

SESSION



BRÚJULA



Presentation of a successful experience, case study, or project.

In the Brújula Session, you will learn from the shared experience of a successful implementation that will serve as a guide to initiate or improve your own plans.

Solve problems and improve your reliability through the implementation of new methodologies and technologies, understanding the origin, analysis, action plan, step-by-step process, achievements, setbacks, and lessons learned that culminate in the business case.

The Role of a Reliability Engineer



Torbjörn Idhammar

President, IDCON INC

IDCON INC – International Presence



Industries Worked In

- Wood, Building Products
- Steel and Metals
- Pharmaceutical
- Power Plants
- Mining
- Food
- Chemical
- Oil and Gas
- Pulp and Paper
- Manufacturing



Ongoing Contracts

- Glatfelter
- Alkegen
- Simmons Food
- Nippon
- Roseburg Forest Pr.
- WestFraser
- Louisiana Pacific
- Novo Nordisk
- Ingredion
- Domtar
- Billerud
- Softys/ CMPC Tissue
- Nitta Gelatin
- Cascades
- Fatima
- Newcrest

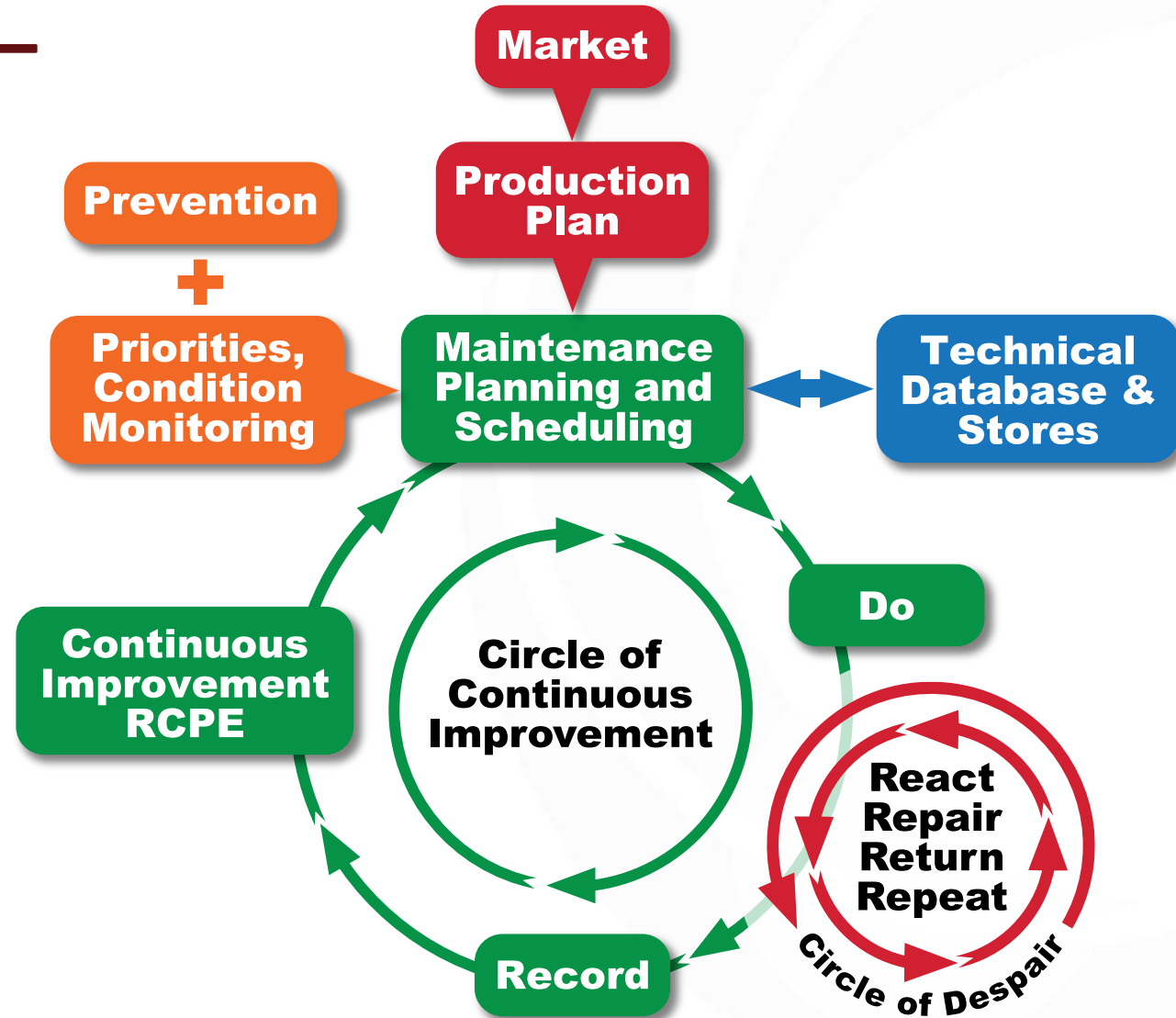
Recent Clients:



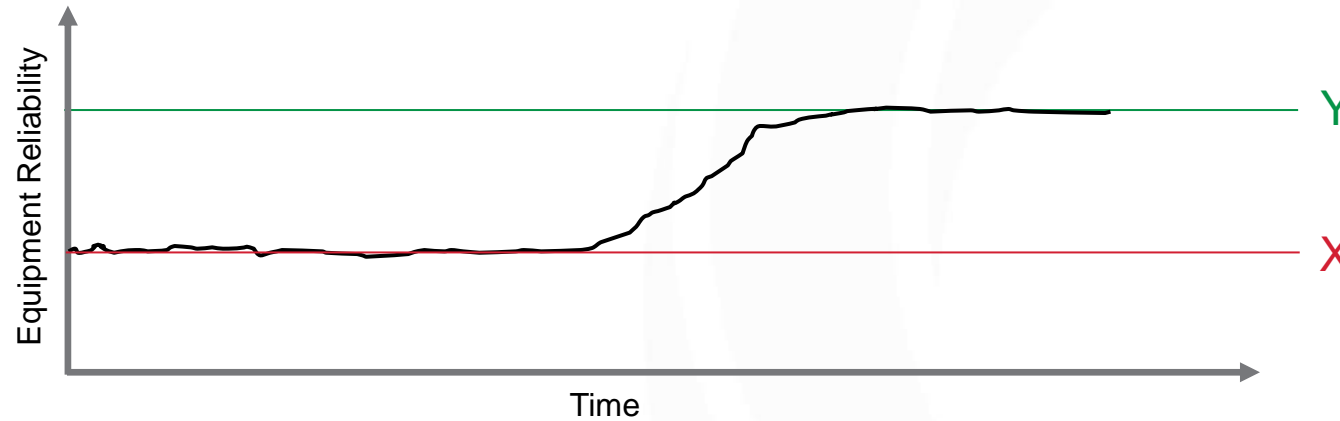
IDCON: Our Mission

“To help our clients improve overall reliability and lower manufacturing and maintenance costs.”

Productivity Circle

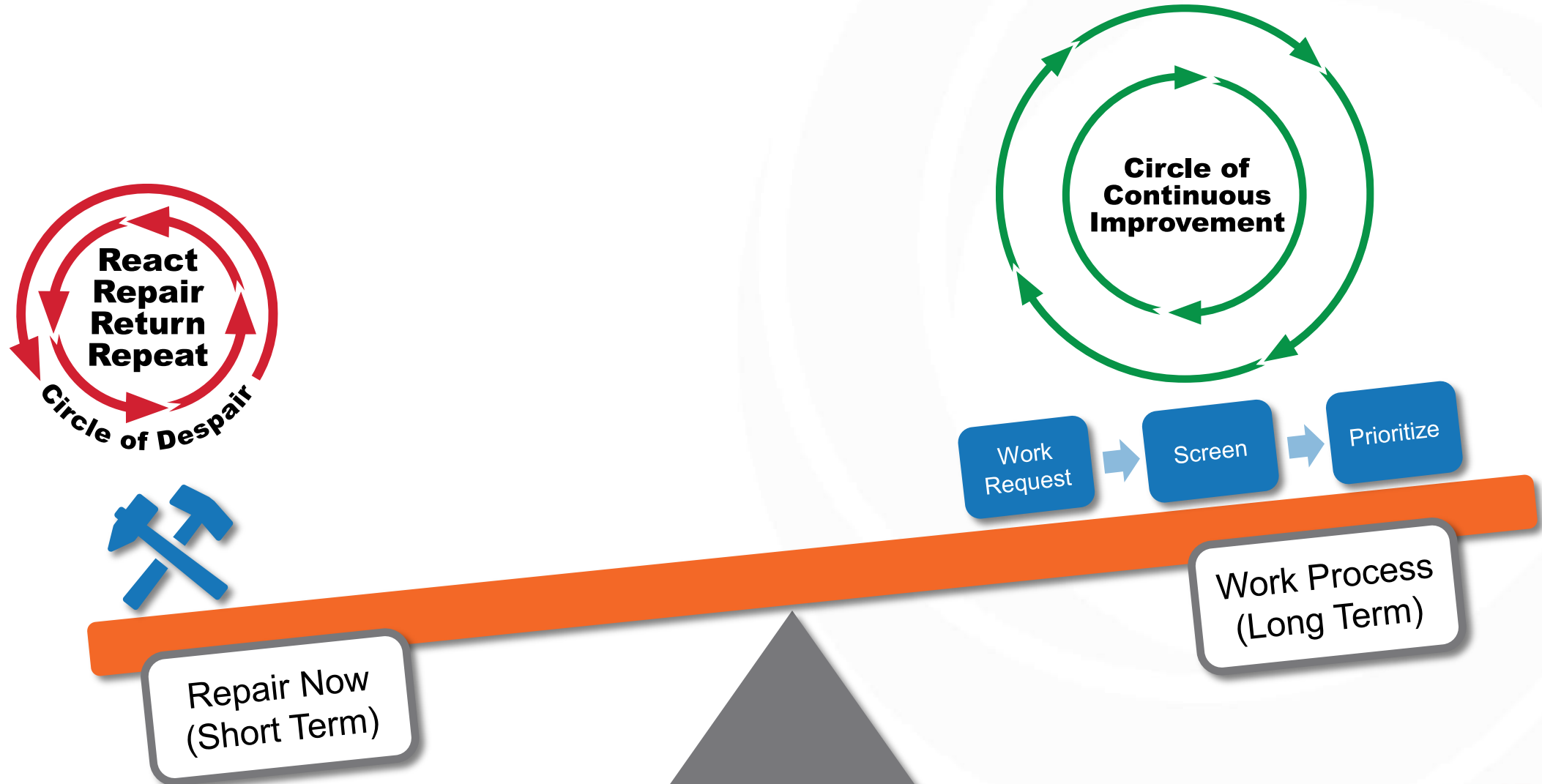


Equipment Reliability Moving from X to Y

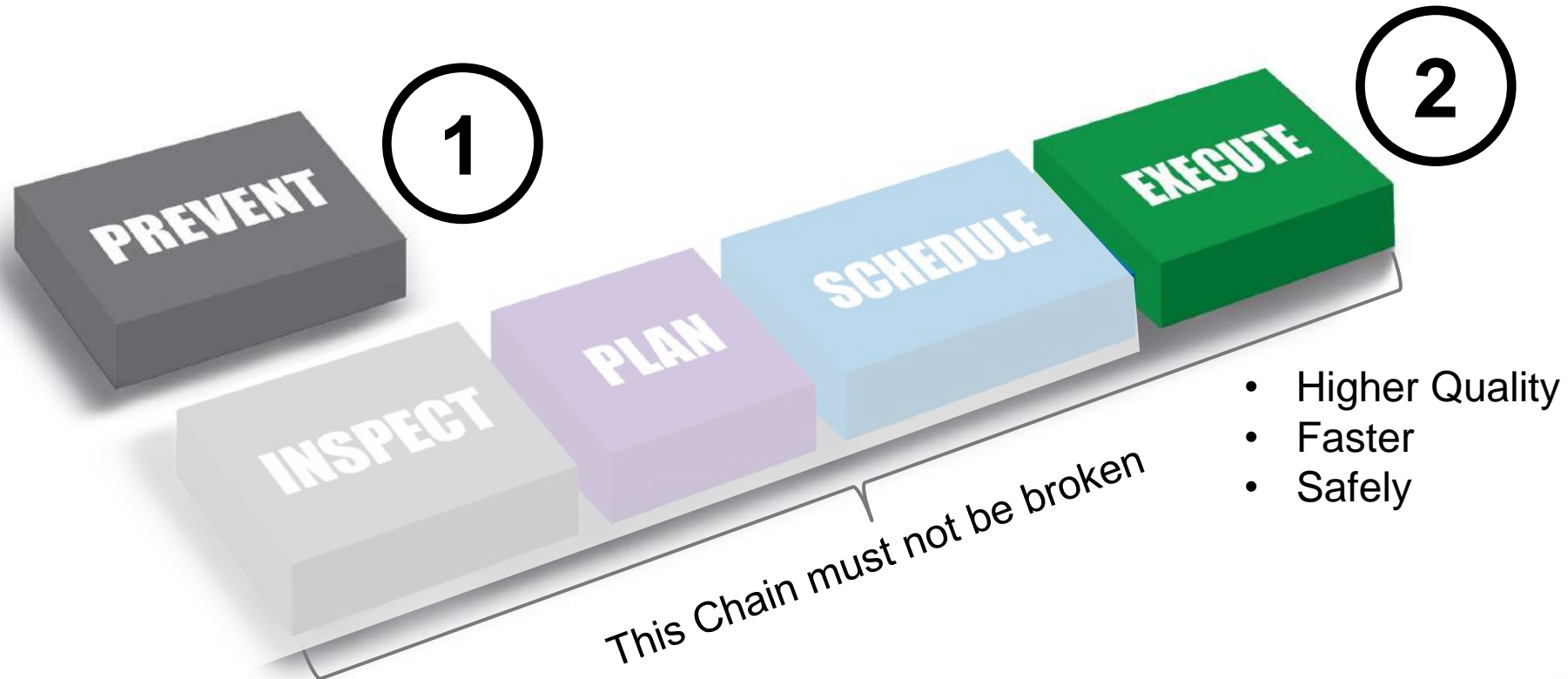


What physically needs to be done to existing equipment to go from X to Y?

Implementation Plan: Where do we focus time?



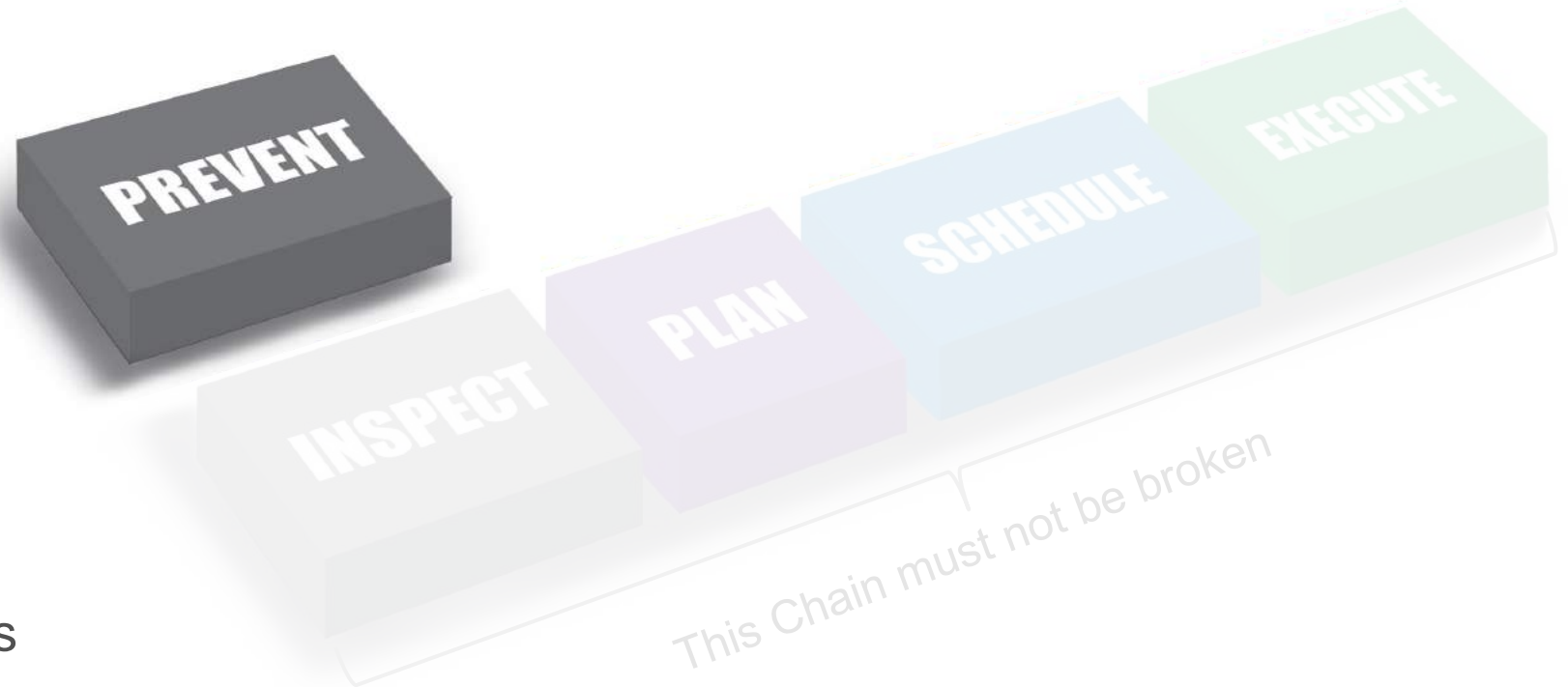
The Ultimate Two (2) Goals for Maintenance



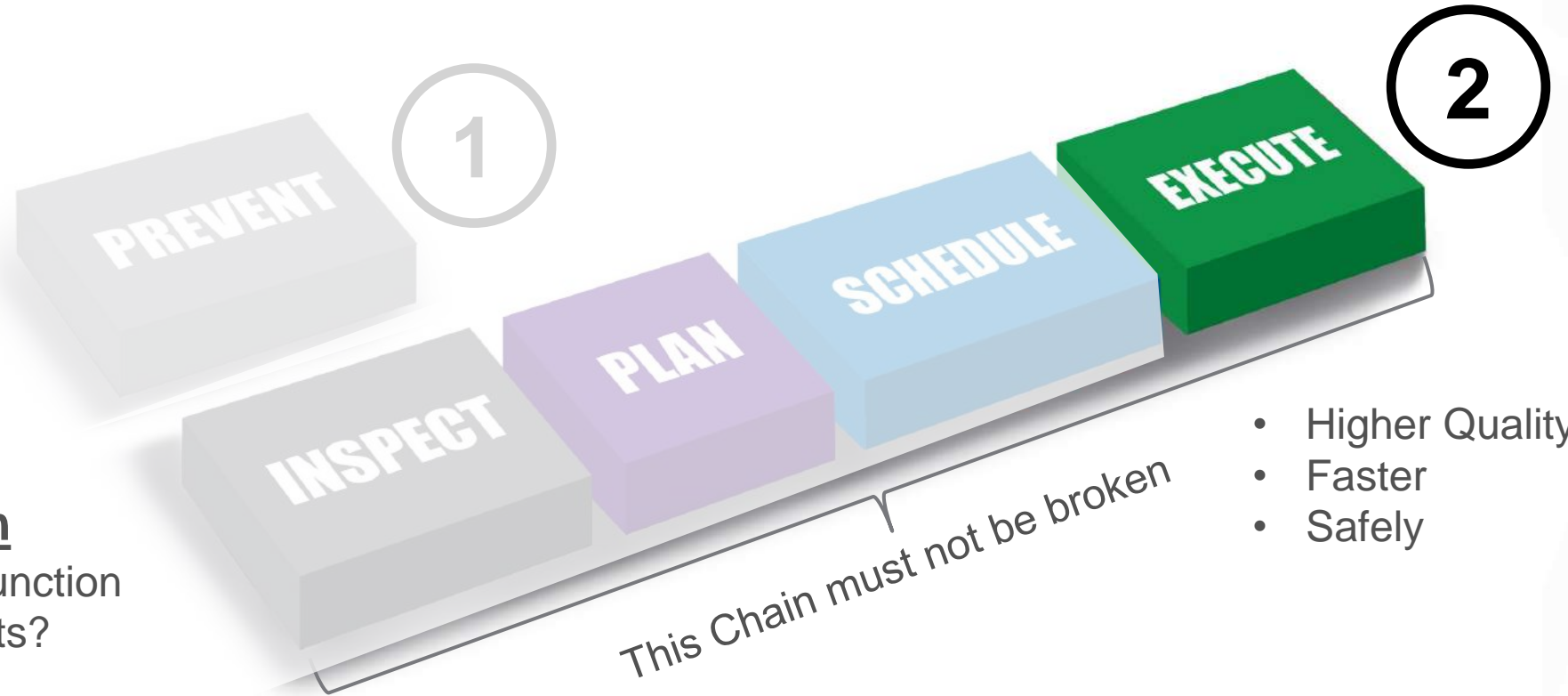
Examples of Prevention

Examples:

- Clean Lubricants
- Precision Installation
- Alignment
- Balancing
- Operating Procedures
- Design for Reliability
- Design for Maintainability
- Design for Inspectability



The Ultimate Two (2) Goals for Maintenance

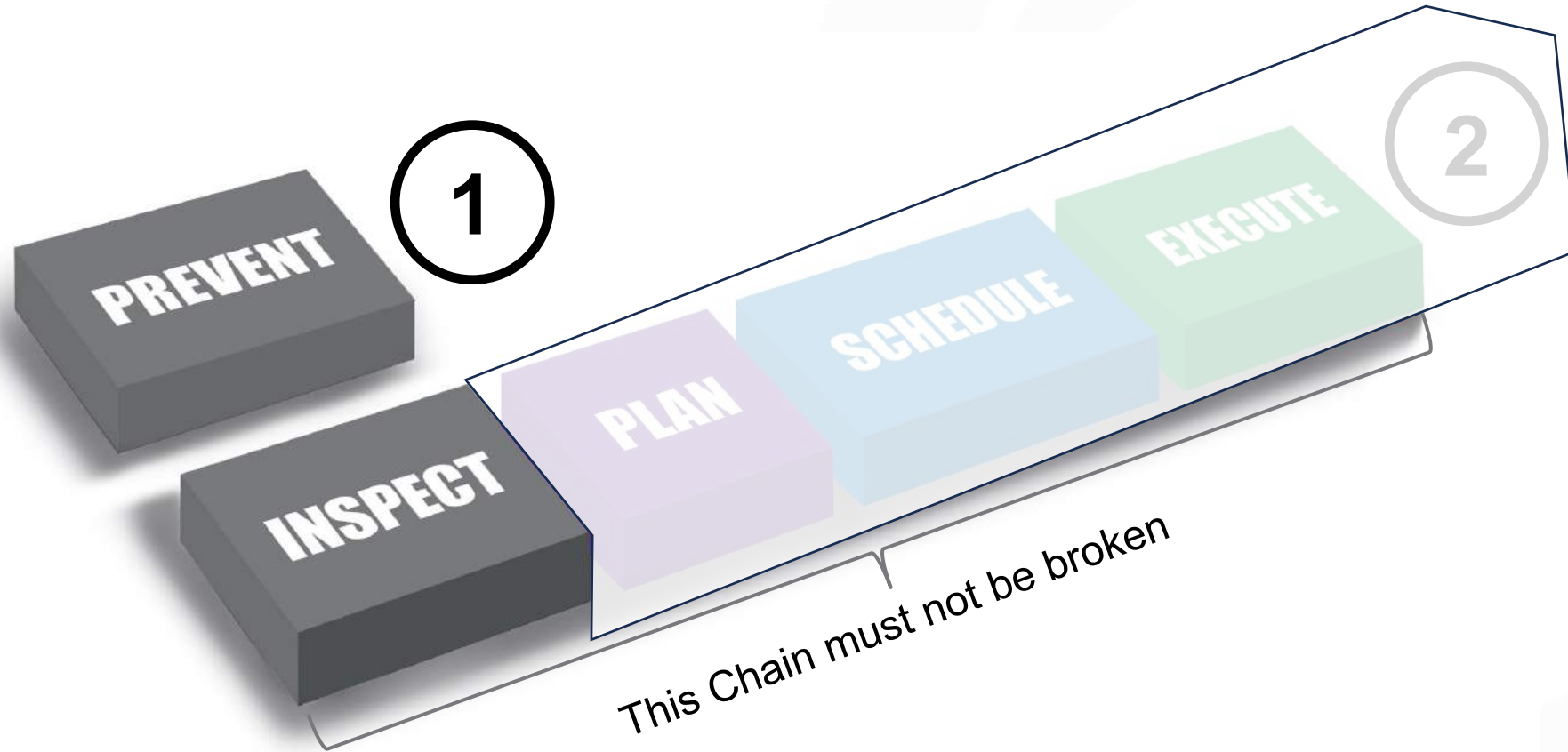


Enablers to the Chain

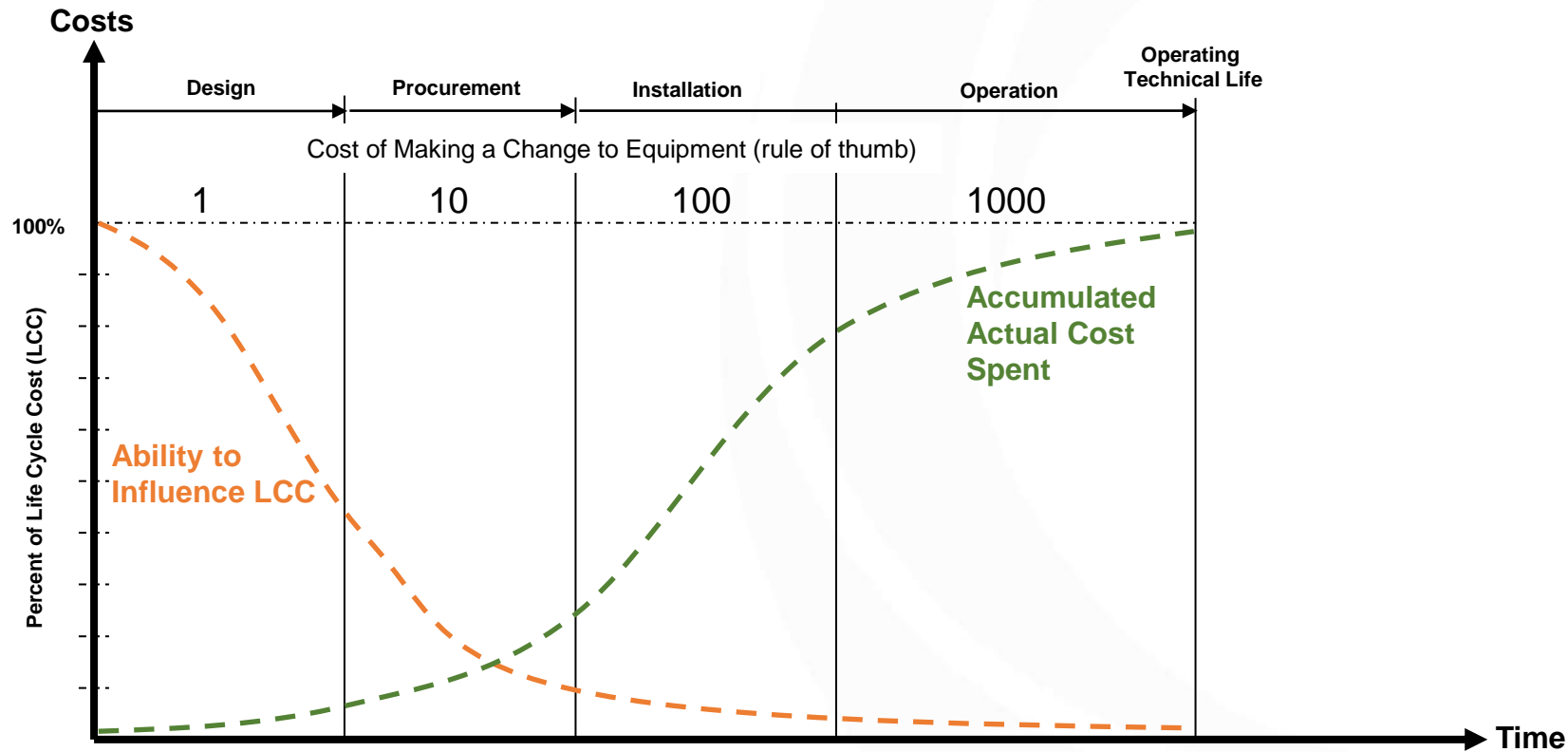
- CMMS Data, usage, function
- Find correct spare parts?
- Technical Data?
- Document CM Inspections
- Inspection tools
- Document lubrication routes
- etc.

- Higher Quality
- Faster
- Safely

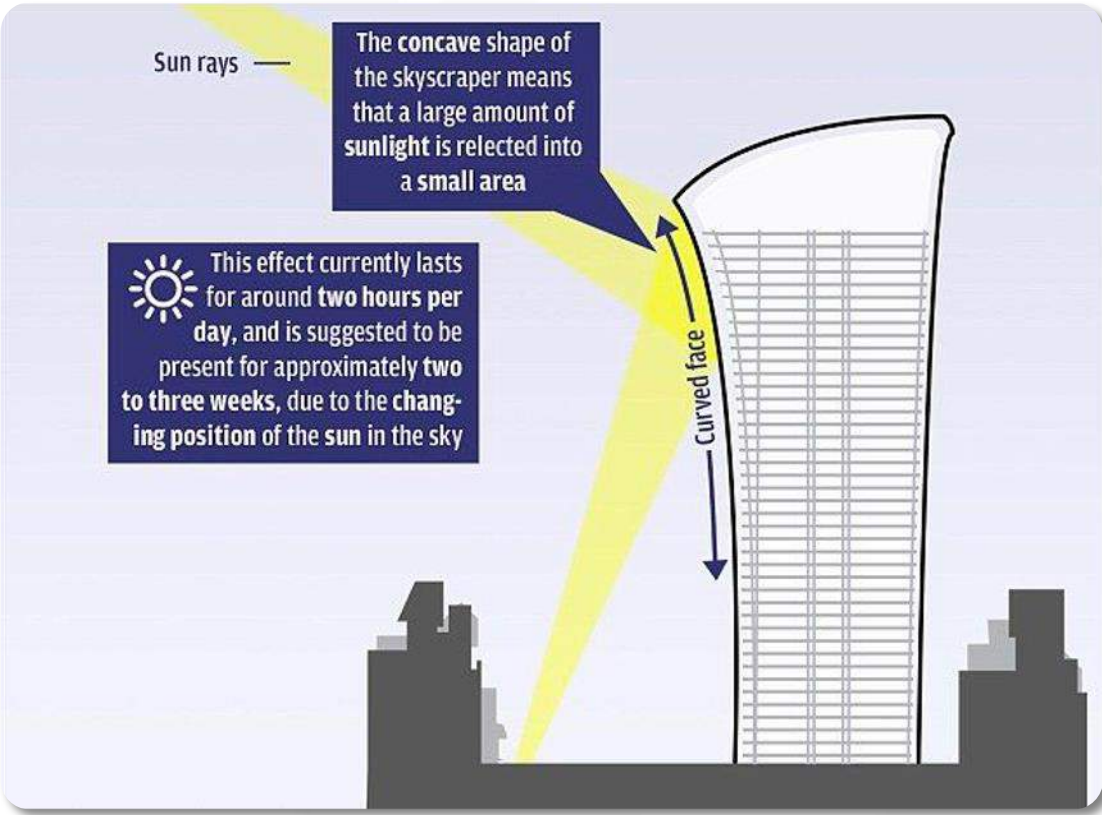
The Role of the Reliability Engineer



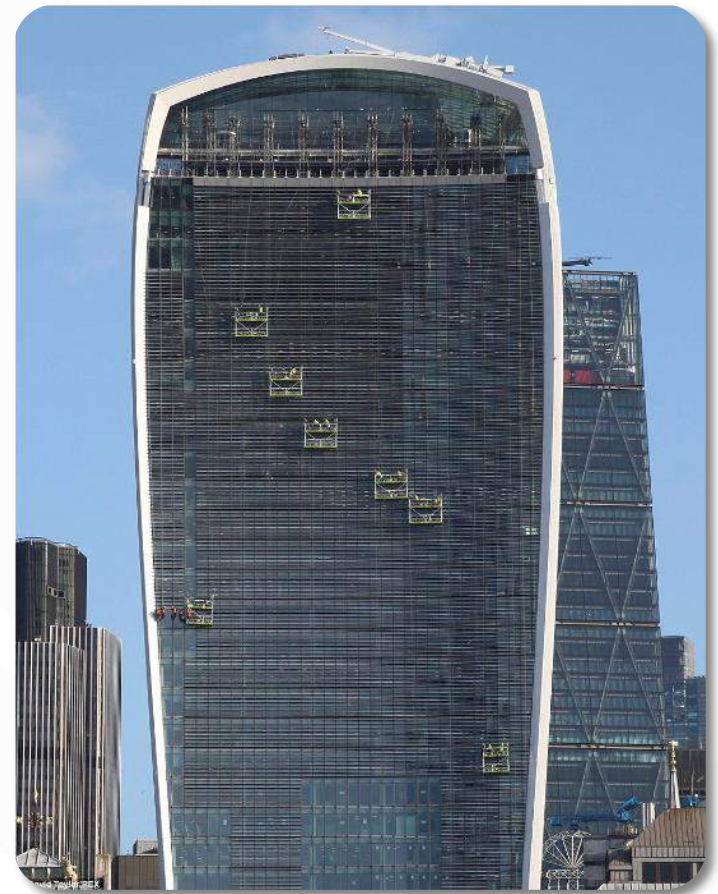
Life Cycle Cost at Early Stages



Cost of Correcting After Design Phase: Walkie Talkie Building (2013)



Walkie Talkie Building (2014)



France's National Rail Operator SNCF – RFF



Ordered 2,000 new high-speed trains

When the first batch was put on rails, they noticed that 1,300 platforms were 20 cm too wide for the trains

€ 50 Million (\$US58 M) to fix

"We discovered the problem a little late," admitted Christophe Piednoël, RFF spokesman

Designing for Inspectability



How would you inspect this belt?

Example: Design for Inspectability, Maintainability



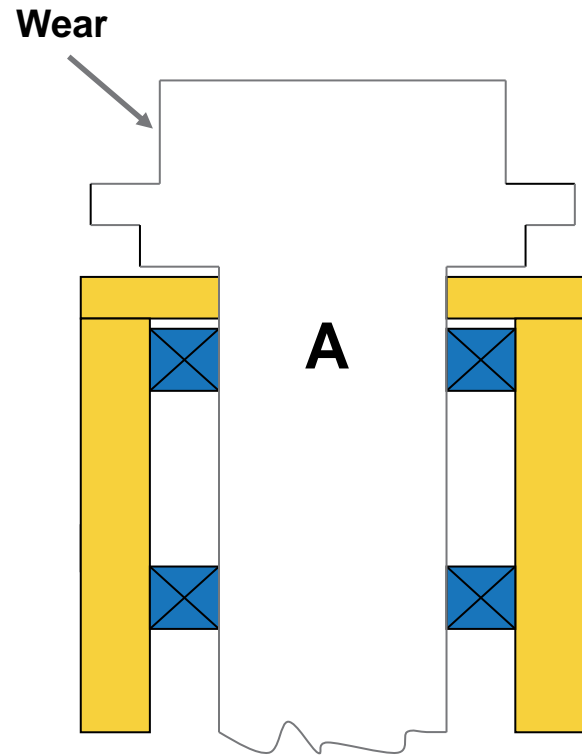
Maintainability – Access



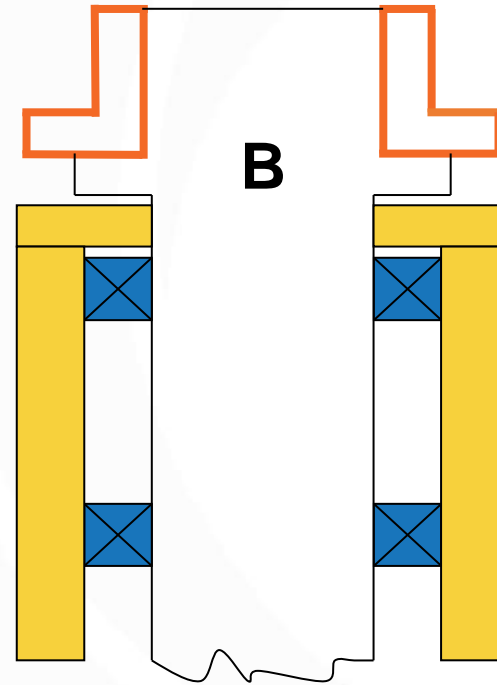
It will be a challenge to replace the pump or motor on this unit



Installation Example



Replace worn wheel unit \$900
6 hours down time



Replace worn wheel \$270
2 hours down time

Maintainability



Design for Reliability



Design for Reliability – Sealed and Shielded Bearings Require No Maintenance





Preventive Maintenance/Essential Care and Condition Monitoring (PM/ECCM)

Essential Care

FTM

Life Extension

- Lubrication
- Alignment
- Balancing
- Detailed Cleaning
- Operating Practices
- Installation Practices
- Filtration
- Adjustments

Condition Monitoring

Detects Failures

Objective

Provides a comparable reading

Measuring

- Pressure
- Flow
- Current, Voltage
- Distance
- Vibration
- Temperature
- Decibels

Using

- Infrared Cameras
- Vibration Sensors
- Shock Pulse Measurement
- Ultrasonic Thickness Test
- Ultrasonic Listening (leaks)
- Oil Analysis
- Gauges, etc.

Subjective

Provides no reading

- Look
- Listen
- Feel
- Smell

Lubrication



Future?



PM/ECCM Example Centrifugal Fan



CMS 142R Fan – Air Centrifugal

*CMS129R Bearings
+ Temp. and vib. limit*

CMS 137R Belt Drive

*CMS 100R Motor AC
+ Amp. & Temp. & vib. limit*

Handheld Example

Eq. no. 813-5423-MT

Name No. 5 Hood Exhaust Fan - Motor AC

Reference CMS100R Rt. Seq. 1020

Check air intake. Detailed Cleaning. Water/ Humidity. Record temperatures. Noise and Vibration. Motor Base. Electrical. Grease.

WORK OR. []

MEASURE []

CLOCK 12:46:59 pm



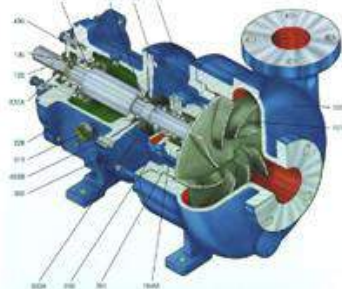
OK

Description
Temperature front bearing of motor

Type	UoM	Latest Reading
Temp.	Farenheight	
	Fahrenheit	
09/06/01	15:33:35	158

New Reading

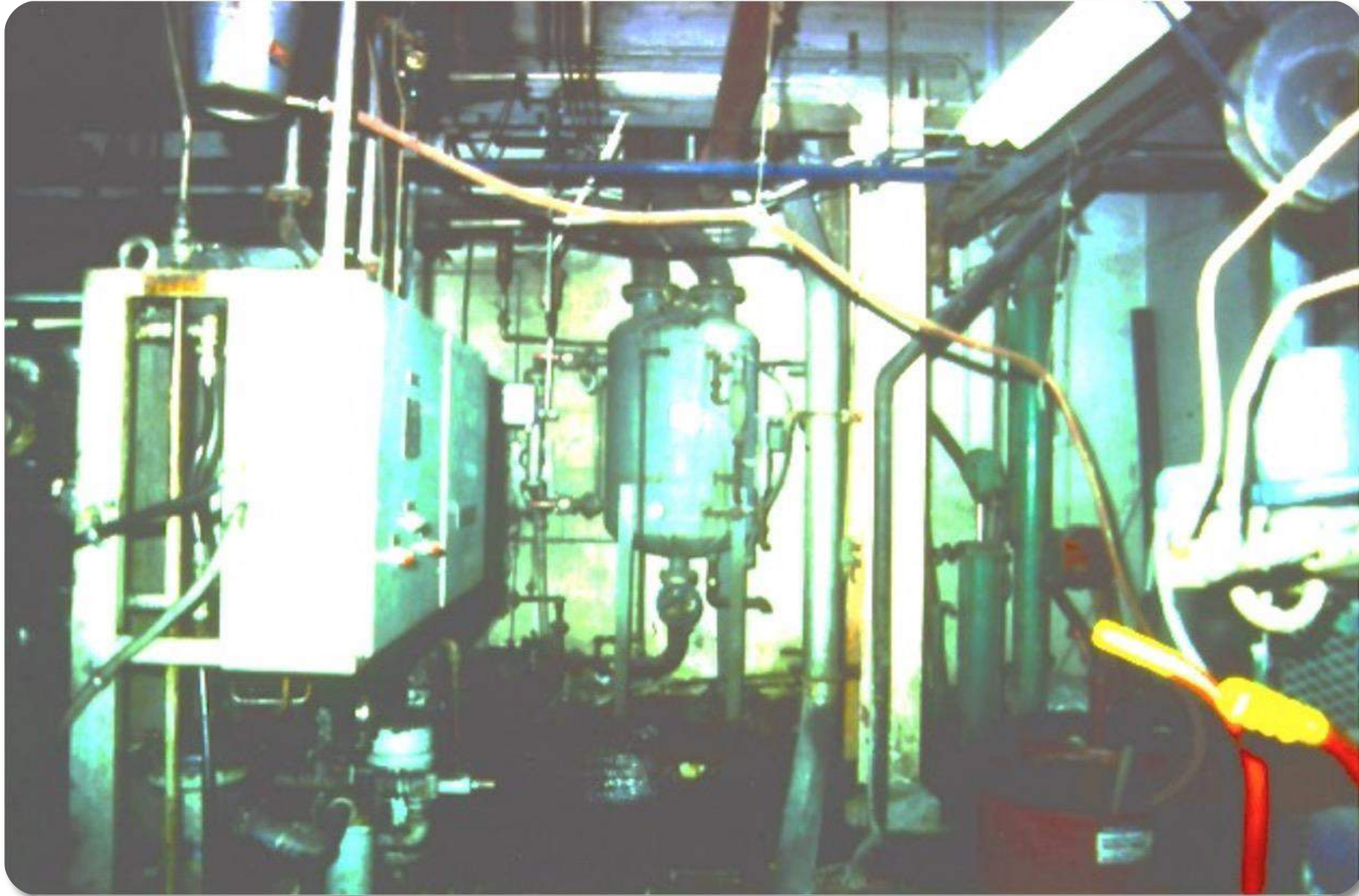
09/06/01	15:34:15	175
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COMPONENT	ON-THE-RUN INSPECTION	Frequency	SHUTDOWN INSPECTION/ FTM	Frequency
<p>Coupling Gear</p>  <p>CMS106R</p>	<p><u>Operators:</u> Noise Temperature Visual Guards</p> <p><u>Mech. Maint.:</u> Noise Temperature Visual Guards</p>	<p>Weekly</p> <p>Monthly</p>	<p><u>Lubricator:</u> Take apart, inspect, clean all parts, change seals, re lubricate, check alignment.</p>	<p>2 years</p>
<p>Motor AC</p>  <p>CMS 100R</p>	<p><u>Operations:</u> Air intake detailed cleaning water humidity Temperature Noise and Vibration Motor Base Electrical Greasing.</p> <p><u>Mech. Maint.:</u> Air intake detailed cleaning water humidity Temperature Noise and Vibration Motor Base Electrical Greasing.</p> <p>Vibration analysis</p> <p>Lubrication (if applicable). Frequency depends on rpm and grease.</p>	<p>Weekly</p> <p>Weekly-monthly</p> <p>2-3 Weeks</p> <p>3 months</p>	<p><u>E/I Maint.</u> For critical motors, it's suggested to run a winding test. A winding test can be done with a number of different tools, use the mill standard tool.</p> <p>If there is a maintenance opportunity, do detailed cleaning of unit, remove junction box cover and inspect connections. Follow required safety procedures.</p>	<p>Yearly</p>
<p>Pump Centrifugal Packing</p>  <p>CMS127R</p>	<p><u>Operations:</u> Temperature Bolts and fasteners seal noise and vibration oil level oil condition leaks in piping pressure gague detailed cleaning breather cavitation</p> <p><u>Mech Maint.</u> Temperature Bolts and fasteners seal noise and vibration oil level oil condition leaks in piping pressure gague detailed cleaning breather cavitation tighten packing if needed.</p>	<p>Weekly</p> <p>Monthly</p>	<p><u>Lubricator:</u> Oil change yearly for mineral oil, every 3 years for synthetic oil.</p>	<p>1-3 years</p>

Root Cause?



Root Cause?



RE Role: Summary

Lubrication
Design for Reliability
Design for Maintainability
Design for Inspectability
Preventive Maintenance

Prevention

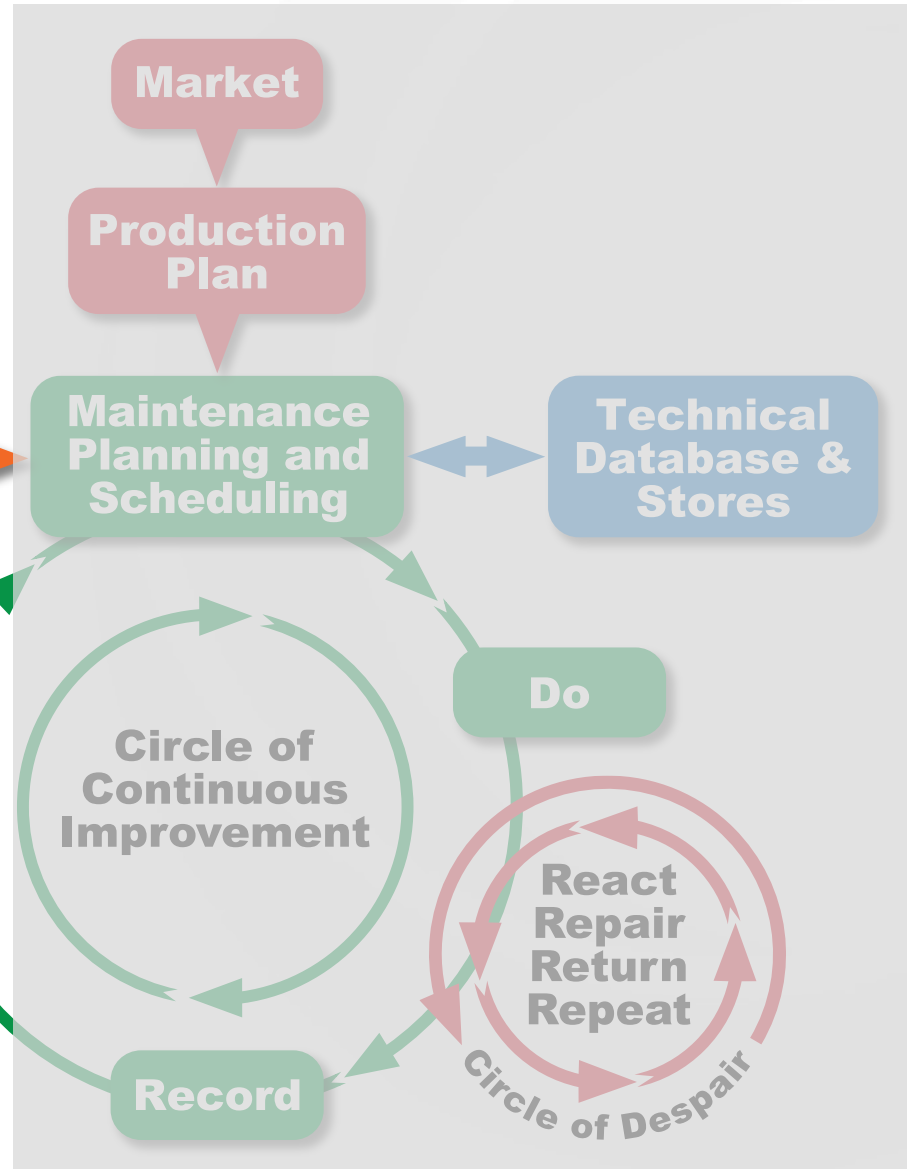


Priorities, Condition Monitoring

Condition Monitoring

Investigative
Corrective Actions

Continuous Improvement RCPE





CONGRESO DE
MANTENIMIENTO
& CONFIABILIDAD
M É X I C O

16
EDICIÓN

THANK YOU!

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