



Asset Lifecycle Management -Modern Considerations-

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Company Mission

The mission of ABS Group of Companies is to be a leading global provider of technical services that better enable our clients to operate safely, reliably, efficiently, and in compliance with applicable regulations and standards. We are focused on adding value to the industries we serve and strategically capturing synergies with ABS.

1300+
Employees

25+
Countries

40+
Years

Parent company, ABS, is the world's leading marine and offshore classification society, founded in 1862



Safety First – Safety Moment



- Discuss Safety Requirements at Site
 - Fire (Drill)
 - Muster Location
 - Emergency Contact Information (Number)
- Safety Hazards relevant to Work Site

Agenda



- Maintenance Maturity
- Asset Lifecycle Management (ALM)
Enterprise Asset Management (EAM)
- Reliability Based Maintenance (RBM)
- Digital Readiness

Structured Approach for ALM Journey

Assess & Evaluate

- EAM Assessment
- ID maintenance maturity level
- Establish "As Is" baseline

Identify Gaps

- Process gaps measured against best practice
- Data collection, quality and usage
- Cyber Security Plan
- Organizational readiness

Plan & Develop

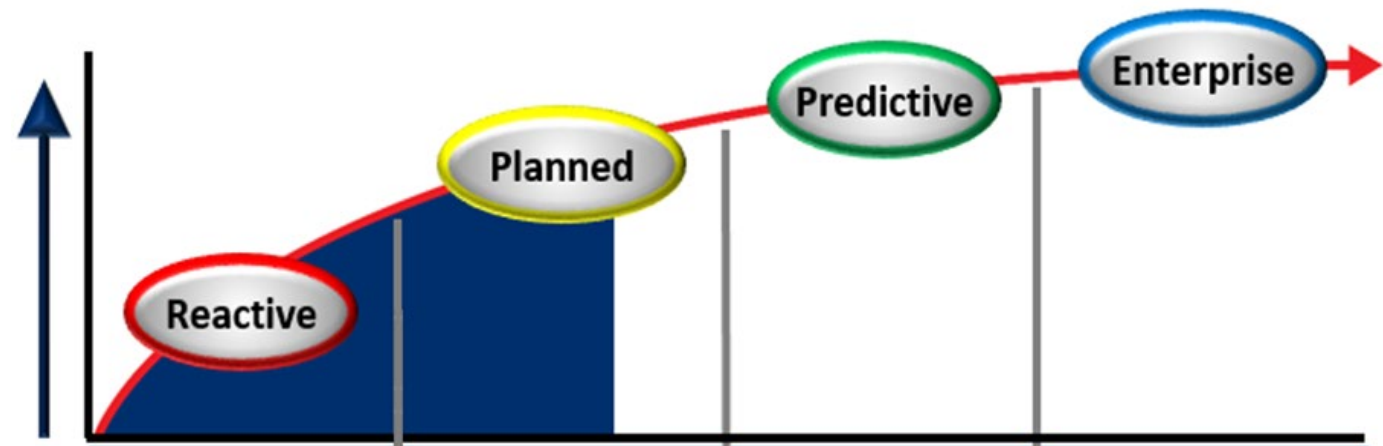
- Asset Management Master Plan "To Be"
- Asset Management Strategy / Council
- Asset management short / long term roadmap

Implement and Sustain

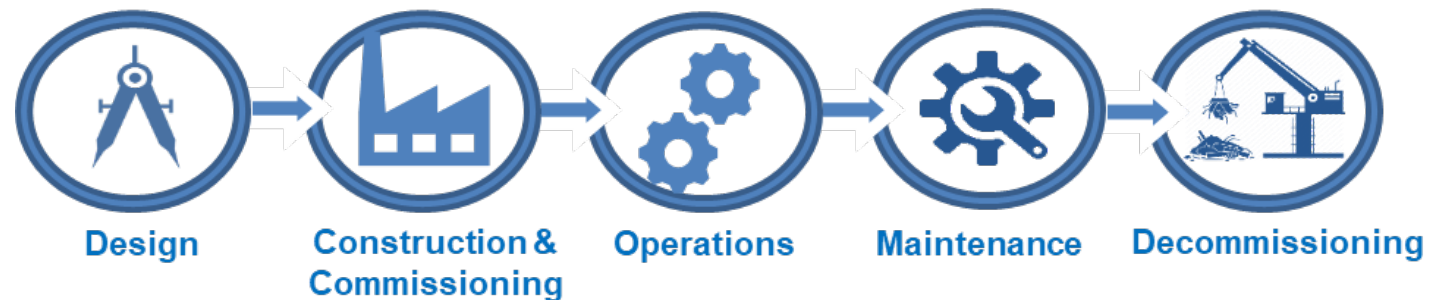
- Utilize EAM and Digital services tactically
- Train technicians in Digital Strategy and applicable technology
- Ensure sustained Continuous Improvement

Asset Lifecycle Management

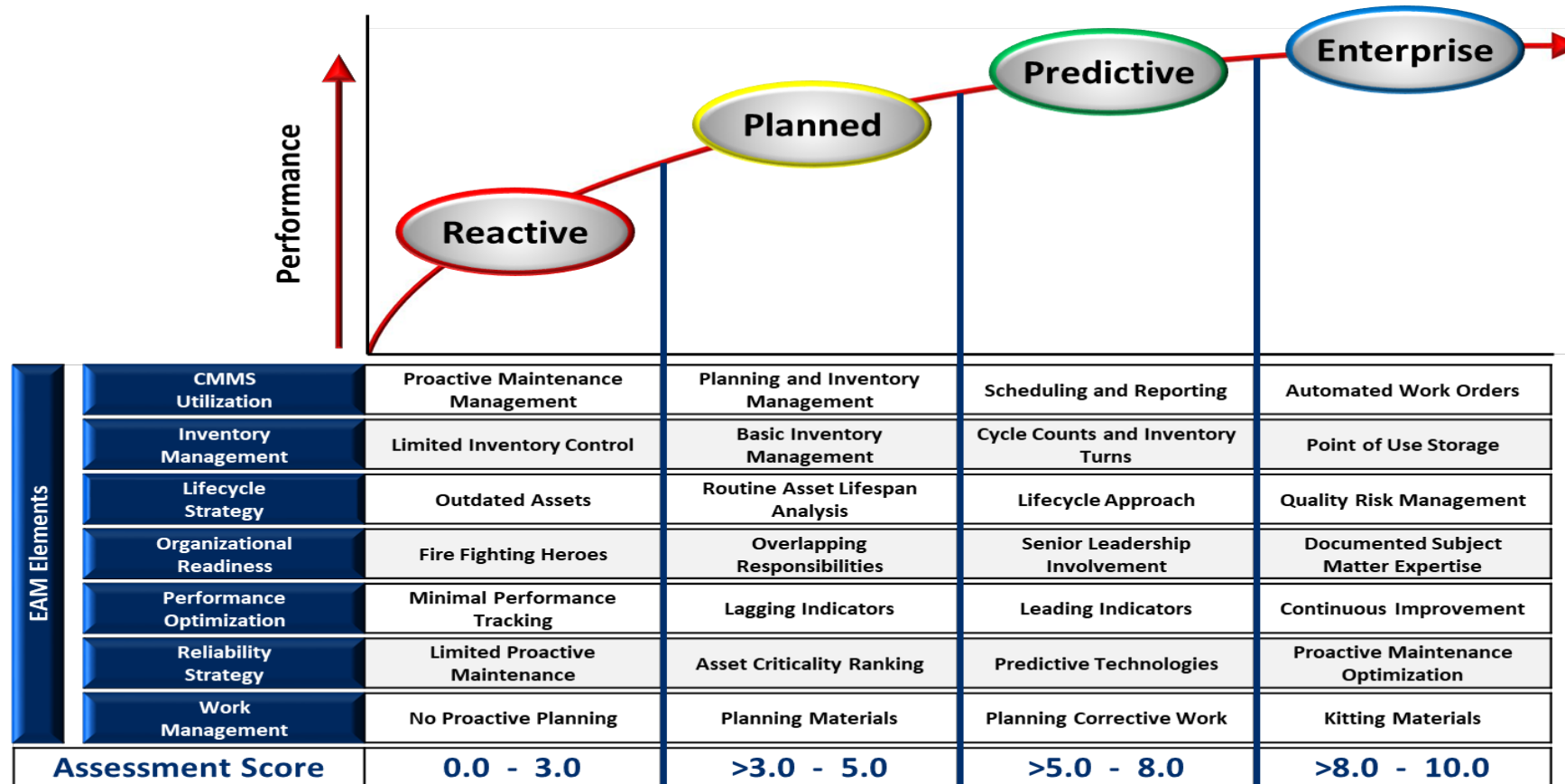
Maintenance Maturity is regarding the maintenance management of the physical assets of an organization throughout each asset's *lifecycle*, based on asset management best practices.



Asset Lifecycle Management - Asset Lifecycle Management is used to plan, optimize, execute, and track the required maintenance activities across all departments, locations, and facilities.



Maintenance Maturity Continuum



Maintenance Maturity Improvement Benefits

- Directs improved reliability and efficiencies across the organization
- Moves the organization up the maintenance maturity continuum
- Aligns the basic building blocks to move the organization into the digital world
- Develops asset management roadmap



Asset Lifecycle Management - Modern Considerations

ALM Elements and Components

CMMS Utilization	CM.01 CMMS Equipment and Locations	CM.02 CMMS Items and Inventory	CM.03 CMMS PMs and Job Plans	CM.04 CMMS Work Orders	CM.05 CMMS Purchase Orders	CM.06 CMMS Administration
Inventory Management	IM.01 Physical Inventory Storage	IM.02 Master Inventory List	IM.03 Spare Part Criticality Ranking	IM.04 Inventory Control	IM.05 Spare Part Kitting	IM.06 Inventory Lifecycle Analysis
Lifecycle Strategy	LS.01 Asset Lifecycle Approach and Phases	LS.02 Asset Acquisition, Operation, and Disposal	LS.03 Asset Risk Management	LS.04 Asset Monitored Activities	LS.05 Cyber Security	LS.06 Digital Class
Organizational Readiness	OR.01 Asset Management Governance	OR.02 Roles and Responsibilities	OR.03 Information Management	OR.04 Budget Management	OR.05 Management Training and Skills	OR.06 Technician Training and Skills
Performance Optimization	PO.01 Asset Management Metrics Level 1	PO.02 Asset Management Metrics Level 2	PO.03 Asset Management Metrics Level 3	PO.04 Continuous Improvement	PO.05 Equipment Lifecycle Cost Analysis	PO.06 Capital Project Turnover Package
Reliability Strategy	RS.01 Master Equipment List	RS.02 Equipment Criticality Ranking	RS.03 Proactive Maintenance Optimization	RS.04 Spare Part Analysis	RS.05 Reliability Analytics	RS.06 Root Cause Analysis
Work Management	WM.01 Work Identification	WM.02 Work Planning	WM.03 Work Scheduling	WM.04 Work Execution	WM.05 Scheduled Out of Service Management	WM.06 Contractor Management

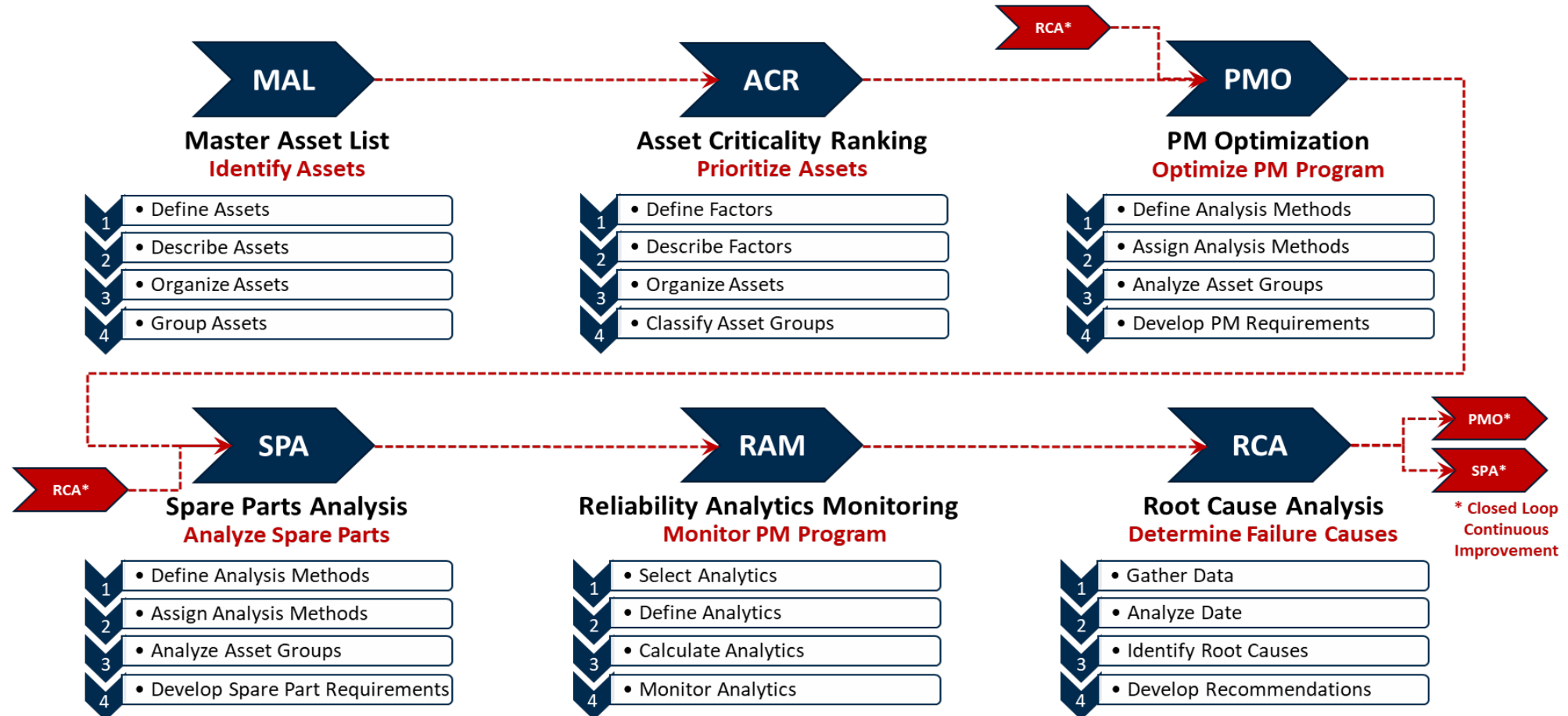
ALM Questions

- How do you determine on which equipment, and when, to perform maintenance today?
- How do you determine what is an appropriate level of maintenance spend?
- Is cost tracking established and tracked (Labor, Materials, Services and Specialized Tools per location, asset, system)?
- What data do you use, and how do you use it, to determine repair vs replace decision today?
- What method did you use, and when, to determine asset criticality, and is it in your CMMS?
- How do you know if you're performing the right level and type of maintenance on assets today?

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Reliability Based Maintenance (RBM)

Reliability Based Maintenance Overview



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Digital Readiness

Data Requirements

Operational Data

- Continuous Time Series data from production sensors on major systems
- Units of Measurement
- Sensor placement map
- Data Resolution: TBD

Events Data

- Failure events history - replace; repair
- CAPA finding + resolution, RCA
- Warranty logs: repairs/replacements
- Equipment Breakdown Structure

Inspection/Survey

- Any inspection or audit data outside of client site: statutory
- Historical inspections: Predictive Maintenance results.

In-Situ Tests

- Historical tests : oil, vibration, IR, etc.
- Condition Based Monitoring
- DCS or BMS Systems

Parts Consumption

- Parts Consumption for Planned & Unplanned events
- Cost of unplanned events (time/labor/etc.)
- Include Shutdown / Turnaround

Additional Systems

- Past & Future Planned events
- Standard scope of PM activity + list of PM parts
- Installed Base data: demographic
- Vendor (repair, parts)
- Key Performance Indicators



DATA AS AN ASSET

OPERATIONAL DATA

EVENTS DATA

INSPECTION/SURVEY

IN-SITU TESTS

PARTS CONSUMPTION

ADDITIONAL SYSTEMS

Digital Solutions - Questions

- What is causing Reliability-Availability-Maintainability (RAM) issues?
- Where do I need to add a sensor, automation, or digitization solution?
- Can I consolidate the data sources to make sustainable RMA improvements?
- What is the impact of operational variation on my asset health?
- How many and which parts inventory would I need, & where? – Example –
Consumption pattern analysis
- Which of my vendors have reliability issues?
- Is my asset performing at an optimal level?

Asset Lifecycle Management - Modern Considerations

Master Plan Development

- **Asset Lifecycle Management Master Plan**
 - ALM Assessment and Master Plan Development
- **Governance**
 - Asset Management Council and Maintenance Strategy
- **Execution**
 - Tactical Improvement Plan (TIP) 12 -18 Month Plan
- **Evolve Maintenance**
 - Time Based → Meter Based → Condition Based → Predictive → Prescriptive

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