



02



PRIORITIZE EVENTS

Identify the chronic events that account for 80% of the losses within the facility.

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ROOT CAUSE ANALYSIS PROCESS STEPS

A systematic approach to uncover the true causes and drive lasting improvement.



01

IDENTIFY EVENTS

Identify undesirable events in the facility using human and digital data.



02

PRIORITIZE EVENTS

Identify the chronic events that account for 80% of the losses within the facility.



03

BUILD TEAM

Establish a cross functional team and appoint an unbiased RCA Facilitator.



04

COLLECT DATA

Gather data within the facility to validate the hypotheses put forth by the team.



05

ANALYZE

Leverage a logic tree approach that will guide the team in assessing root cause hypotheses and utilize data to validate each hypothesis.



06

COMMUNICATE ACTIONS

Convey RCA findings and corrective actions to stakeholders to ensure root causes are addressed.



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CHRONIC FAILURE PRIORITIZATION



With thousands of pieces of equipment and failures, how do you generate a list of “bad actors”?



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The Pareto Rule, also known as the 80/20 rule, states that roughly 80% of the effects come from 20% of the causes, emphasizing the unequal distribution of impact or significance in many situations.

The Pareto Rule

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PARETO ANALYSIS STEPS

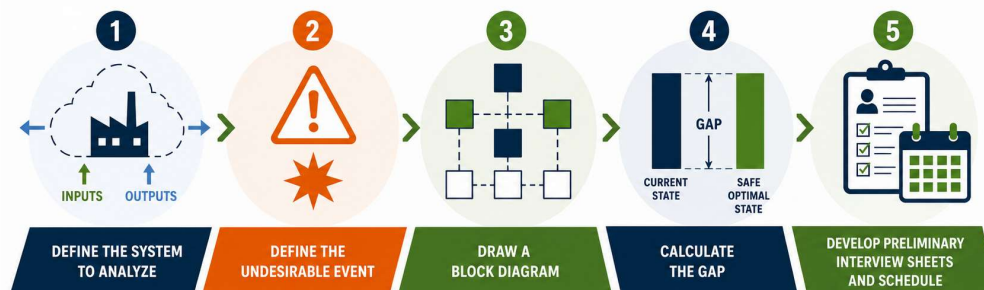
- 1** 
PERFORM PREPARATORY WORK
 Define the problem, scope, and objectives.
 Assemble your team and plan your approach.
- 2** 
COLLECT DATA
 Gather accurate and relevant data related to the problem.
- 3** 
CALCULATE THE LOSS
 Quantify the impact or cost of each cause or category.
- 4** 
DETERMINE THE "SIGNIFICANT FEW"
 Rank the causes by impact and identify the few that contribute to the majority (typically 80%).



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Perform Preparatory Work



KEY TAKEAWAYS

- 1 Define System Boundaries:**
 Establishes clear inputs, outputs, and operational parameters before analyzing.
 
- 2 Pinpoint Undesirable Events:**
 Identifies the exact worst-case hazard or failure scenario to focus resources.
 
- 3 Map Functional Blocks:**
 Translates the physical system into a visual network showing components and dependencies.
 
- 4 Quantify the Gap:**
 Measures the variance between current capabilities and the safe, optimal state.
 
- 5 Plan Field Discovery:**
 Drafts structured interview sheets and schedules to gather human operational insights.
 

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DEFINE THE DEFINITION OF THE UNDESIRABLE EVENT

EXAMPLES



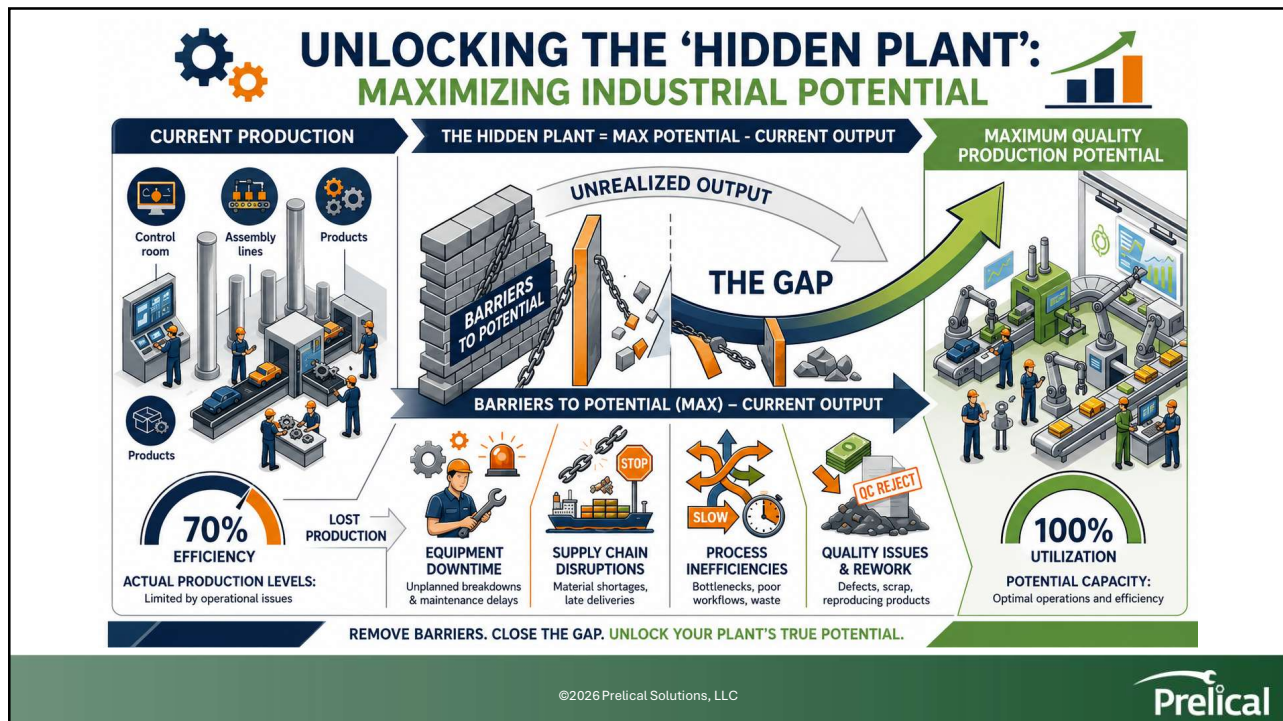
ANY EVENT OR CONDITION THAT **INTERRUPTS** THE CONTINUITY OF MAXIMUM QUALITY PRODUCTION



ANY EVENT OR CONDITION THAT **REQUIRES** THE EXPENDITURE OF DOLLARS

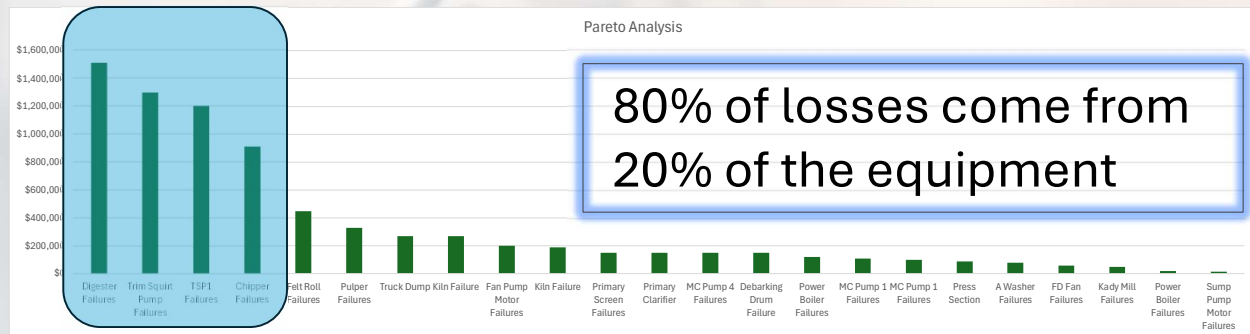
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Pareto Principle for Chronic Failures



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Chronic Failure Pareto Analysis Example

System	Event Description	Event Mode	Frequency Per Year	Production Loss/Event	Maintenance Cost/Event	Total Impact
Pulp Mill	Digester Failures	Cap Failures	52	\$4,000	\$25,000	\$1,508,000
Paper Machine 1	Trim Squirt Pump Failures	Impeller Wear	12	\$100,000	\$8,000	\$1,296,000
Bleach Plant	TSP1 Failures	Locks Up	6	\$0	\$200,000	\$1,200,000
Woodyard	Chipper Failures	Blade Failures	26	\$5,000	\$30,000	\$910,000
Paper Machine 1	Felt Roll Failures	Bearings	5	\$0	\$90,000	\$450,000
Paper Machine 1	Pulper Failures	Pulper Gearbox Failures	3	\$0	\$110,000	\$330,000
Woodyard	Truck Dump	Hydraulic Failures	6	\$0	\$45,000	\$270,000
Recausticizing	Kiln Failure	Insulation Failures	2	\$10,000	\$125,000	\$270,000
Paper Machine 2	Fan Pump Motor Failures	Winding Failures	1	\$100,000	\$100,000	\$200,000
Recausticizing	Kiln Failure	Gearbox Failures	1	\$100,000	\$90,000	\$190,000
Pulp Mill	Primary Screen Failures	Screen Fails	2	\$0	\$75,000	\$150,000
Waste Treatment	Primary Clarifier	Bull Gear Bearing Failures	2	\$0	\$75,000	\$150,000
Bleach Plant	MC Pump 4 Failures	Bearing Failures	2	\$0	\$75,000	\$150,000
Woodyard	Debarking Drum Failure	Gearbox Failures	2	\$0	\$75,000	\$150,000
Power	Power Boiler Failures	Trips	6	\$0	\$20,000	\$120,000
Pulp Mill	MC Pump 1 Failures	Bearing Failures	2	\$0	\$55,000	\$110,000
Pulp Mill	MC Pump 1 Failures	Seal Leaks	4	\$0	\$25,000	\$100,000
Paper Machine 2	Press Section	Press Roll Failures	1	\$0	\$90,000	\$90,000
Pulp Mill	A Washer Failures	Doctor Failures	3	\$0	\$27,000	\$81,000
Power	FD Fan Failures	Coupling Failures	2	\$0	\$30,000	\$60,000
Paper Machine 2	Kady Mill Failures	Bearing Failures	2	\$0	\$25,000	\$50,000
Power	Power Boiler Failures	Igniter Failures	4	\$0	\$5,000	\$20,000
Waste Treatment	Sump Pump Motor Failures	Will not start	3	\$0	\$5,000	\$15,000
Total						\$7,870,000

Pareto Split

80% of the Loss / 20% of the Event

Example

Grand Total = \$1000

Pareto Cut = .80

Significant Few = \$800

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What makes chronic failures so important?

Frequency

$$12/\text{Yr.} \times \$20,000/\text{event} = \$240,000/\text{Yr.}$$

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Any Event or Condition

that requires the expenditure of money to **operate** and **maintain** your home.



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GROUP EXERCISE

Utilizing the handouts, build a **pareto analysis** on the house systems in the handout.





1. REVIEW
Review the handouts for house systems.



2. IDENTIFY
List the potential issues for each system.



3. ANALYZE
Determine frequency and impact for each issue.



4. BUILD
Create a Pareto analysis to identify the Significant Few issues.



PARETO ANALYSIS



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SAPPI Specific SAP Work Order Data

<https://prelcal.com/sappisom26>

Row Labels	Count of Order	Sum of TotSum (actual)	Area	Order Type
#2 PAPER MACHINE	427	\$2,691,340	#1 PAPER MACHINE	PM01
SO-PA-122 (#2 PAPER MACHINE)	273	\$1,019,701	#2 PAPER MACHINE	PM02
SO-PA-122-080 (#2PM DRYER SECTIONS)	29	\$391,078	#3 PAPER MACHINE	PM03
SO-PA-122-060 (DEL-#2 PM PRESS SECTION)	6	\$248,572	ADMINISTRATION	PM05
SO-PA-122-200-060 (#2 PM CHILLER HVAC)	7	\$242,405	BIOMASS FUEL PRO...	PM06
SO-PA-122-400 (#2 PM MAINTENANCE SUPPLIES)	15	\$150,114	BLEACH PLANT	PM07
SO-PA-122-140-070 (BULK OIL STORAGE & LUBE EQUIPMENT)	1	\$141,896	CHEMICAL PREPAR...	
SO-PA-122-085 (#2PM OPTISIZER)	16	\$132,767	CHEMICAL RECOVE...	
SO-PA-122-210 (#2 PM MISC)	77	\$131,813		
SO-PA-122-220-060 (CONTROL LOGIX SAPPI_PM2)	2	\$121,227		
SO-PA-122-130-200 (ABB LINEUP 200)	1	\$111,769		
ROUNDWOOD PROCESSING	152	\$1,630,347		
#1 PAPER MACHINE	208	\$1,522,030		
BIOMASS FUEL PROCESSING	135	\$1,448,913		
#3 PAPER MACHINE	207	\$1,104,119		
HOG FUEL BOILER #1 (HFB#1)	47	\$890,512		
PULPING - DIGESTER / BROWN STOCK	82	\$868,708		
ROLL HANDLING FINISHING GENERAL	256	\$796,133		
HOG FUEL BOILER #2 (HFB#2)	71	\$715,201		
KILN, RECAUST & LIQ SUPPLY SYS_INC SEWER	29	\$658,334		
POWER PLANT AUXILIARY SYSTEMS	69	\$595,512		
BLEACH PLANT	21	\$532,704		
WOODYARD STORAGE AND HANDLING	56	\$508,309		
RECOVERY BOILER SYSTEMS	84	\$504,564		

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Build Our Facility Failure History

Utilizing the Excel file of work order history (if available) and team experience, build a pareto analysis on an **area** in the facility.

Use the **Pareto worksheet** provided to compile the list. (Utilize Excel worksheet if available)





1. COLLECT DATA
Use work order history and team experience.



2. COMPILE LIST
List all real failure events.



3. BUILD PARETO
Rank and graph the most common failures.

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