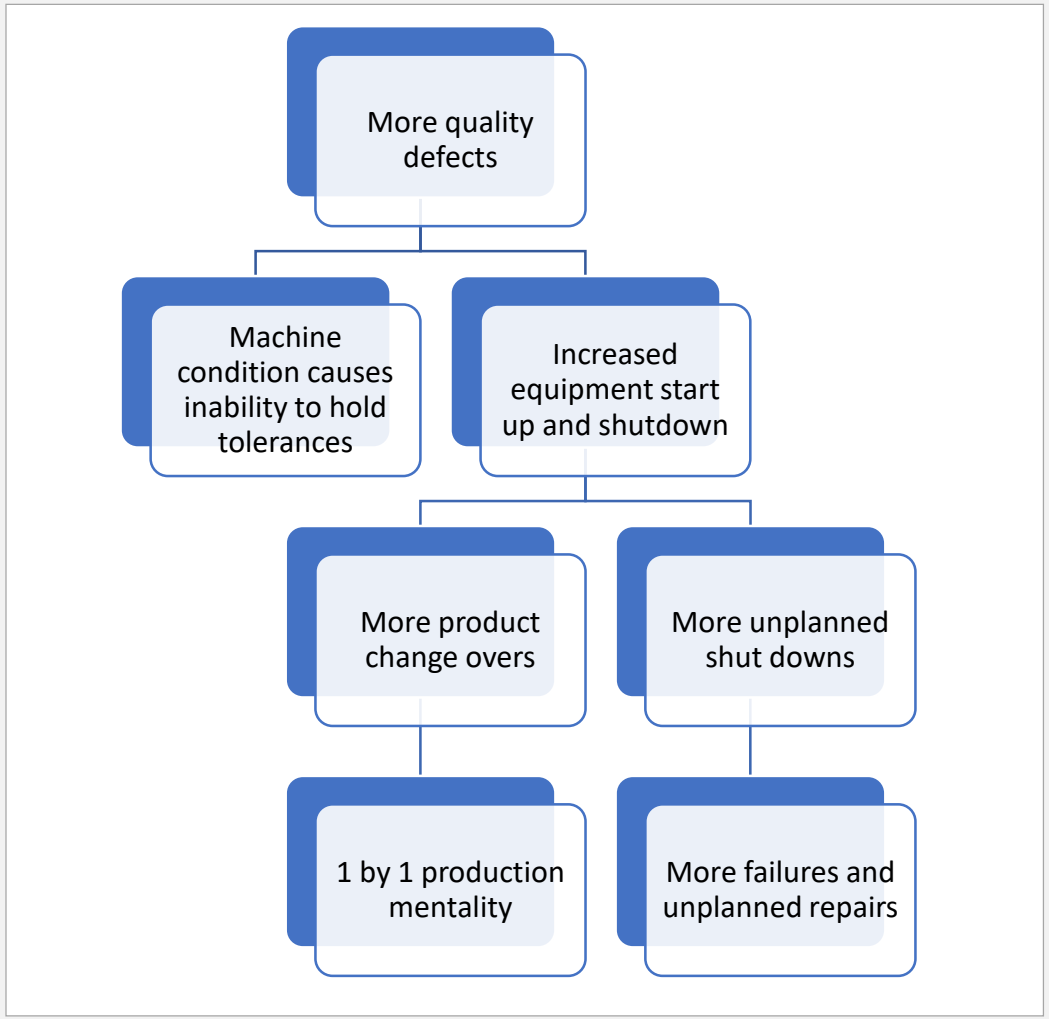
Learning project submitted



Not enough effort



POLL QUESTION No. 2

Are your fault trees more than 10 boxes?

(Click only one answer)

- Yes, we have 20+ boxes with actions and conditions
- No, ours are 5 whys or simple trees of ~10 boxes
- We don’t use fault trees

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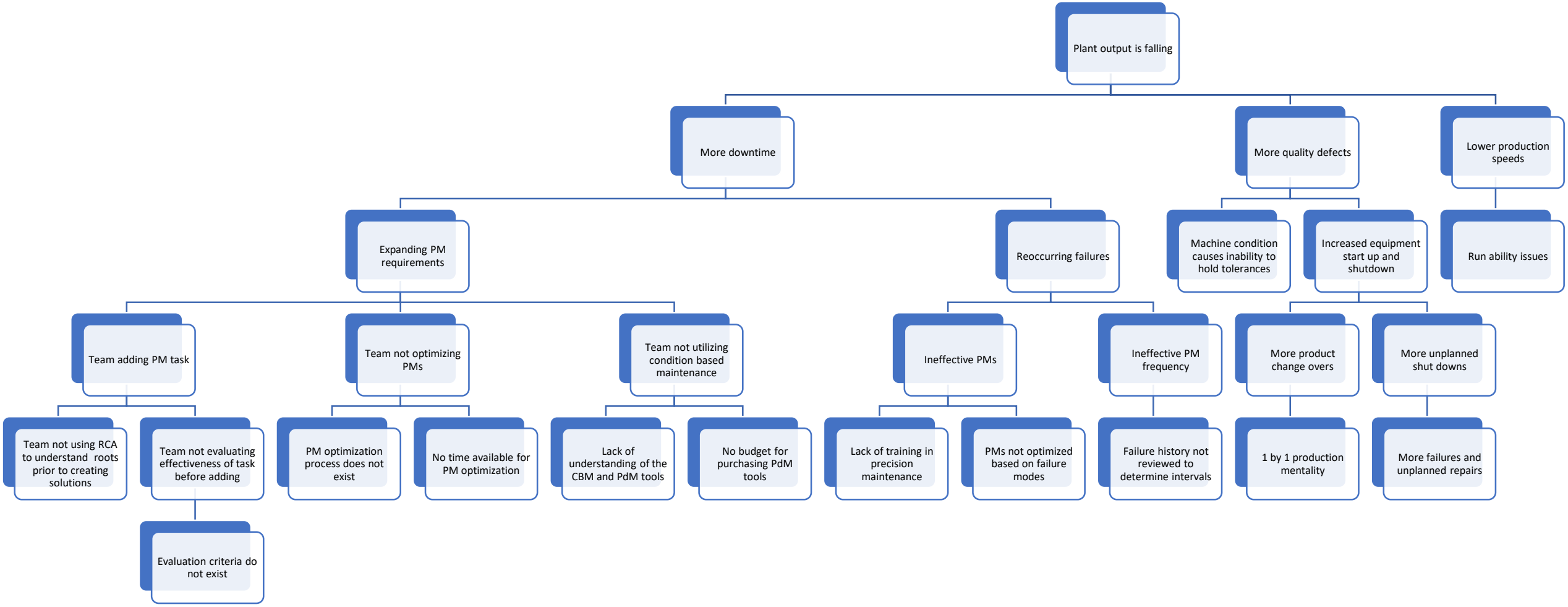
Let’s get started



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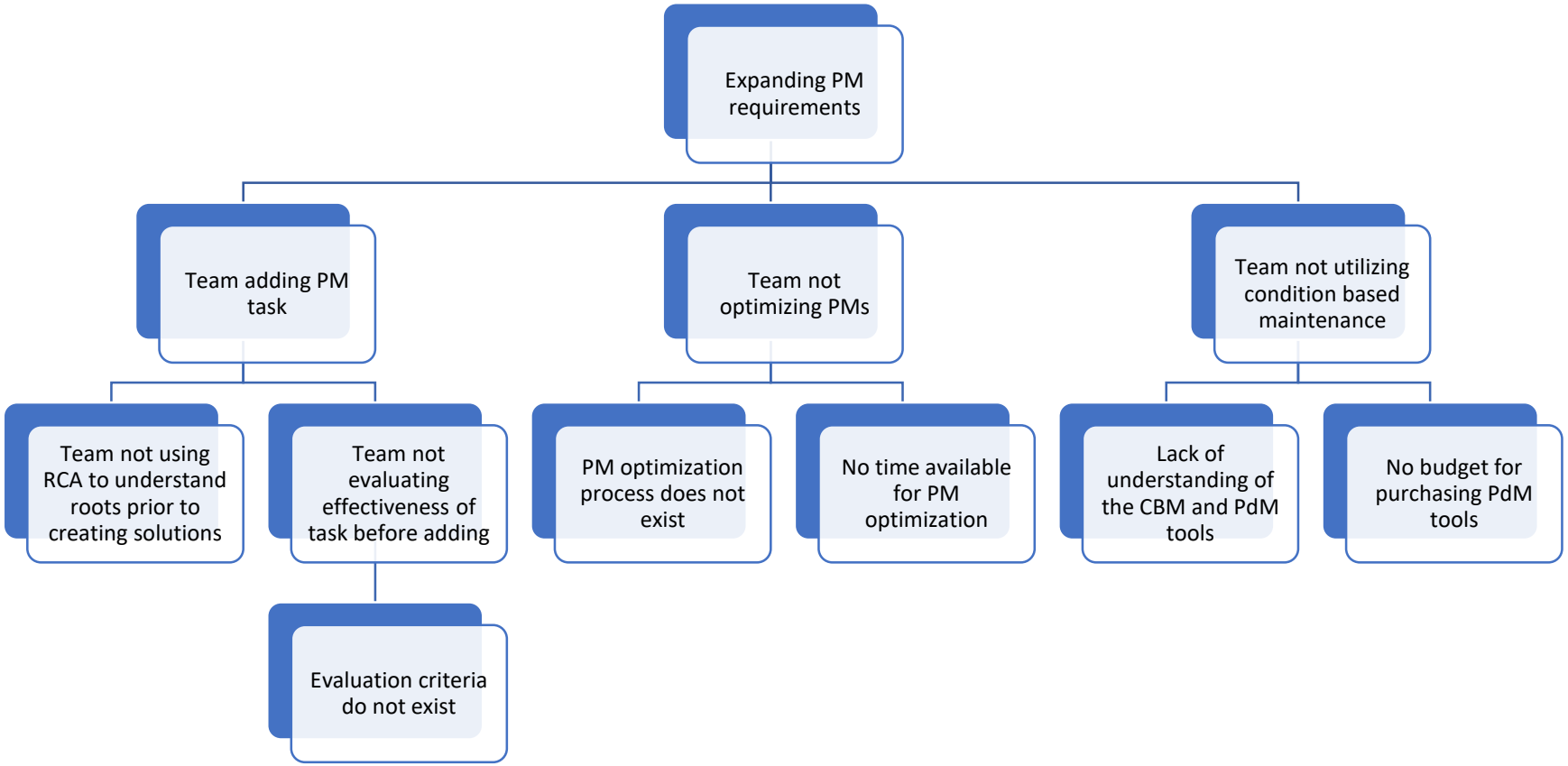
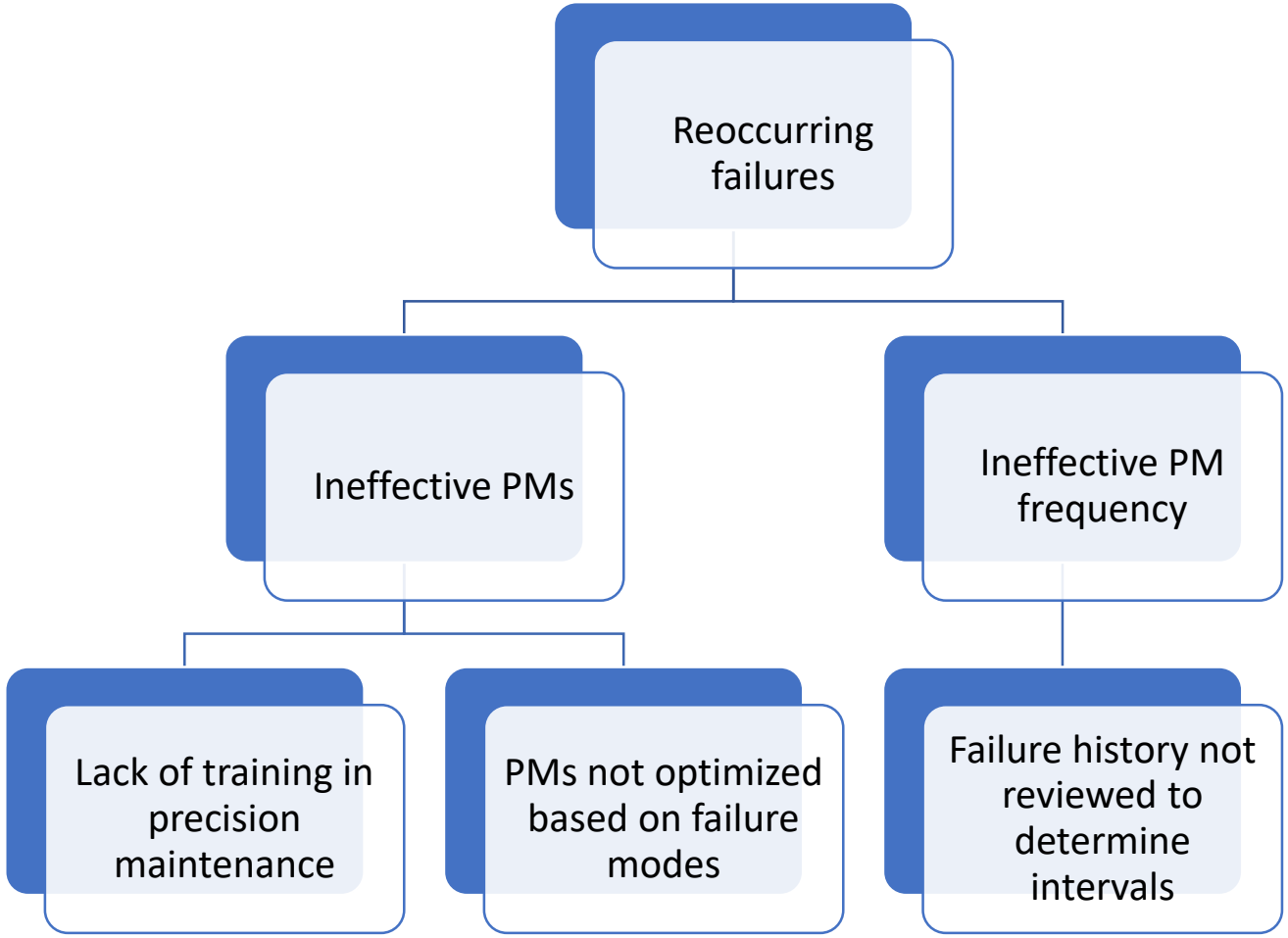
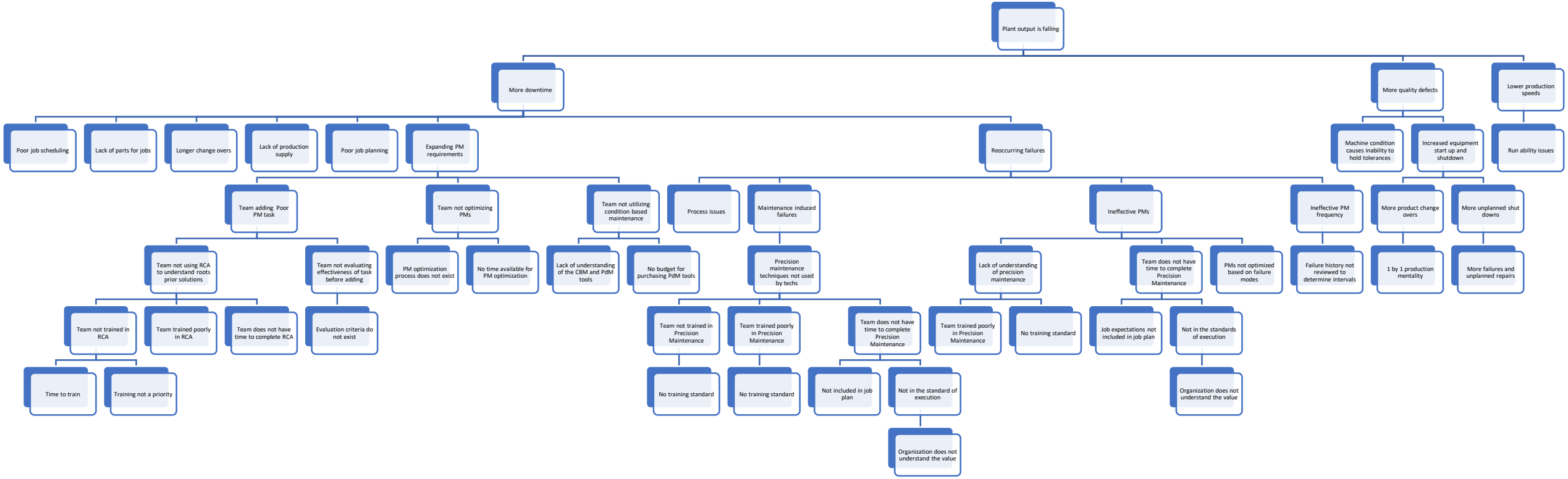
Zoom in



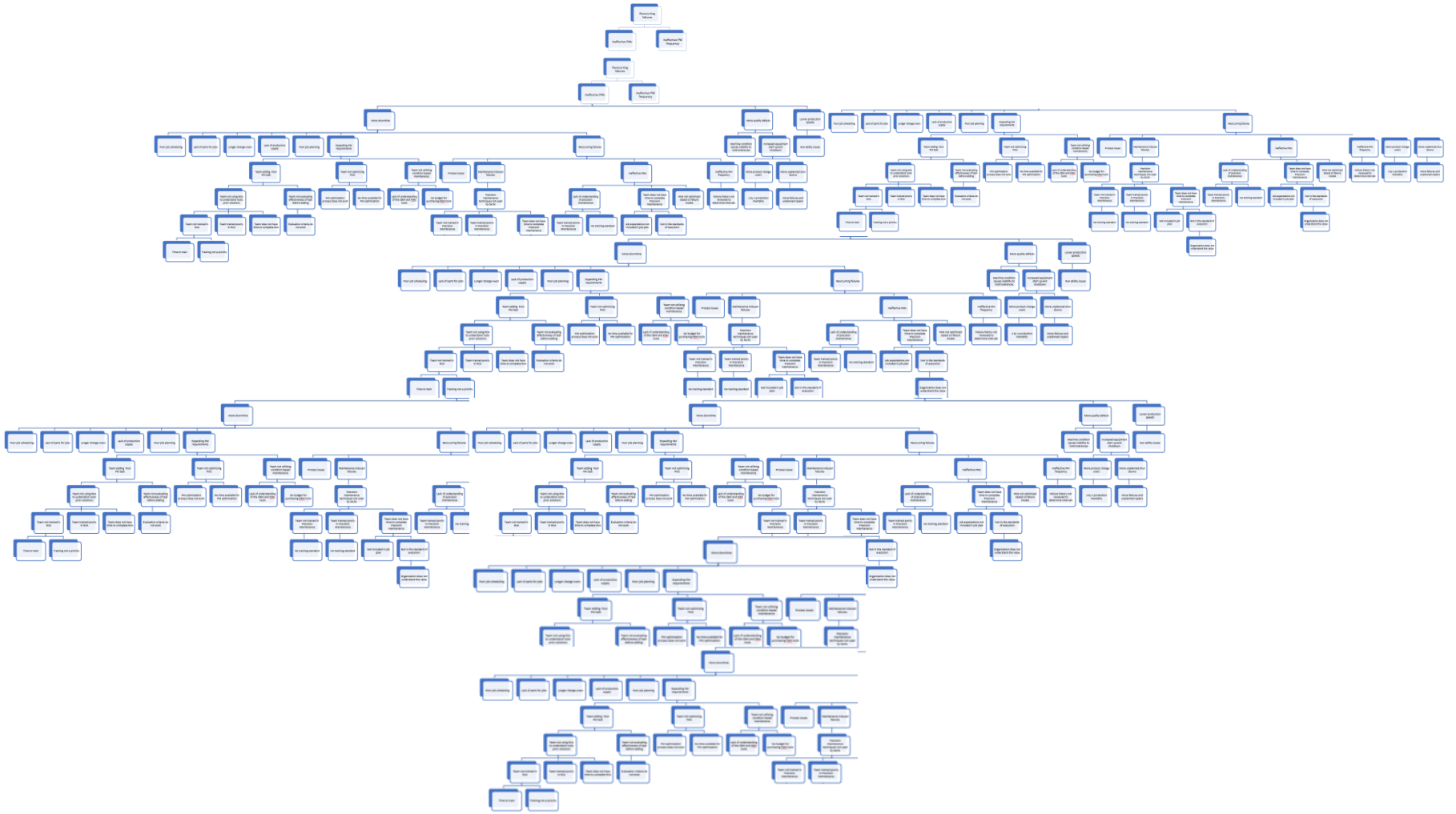
Zoom in



More …



More …



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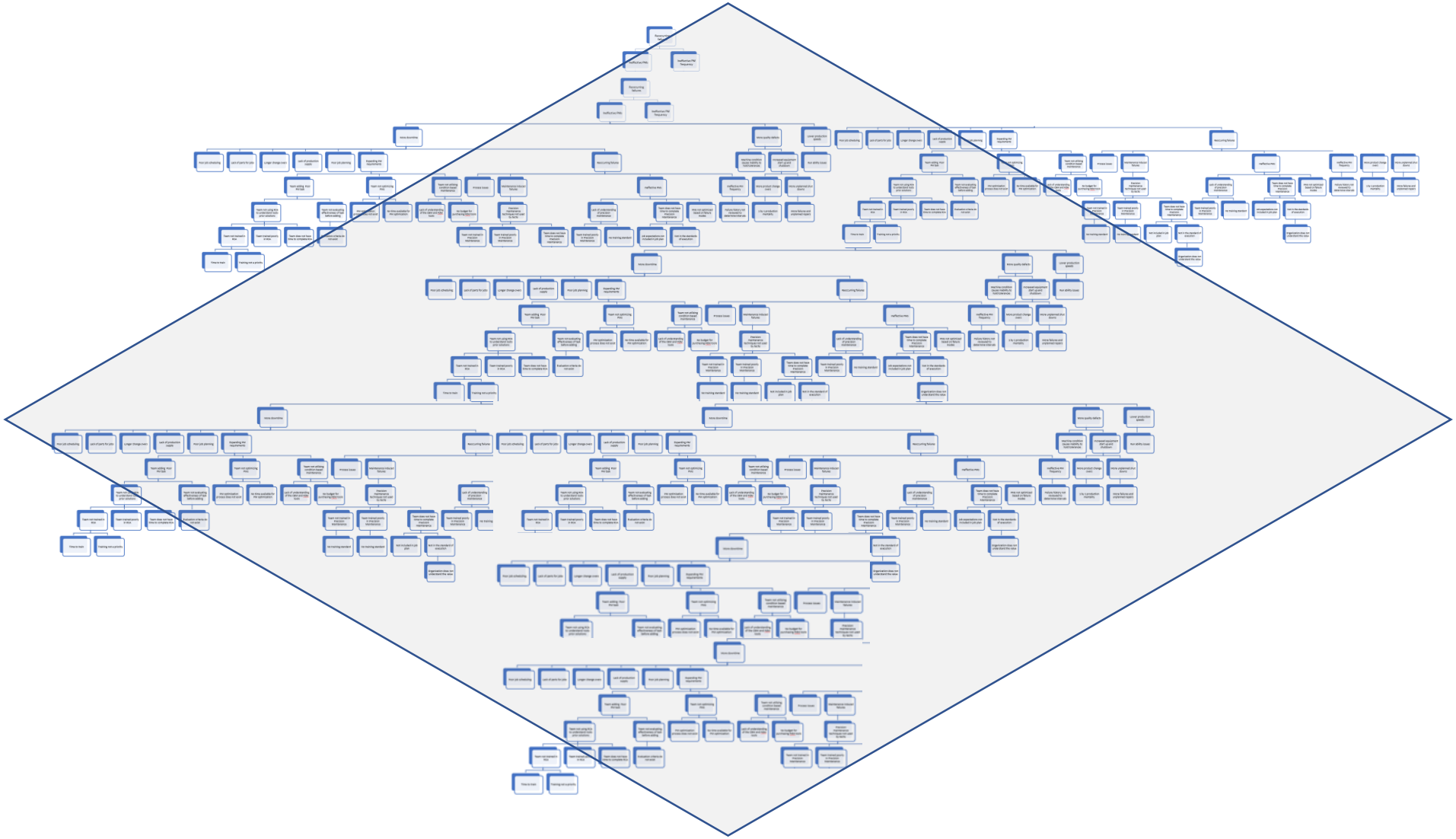
The point is …

- It’s a diamond if you link them
- It comes down to some fundamentals:
  - Training alone is not your problem
  - Do you have a plan
  - Risk, communication, change management, leadership, vision, guiding principles
  - The value of “it”

More …



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POLL QUESTION No. 3

Are you addressing the systemic and latent roots?

(Click only one answer)

- Yes, we are, using business case thinking
- No, we tend to focus on the physical and human roots
- Don’t know/not sure

Training alone is not your problem

- Easy to blame
- YouTube videos/Master Class/Udemy
- Coaching
- Project
- Plan

Vision mission

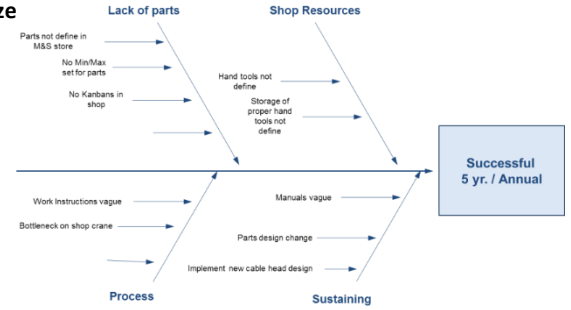
Project: Subsea Ninja Workflow

Define (Problem):
Long lead time to produce a 5-year and annual check. Poor use of resources, lack of spare parts, poor delivery on repaired parts. Improper management of tools, poor use of shop space, manuals vague, improperly defined maintenance or over maintenance performed. Key points for quality assurance are missed due to lack of definition.

Scope: Improve turnaround time of senturian maintenance while improving quality of product. Also set baseline for locations to perform 5-year maintenance.

Defects:
- Insufficient parts - long lead time on parts
- Increased wait time due to lack of crane in control room shop
- Disorganize space - not sustaining the 5S implementation
- Lack of visual quality control - not sustaining the 5S implementation
- Maintenance manuals do not well define 5-year service.
- Maintenance processes cumbersome and unnecessary
- Higher leak rates on valves after one to two jobs

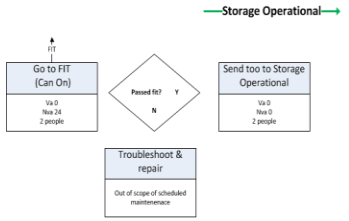
Analyze



Improve
- Share crane in lab to extend resource
- Define and set up Kanbans, along with min/max
- Implement efficiency in maintenance task
- Organized and setup toolbox dedicated to Senturian
- Use of new control shop workflow and pump room

Measure

Senturian VSM results



FIT Testing
VA 154 hours 27%
NVA 416 hours 73%
Total 670 hours or 23.75 days with 3 people

Major
VA 154 hours 12%
NVA 1084 hours 88%
Total 1238 hours or 51.58 days with 3 people

Q check
VA 124 hours 31%
NVA 266 hours 68%
Total 390 hours or 16.25 days with 3 people

Q & Major combined
VA 278 hours 17%
NVA 1350 hours 83%
Total 1628 hours or 67.83 days with 3 people

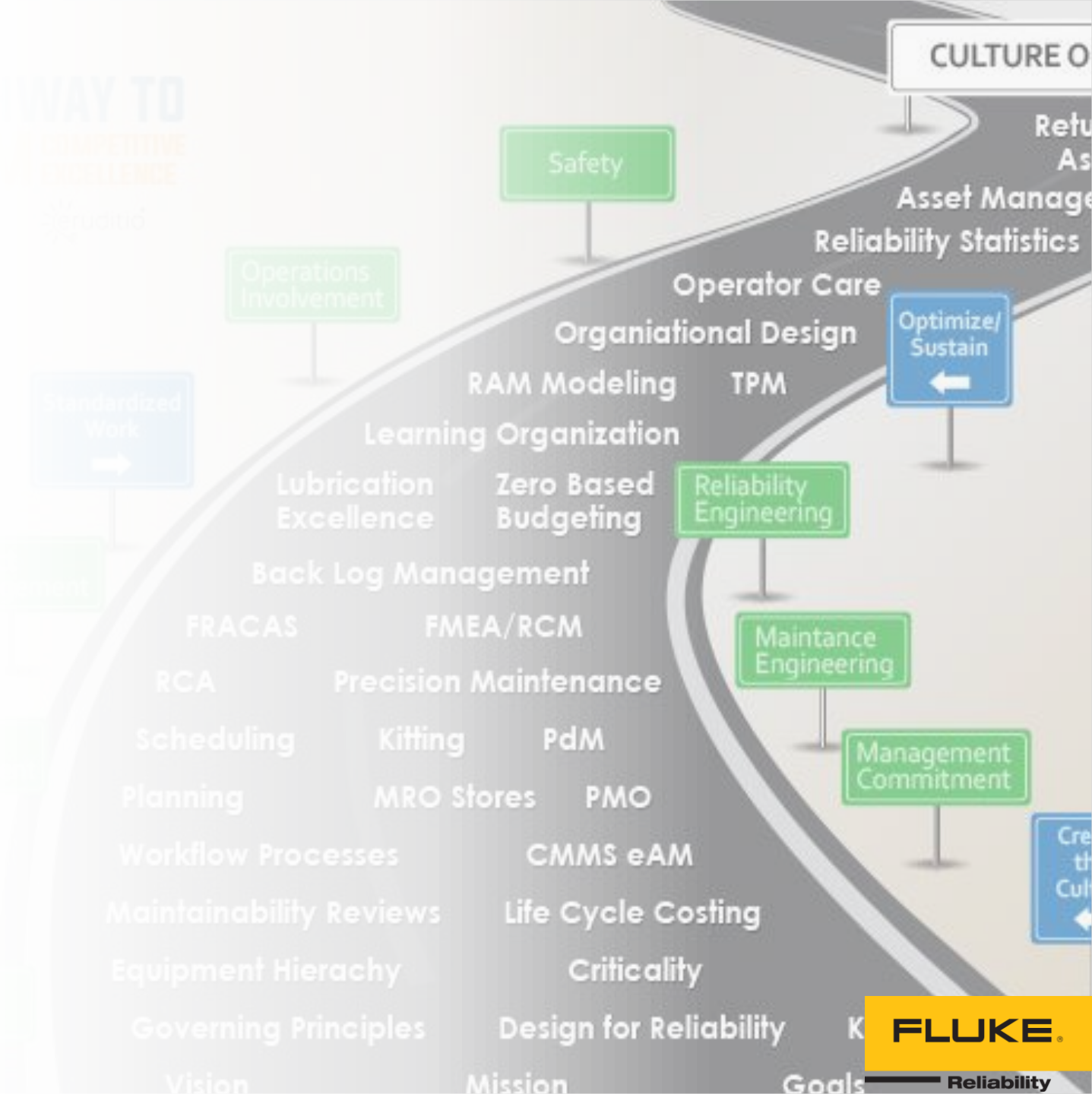
Post & Q & Major
VA 308 hours 17%
NVA 1500 hours 83%
Total 1808 hours or 75.33 days with 3 people

Control

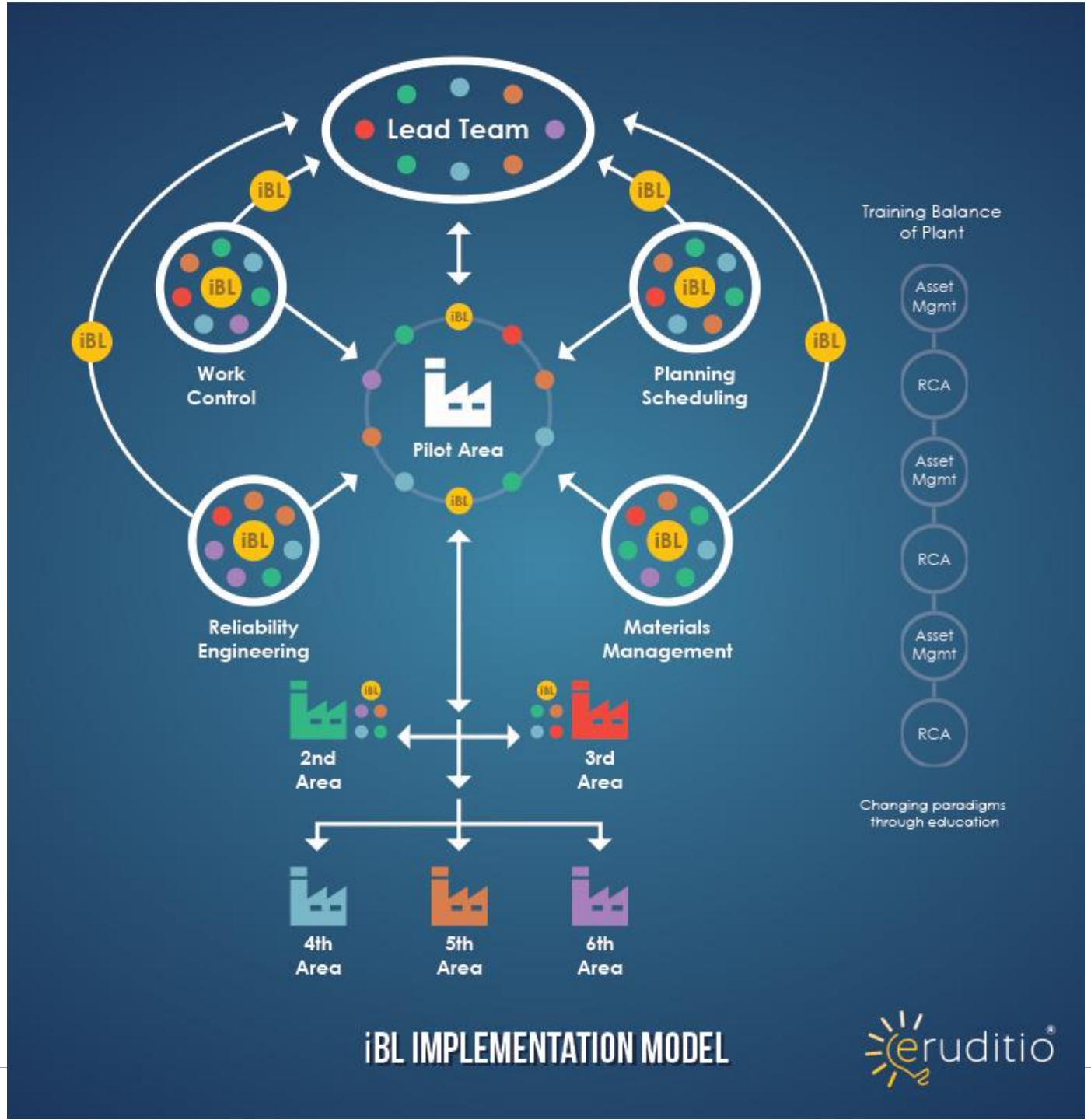
Realized Opportunities	1-year savings
Man-hour savings	$ 362,458.50
Materials savings	$15,000.00
Soft savings	$ 0.00
Total 1-year savings	$237,458.50
Project cost for first year	($19770.00)
Net project savings	**$462,688.50**

Plan and path

- Where are we going?
- Can we get it all done?
- What have others done?

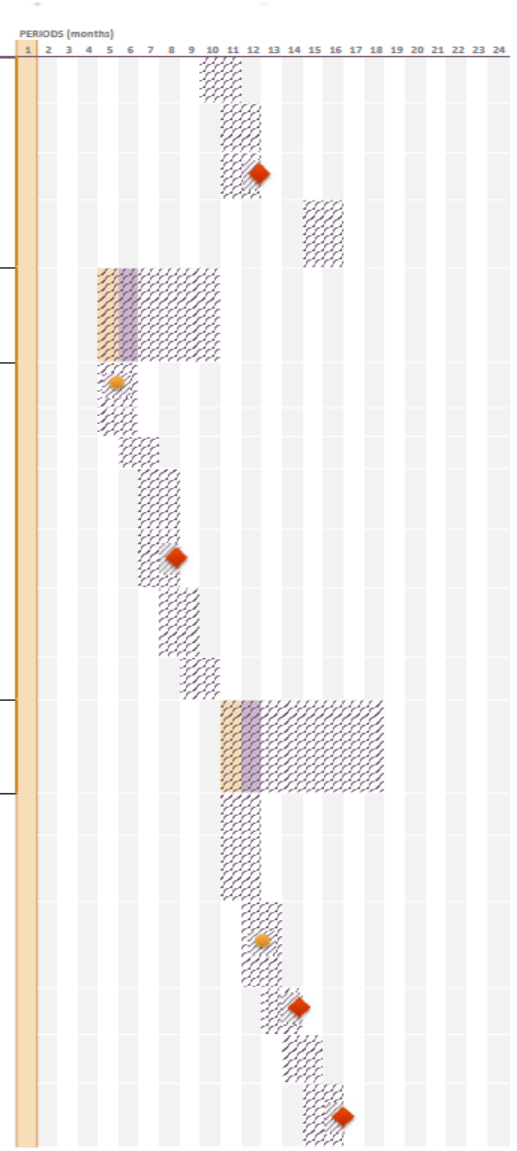


Implement

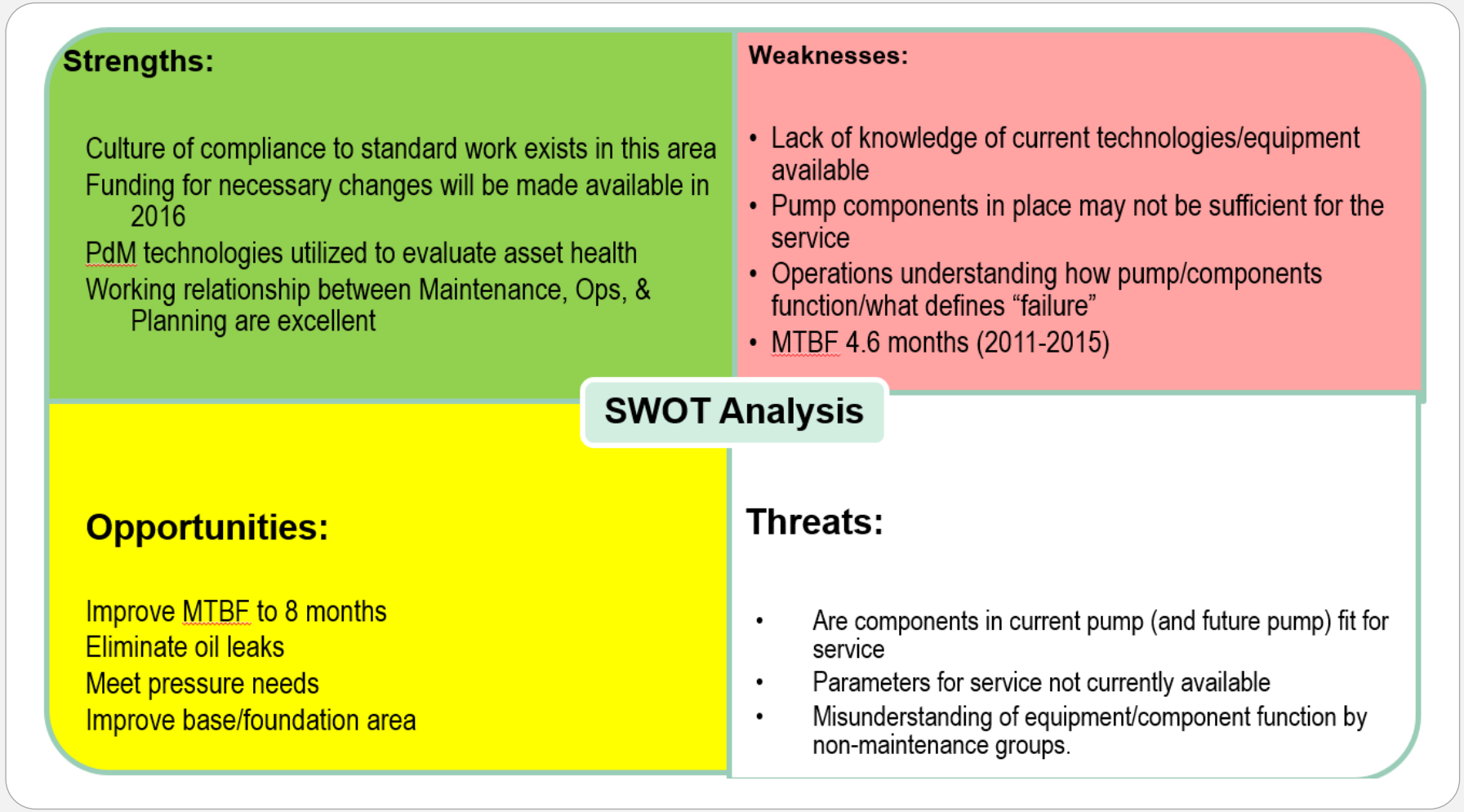


Plan

Deliverables		PLAN START (period)	PLAN DURATION (months)	ACTUAL START	ACTUAL DURATION	PERCENT COMPLETE
Set-up Maintenance Daily Management Board	Establish a communication board for pilot area, and train area supervisors.	11				0%
Work Management Training	Provide eLearning modules and 2-day Work Management workshop #1 for pilot area - Eruditio/FIT Co-facilitate.	12				0%
Planner/Scheduler Training	Provide eLearning modules and 2-day Planner/Scheduler workshop - Eruditio Facilitate.	12				0%
Work Management Training	Provide eLearning modules and 2-day Work Management workshop #2 for balance of plant and including Spare Parts training package - Eruditio/FIT Co-facilitate.	16				0%
Running Maintenance Execution Work Package	*Running Maintenance (i.e. TPM) Execution requires Planned Maintenance Execution to be able to effectively manage the Maintenance Backlog, and effective Problem Solving practices to be in place.*	6	5	6	0	0%
FIT Operator Driven Reliability (ODR) Event	Facilitate ODR workshop #1 in pilot area based on system-level criticality rankings.	6				0%
Set-up Visual Controls	FIT identify abnormalities and establish visual controls.	6				0%
Develop Inspection Standards	Create standard procedures for PM/TPM routines.	7				0%
Add ODR Elements to Communication Board	Add inspection standards, PM/TPM schedule, PM/TPM audit and TPM tagging elements to "war room" communication board in pilot area.	8				0%
Map TPM Tagging Process to Work Management Process	Define how TPM Tags will be collected, recorded and tracked to completion within Work Management process and SAP.	8				0%
Create PM/TPM User Training Package	Assemble user training resources, such as PowerPoint Presentation, whitepaper, and Single-point lessons for communication board.	9				0%
Operator Driven Reliability Event for Pilot Area	Eruditio/FIT Co-facilitate Operator training in pilot area for new PM/TPM routines, TPM tagging, and visual controls.	10				0%
Spare Parts Management Work Package	*In order to improve Spare Parts Management, effective Planning & Scheduling practices must be established. The initial focus of this work package is to identify obsolescence and "critical" spare parts inventories.*	12	7	12	0	0%
FIT Spare Parts Optimization Training	Provide eLearning modules and 2-day Spare Parts Optimization workshop.	12				0%
Evaluate Inventory Effectiveness	FIT collect data pertaining to inventory usage, turns, purchasing cost, and carrying cost to evaluate inventory effectiveness for pilot area.	12				0%
Perform A-B-C Classification of MRO Inventory Items	Evaluate maintenance, repair and general operating supplies inventory classifications used in pilot area based on system-level criticality rankings and ABC analysis model provided by Eruditio.	13				0%
Update Bill of Materials for Critical Assets	Revise or create BOMs in SAP for pilot area assets in critical systems using ABC classification evaluation/conclusions.	14				0%
Map Sustaining Process	Develop the business process used to manage MRO spares, control inventory, and audit inventory effectiveness metrics.	15				0%
Create Spare Parts User Training Package	Assemble user training resources, such as PowerPoint Presentation, whitepaper, Single-point lessons, and Excel tool(s).	16				0%



Identifying potential barriers or points of pushback



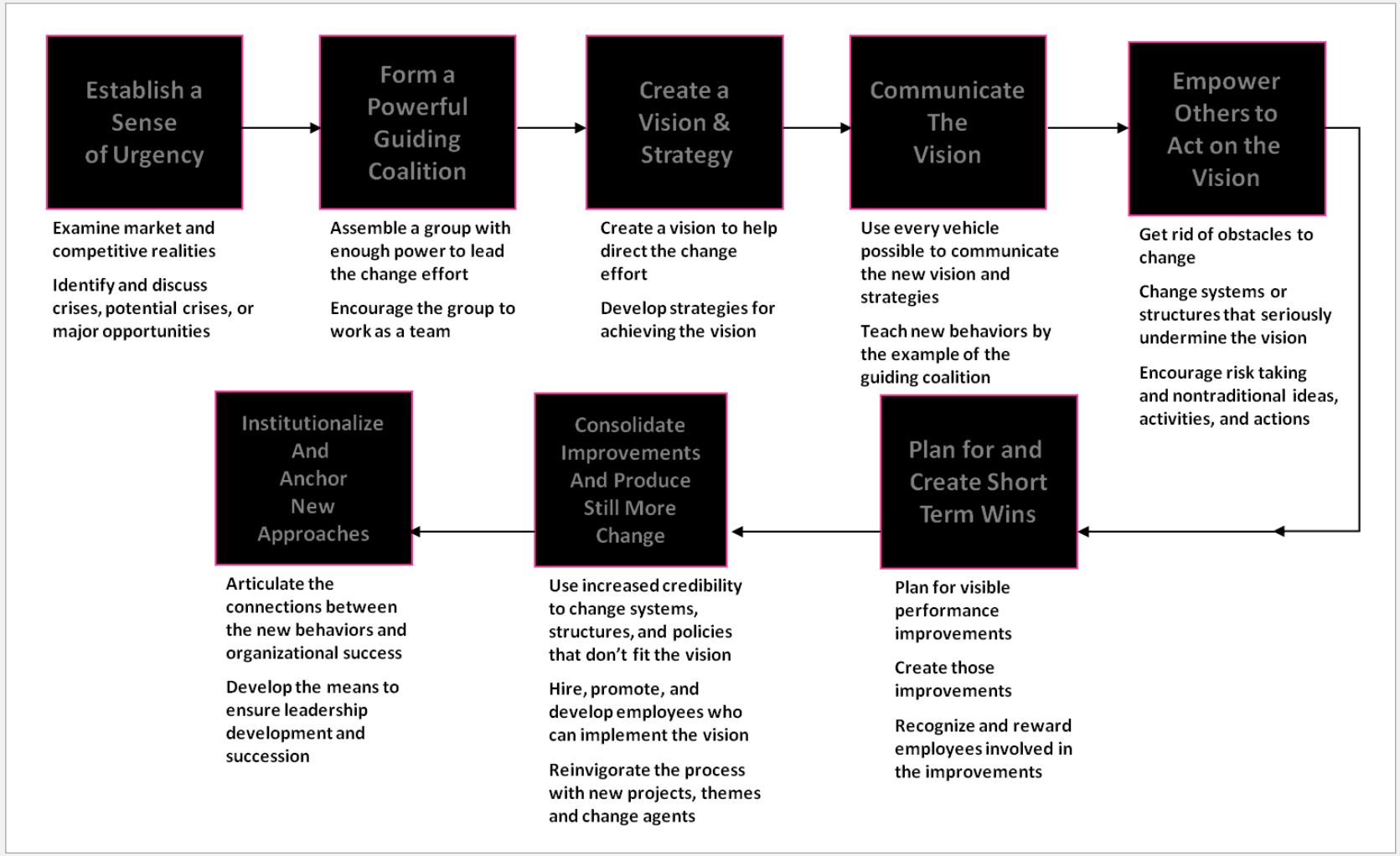
Using the plan

- Keep it up to date
- It will change (when it does communication is key)
- It is not a one-person document or effort
- Use the predecessors to keep your work to a minimum when things move
- Share at the appropriate level, based on needs

Project plan for Success

- Start early with a plan that grows
- Understand where you are
- Understand where you would like to be
- Understand why you are not there
- Refine your plan based on this information
- Integrate other plans with yours
- Use your plan as a tool, not a burden

“Kotter” change model: 8 stages of effective change



- Awareness
- Desire
- Knowledge
- Ability
- Reinforcement

Sell, sell, sell

- Metrics and stories
- Short-term and long-term
- Political, logical, emotional

Cost-savings template

LEAN & Lean Six Sigma Project Year 1 Financial Savings

GeMS 100588981 rev AF

Lean Six S

Lean or LSS Project	Reliability Improvement---Telescope	Red font shows the data need to be input on the tracking Site Actual Hard saving, Actual Soft saving, Total cost, Total customer saving (where applicable)	**Project Owner (Leader)**	
Closure date:			**Project Sponsor**	
Rate Info	**Non-exempt hourly rate** $17.00		**Controller**	
	Exempt hourly rate		**Location**	
	Job specific hourly rate (if applicable)			

		HARD SAVINGS/COSTS					SOFT SAVINGS/COSTS			
LABOR	Description	Baseline process	New process	Hours Saved	Hourly Rate	Savings	Baseline process	New process	Hours Saved	Hourly Rate
Non-exempt time per year	MMA-BD SL Effectiveness Evaluation SL1 42 Steps in 2013"	1224	1205	540.00	$ 17.00	$ 9,180.00				
Non-exempt time per year	MMA-BD SL Effectiveness Evaluation SL2 64 Steps in 2013	1245	1179	6500	$ 17.00	$ 110,500.00				
Non-exempt time per year	MMA-BD SL Effectiveness Evaluation SL3	2952	2904.5	1400.00	$ 17.00	$ 23,800.00				
Capacity Increased	Assembly/Disassenbly Bench		0.5	47	$ 17.00	$ 799.00				
Capacity Increased	Ultrasonic Cleaner		0.5	47	$ 17.00	$ 799.00				
Capacity Increased	Vibration Analysis Tool		0.05	10.55	$ 17.00	$ 179.35				
Capacity Increased	MMA Oil Analyzer			20	$ 17.00	$ 340.00				
Capacity Increased	SL Kits		0.08	17.58	$ 17.00	$ 298.92				
Capacity Increased	InfraRed Thermography		0.17	15.67	$ 17.00	$ 266.33				
						$ 146,162.60				
MATERIALS / TRANSACTIONS	Description	Baseline process	New process	Value per Unit	Number of units per year	Savings	Baseline process	New process	Value per Unit	Number of units per year
						$ -				
						$ -				
						$ -				
						$ -				

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POLL QUESTION No. 4

How are you selling your reliability results?

(Click only one answer)

- Yes, we actively show our successes using metrics, examples, and stories
- Sometimes we share with some of the facility
- No, we keep to ourselves and just do our job

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Reach out on LinkedIn or

www.eruditio.com

Questions

QUESTIONS?

Thank you!

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Next webinar: Building a culture of safety beyond a pandemic

BEST PRACTICE WEBINAR

Wednesday, Sept. 16, 11 a.m. ET

Building a culture of safety beyond a pandemic

Safety is all about people and building a culture of safety is about instilling human behaviors that become the norm. That includes taking steps to protect workers from being infected by COVID-19, but it goes beyond this. And it is not something accomplished in a short time—typically, it takes five to 10 years. Yet positive short-term changes in processes and systems can, over time, contribute to building this culture.

In this webinar, workplace safety expert **Chuck Pettinger,** a Process Change Leader at Fortive-owned Predictive Solutions, discusses his ongoing work with industrial companies to help build this safety-focused climate.

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DEMO

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