From RCM to CMMS: How to implement the RCM recommendations in EXP and Maximo

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- Doing the right minimum work to maximize asset performance
- Enabling change and sustaining the new processes for continued improvement
- Enabling the RCM recommendations to be implemented into daily life
- Capturing and managing all the data
- You all can add others…

Cost of Not Doing the Right Work

IVARA

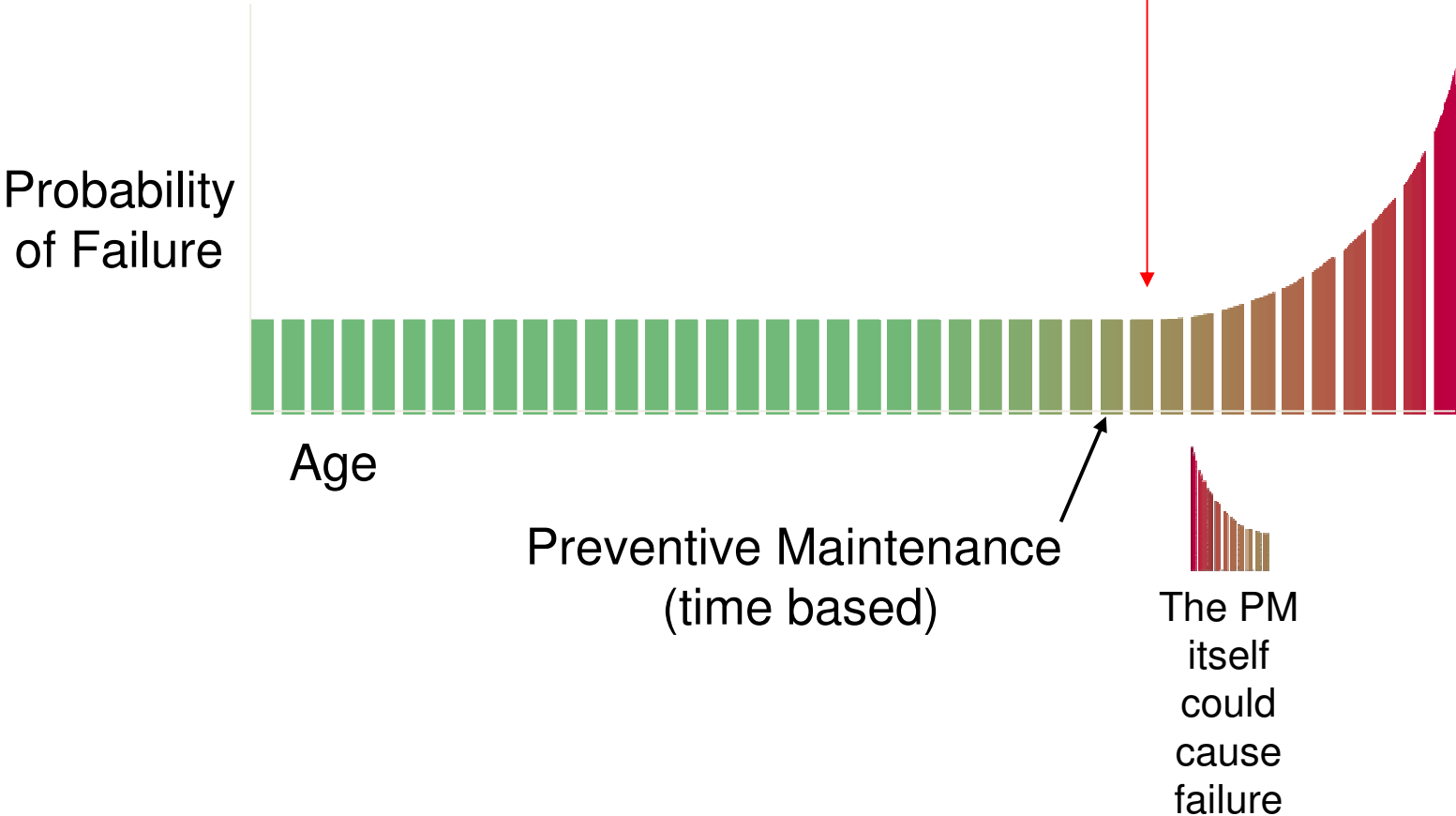| Type of work	Cost	Result
Reactive/ Deviation	Downtime - highest repair $	Too Little Too Late
Non-value added	Unnecessary parts and labor $	Too Much Too Early
Base Work	Minimum $ to ensure reliability	*The Right Work at the Right Time*

Cost of Not Doing the Right Work

IVARA

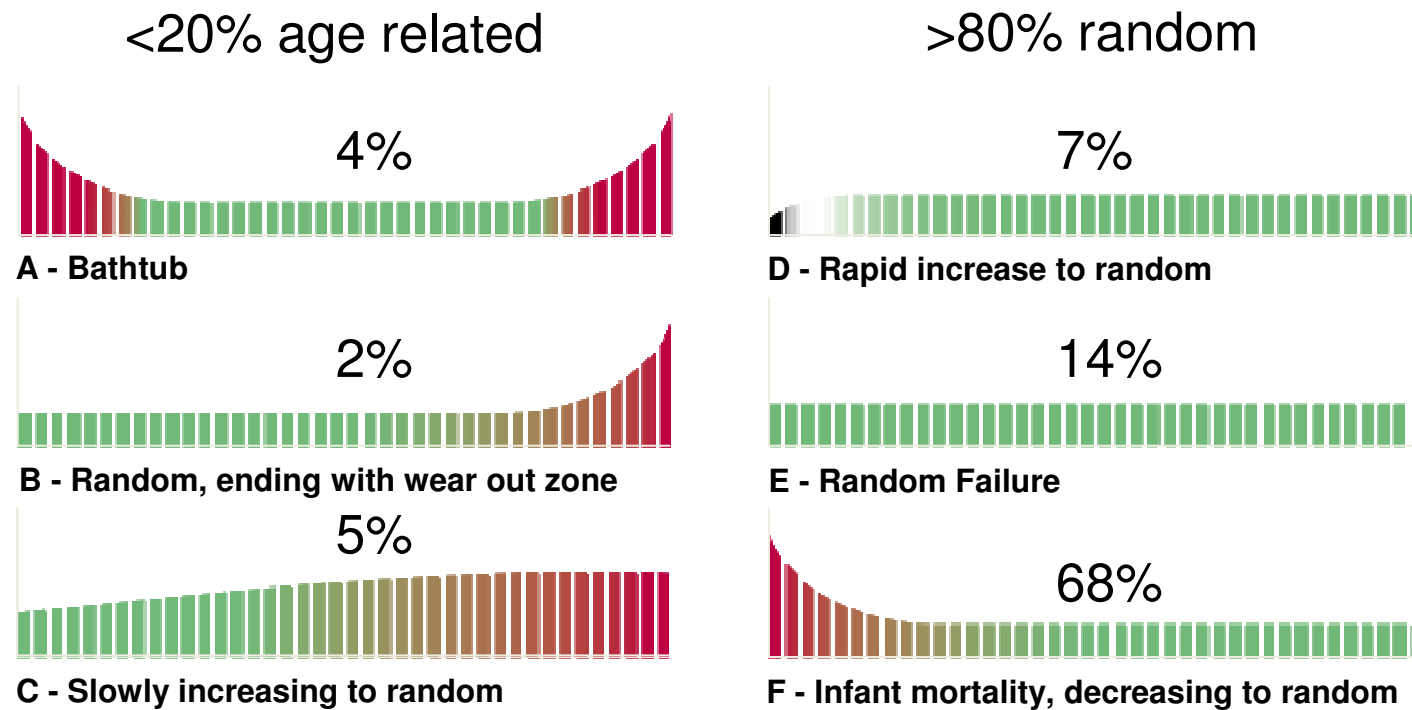|	Industry Average	Best in Class
Reactive / Deviation work Too little, too late	60 %	15 %
Non-value added work Too much, too early	20 %	5 %
Base work *The Right Work* *at the Right Time*	20 %	80 %

SMRP: Reactive work takes 3X longer and cost 4 – 10X more
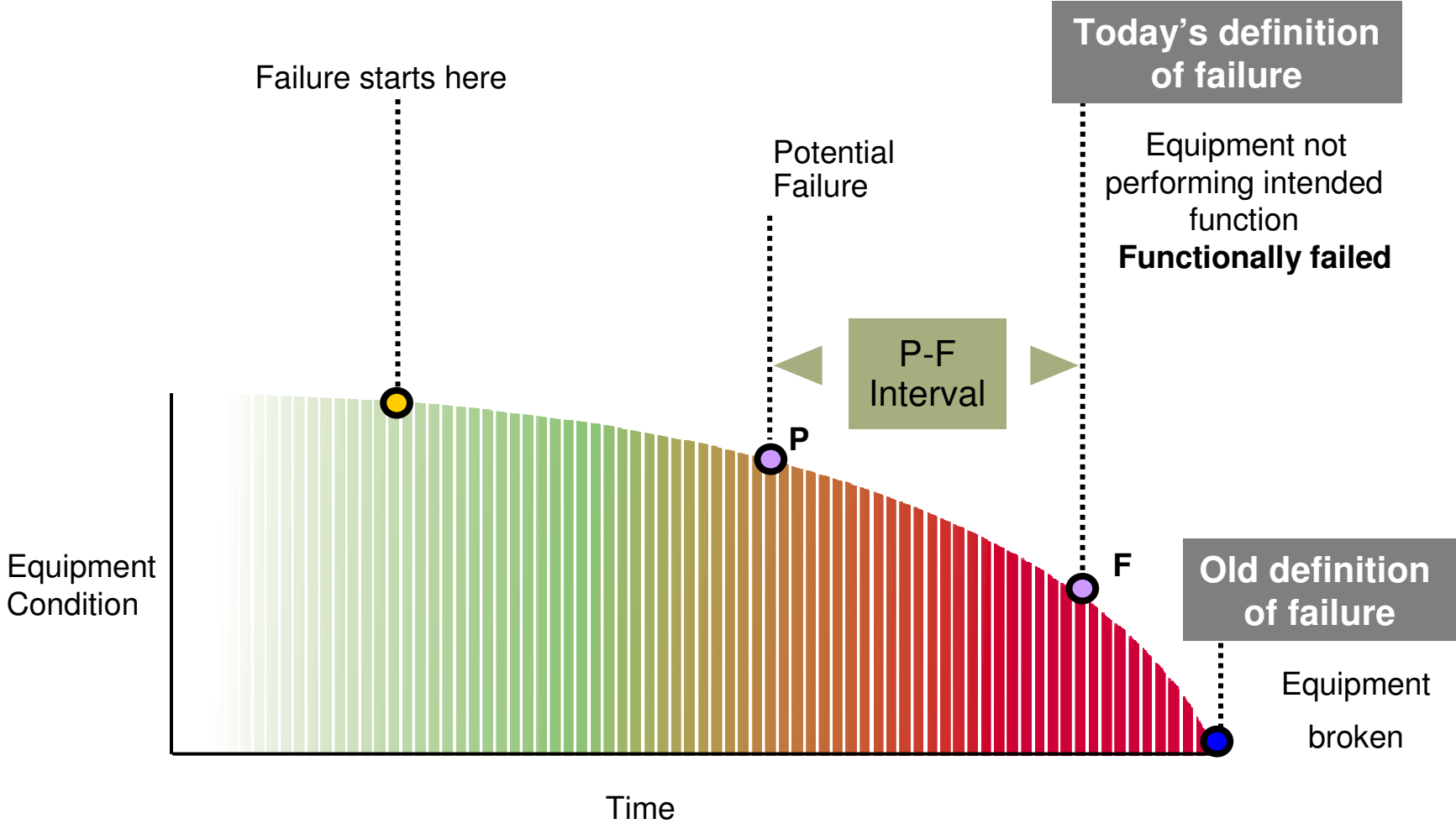
Assumed most items
wear out at about the same age

Probability
of Failure

Age

Preventive Maintenance
(time based)

The PM
itself
could
cause
failure

- There are six failure patterns

<20% age related

>80% random

4%

A - Bathtub

7%

D - Rapid increase to random

2%

B - Random, ending with wear out zone

14%

E - Random Failure

5%

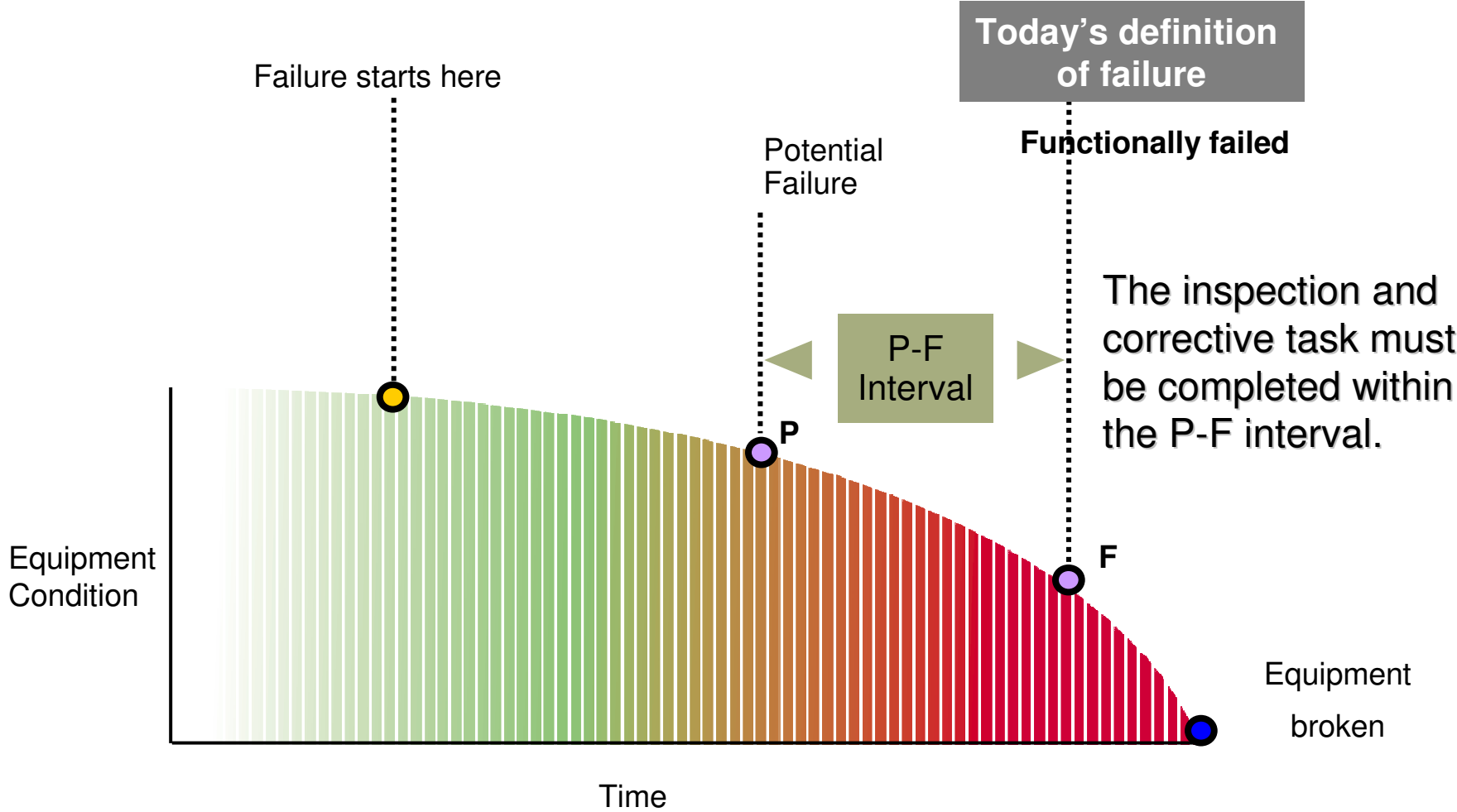**C - Slowly increasing to random**

68%

F - Infant mortality, decreasing to random

The majority of failures are random, not age related

Today's Definition of Failure

Failure starts here

Today's definition of failure

Potential Failure

Functionally failed

P-F Interval

The inspection and corrective task must be completed within the P-F interval.

P

F

Equipment Condition

Equipment broken

Time

Consolidating Islands of Data

IVARA

Infrared Thermography

Operator Rounds

Data Historians

Vibration Analysis

PLC's

Motor Circuit A...

Maintenance Rounds

SCADA

Non-Destructive Testing

Visual Inspec...

Lubrication Analysis

DCS

Ana...

Recommended Tasks

PROCESS CONTROL TOOLS

DCS
PLC's
Data Historians
SCADA

INSPECTIONS

Visual Inspections
Maintenance Rounds
Operator Rounds

RCM

Analysis Results
Recommended Tasks

PREDICTIVE TOOLS

Infrared Thermography
Motor Circuit Analysis
Non-Destructive Testing
Lubrication Analysis
Vibration Analysis

IVARA exp ENTERPRISE

- The Ivara software solution ties it all together
  - Technology
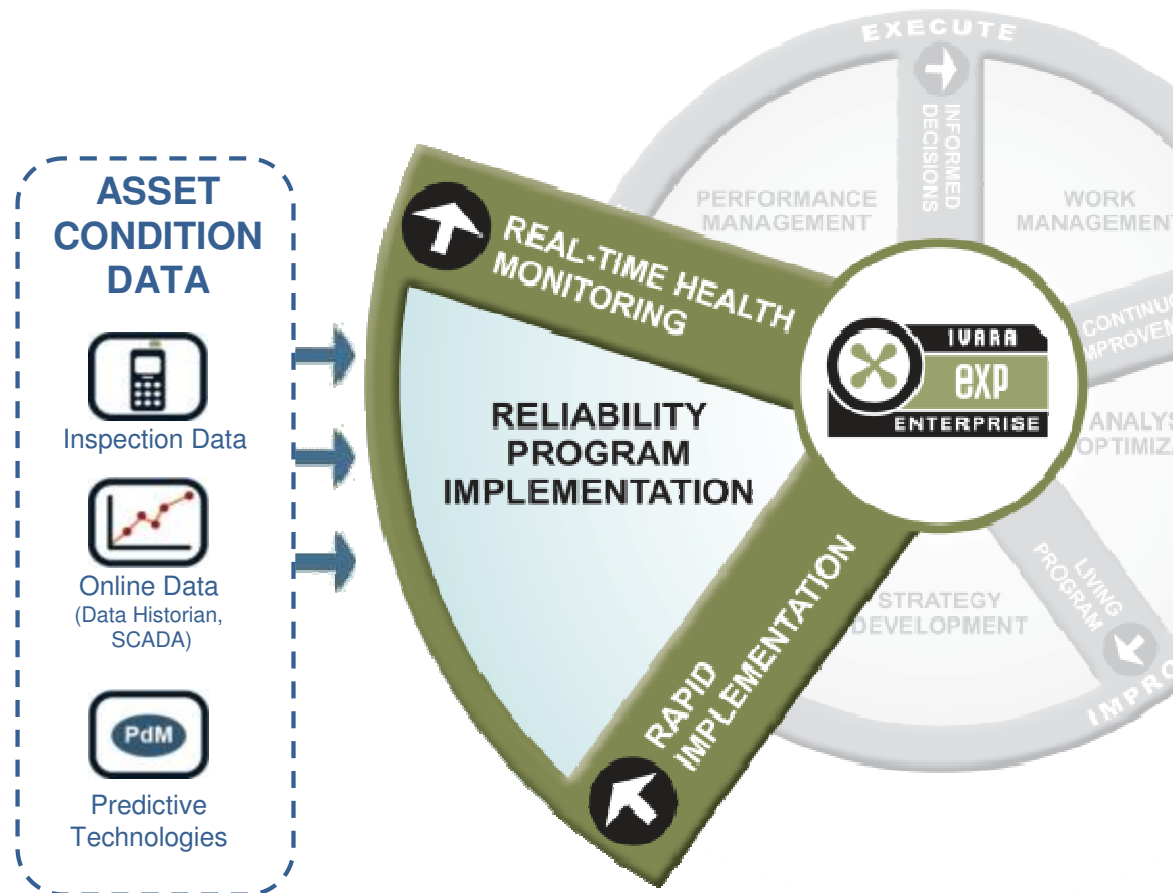 - Process & Practices
  - People

Strategy Development
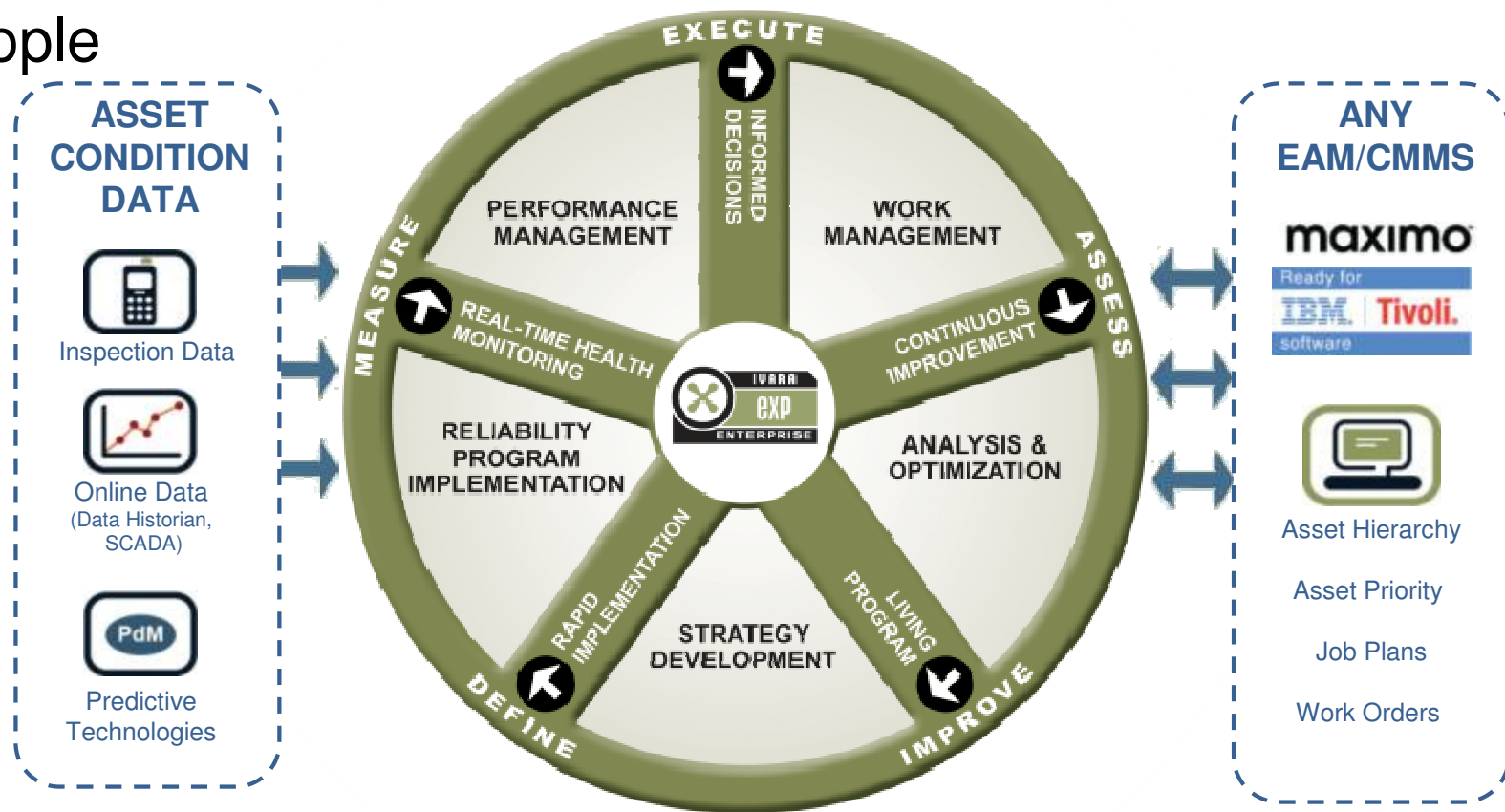
•Set performance targets

•Prioritize opportunities and risks

•Analyze assets and develop reliability action plans

- RCM2™
- MTA
- CPR

•Integration points:

- Synchronize Ivara asset hierarchy from IBM Maximo (master)
- Maximo asset priority is updated based on Ivara risk prioritization analysis (consequence priority)
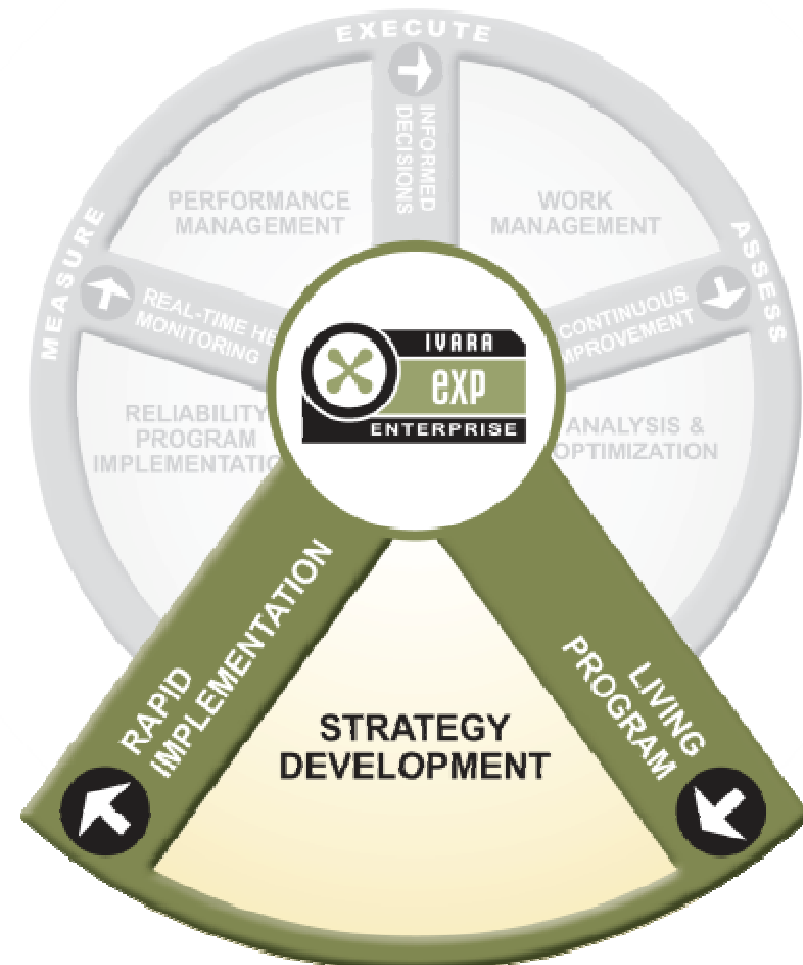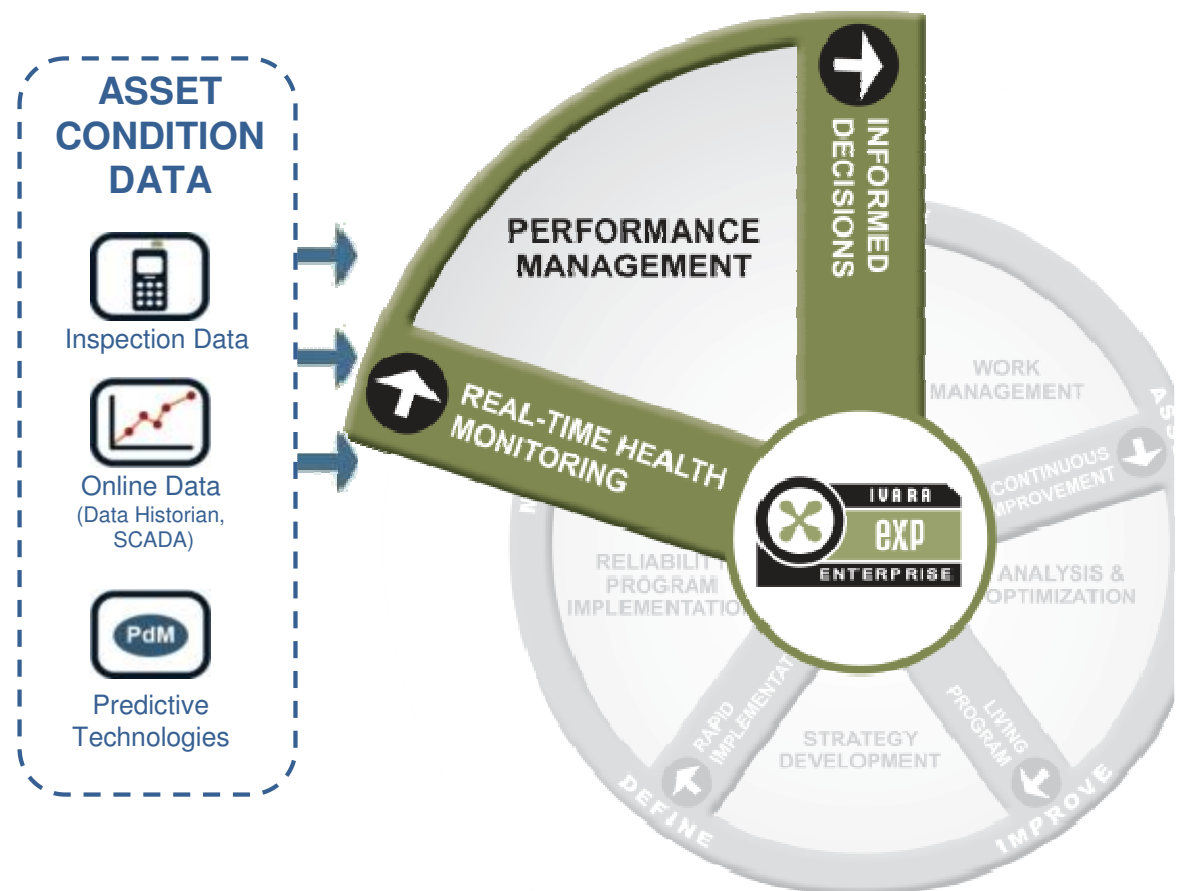
Reliability Program Implementation

- Rapidly implement

- Define and manage tasks and data derived from RCM

- Define alarm points and planned response

- Collect condition data

- Integration points
  - Synchronize IBM Maximo Job Plans and Ivara tasks (bi-directional)

ASSET CONDITION DATA

Inspection Data

Online Data (Data Historian, SCADA)

PdM

Predictive Technologies

RELIABILITY PROGRAM IMPLEMENTATION

REAL-TIME HEALTH MONITORING

RAPID IMPLEMENTATION

EXECUTE

PERFORMANCE MANAGEMENT

WORK MANAGEMENT

INFORMED DECISIONS

CONTINUOUS IMPROVEMENT

ANALYSIS OPTIMIZE

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STRATEGY DEVELOPMENT

LIVING PROGRAM

IMPROVE

Performance Management

- Shared view of current asset health – online in real time

- Consolidated and automated analysis to make informed decisions, initiate work

- Manage by exception, priority

- KPIs

ASSET CONDITION DATA

Inspection Data

Online Data
(Data Historian, SCADA)

Predictive Technologies

PERFORMANCE MANAGEMENT

INFORMED DECISIONS

REAL-TIME HEALTH MONITORING

WORK MANAGEMENT

CONTINUOUS IMPROVEMENT

ANALYSIS & OPTIMIZATION

RELIABILITY PROGRAM IMPLEMENTATION

STRATEGY DEVELOPMENT

RAPID IMPLEMENTATION

LIVING PROGRAM

DEFINE

IMPROVE

IVARA exp ENTERPRISE

- Make informed decisions in responding to alarms

- Integration points:

  - Create work orders in IBM Maximo
    - Acknowledgement of an alarm due to a condition being out of normal range
    - Use pre-planned Maximo job plans as the basis for the work triggered.
  - When resulting work is completed (work order is closed in Maximo), the work order is closed in EXP.

EXP / IBM Maximo Integration
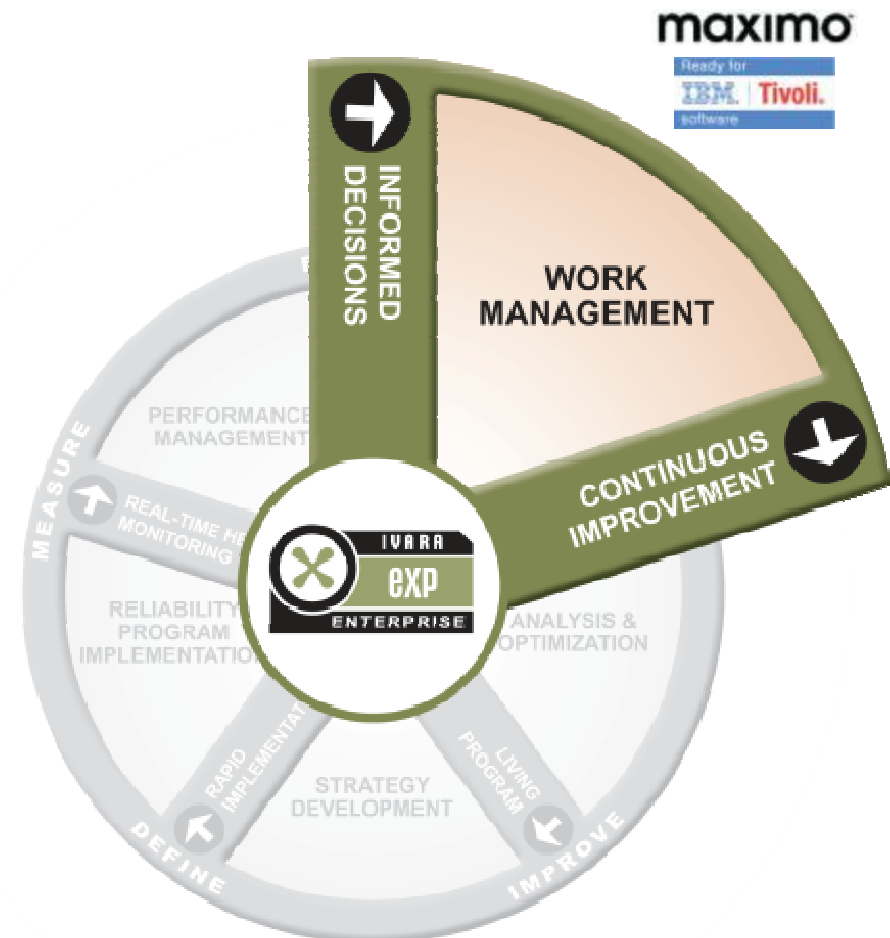
- Maximizes your investment in IBM Maximo by ensuring the right work is executed at the right time to optimize asset performance

- Standard integration accelerates the deployment of EXP

- Rapid implementation and value realization through EXP's proactive maintenance process accelerates IBM Maximo time-to-value

- Eliminates duplication of effort and inconsistent data through automated synchronization of key data

- Streamlines IT infrastructures and reduces costly integration efforts

EXP / IBM Maximo Integration Details
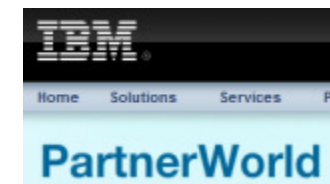
- IBM Maximo is the master for all key asset master data

- EXP asset risk prioritization (consequence priority number) updates Maximo Asset Priority

- EXP guides you through the development of RCM and FMEA analyses. The resulting reliability programs reside in EXP.

  - Maximo PM and Job Plans are synchronized with the reliabilty program in EXP

- Monitor condition in EXP, alarms trigger work orders in Maximo

  - When a maintenance task is initiated, you understand the link back to the cause of failure

  - When resulting work is completed, the close status is returned to EXP to drive important failure statistics

Benefits for IBM Maximo Customers

Reduces integration costs, streamlines IT efforts

Accelerates the deployment of EXP Enterprise with IBM Maximo

Accelerates IBM Maximo time-to-value

Ensures informed maintenance decision-making

Holistic approach to executing a proactive condition-based maintenance strategy to optimize asset performance

Case Studies

Details:

- ArcelorMittal
- Scottish Power

METALS

STEEL

Background / Challenge

- Globally competitive steel industry

- Unprecedented growth in China

- Industry consolidation

- Rising costs and pricing pressure for steel

- Fluctuating exchange rates

- Aging workforce

Strategy

- Implement a proactive equipment reliability process supported by technology (Ivara EXP), new organizational structure, and RCM2 based reliability practices throughout its ten business units

- Piloted solution on the Galv Line
 - Target of 80 percent asset utilization

Results

- With the Ivara solution, Dofasco's DSG automotive galvanizing line achieved:
  - a 14% improvement in asset utilization
  - resulting in an additional 5600 tons/month
- Reactive 'fire-fighter' approach to maintenance replaced with a proactive reliability-based maintenance program
- Now rolling out throughout the Dofasco Hamilton operation, asset by asset.
- Roles and responsibilities for all positions have been developed and people trained as required

ArcelorMittal
DOFASCO   HAMILTON
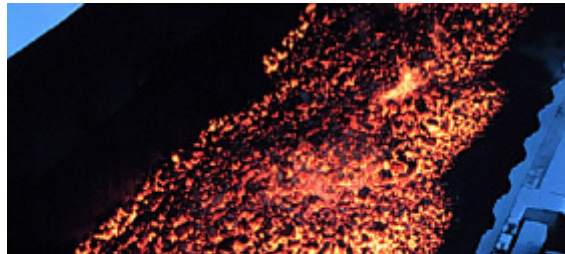
METALS

STEEL

- Dofasco Process and Methodology for Asset Manangement adopted by ArcelorMittal Flat Rolled Carbon

- ArcelorMittal Flat Rolled Carbon USA rolls out Ivara EXP and Dofasco Process and Methodology to 5 integrated steel sites
    - Using RCM, MTA, CPR for Strategy Development
    - Integrated EXP to Tabware (CMMS)

- Total cost savings to date this year at one site = $2.1 Million +

Scottish Power

SCOTTISHPOWER

ELECTRIC UTILITIES

POWER GENERATION

Background / Challenge

- External Factors

  - Energy policy, evolving energy markets, low-carbon economy, security of supply, Process Safety incidents, benchmarking

- Internal Drivers

  - Operational excellence, aging assets, plant failures, focus on health and safety, risk management

Strategy

- Improve plant performance, reliability & process safety, PAS 55 accreditation

  - Seven work groups containing nineteen projects

  - Leadership of change – business leads assigned, governance ensures structured coherent program

  - Adopt Wholesale's award winning project delivery methodology

  - Build on existing core processes /underlying integrated IT platforms

  - Continual cycle of challenge and review

maximo

Ready for

IBM. Tivoli.

software

Scottish Power

ELECTRIC UTILITIES

POWER GENERATION

How?

- CPR / MTA / RCM - to develop the reliability program

- Ivara EXP – to determine actions required

    - Identify what information is important

    - Determine collection frequency

    - Implement tools to improve data quality

    - Automatically detect deteriorating performance

    - Integrate processes

Results

- PAS 55 accreditation (1st European utility)

- EXP and handheld devices improved information capture, data quality

- EXP acts as audit Trail – supports Process Safety KPI's

- Integrated O&M

    - Operator Routes

    - Proactive Maintenance – work orders triggered based on asset condition into Maximo

    - Maintenance work planned, scheduled and executed in

Maximo

maximo

Ready for

IBM. Tivoli.

software
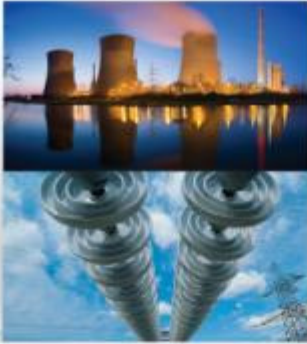
Thank You

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