



# Operational Excellence through **Reliability Management**

For improving Asset Performance  
& minimising costs

**Steel Industries**



# ENHANCE YOUR ASSET PERFORMANCE AND OPERATIONAL PROFIT MARGIN THROUGH RELIABILITY MANAGEMENT & IoT TECHNOLOGY

Arrelic end-to-end Reliability Management allows you to Identify and rectify equipment problems before they happen, Reduce maintenance costs and approach zero unplanned downtime

## Business Challenges

### Inadequate Asset Control

Industries are challenged by a lack of visibility into their assets' data and by not having appropriate predictive to know in advance when asset failure is about to occur. O&M teams miss signs that equipment is about to fail

### Low Productivity and inefficiencies

Conventional use of time-based approach to maintenance, does not take into consideration the way assets are being utilized, their current condition, and real-world operating conditions.

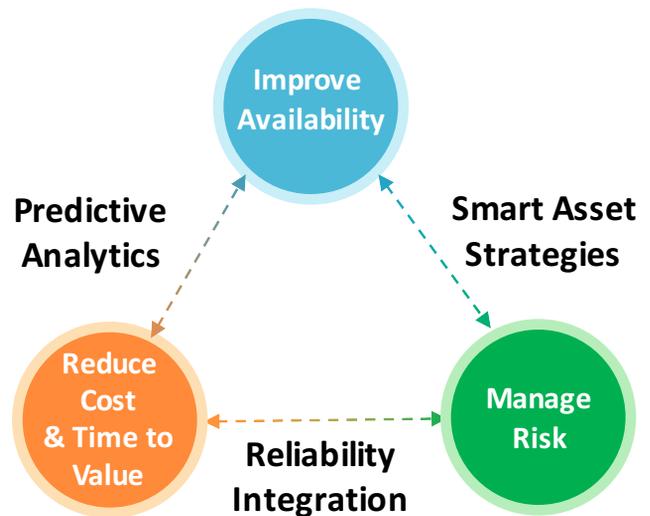
### Downtime and high costs

Failure to curb unplanned downtime and control over value chain processes and activities leads to high costs, inefficiencies and poor compliance. These severely impacts the profit and hampers the industrial growth.

### External Environment

A flat global economy, pressure to grow revenue and profit, tighter regulations, availability of raw materials, change in demand and technologies and increased competition has significantly changed the way industries are operated

**So how can you ensure optimal performance at lower sustainable costs while making your operation safer and more reliable?**



Arrelic's holistic risk-based intelligent strategies and reliability management balance performance and cost by considering design, operational procedures, and maintenance plans of all assets. Reliability Management manages collaborative workflows between experts and operational teams while balancing cost, availability, and risk.

**An effective Reliability Management can improve Operating Profit Margin by 15 to 35%**

\*Based on ideal condition. Solely depends on many internal and external factors.

# ARRELIC RELIABILITY MANAGEMENT APPROACH

## RAMS Studies

Not sure where to begin with reliability management or cost reduction? Not sure Which area, asset or problem to prioritise? A high level RAMS Study will provide the direction you need. We have the tools to capture RAMS data and using our simulation tool we will provide justifiable prioritisation.

## Reliability Centered Maintenance Approach

Maintenance strategies developed using the principles of RCM on critical assets ensures that the right maintenance is specified at the optimum interval and achieve optimal operational excellence. Application of generic maintenance plans from library models ensures that plans are developed efficiently in an appropriate time frame.

## Risk Based Inspection

Operating assets of all kinds and ages are vulnerable to defects, including process, system and human factors which either singularly or in combination lead to potentially catastrophic events. We have pioneered a new way of analysing and eliminating the vulnerabilities.

## Root Cause Analysis and Defect Elimination

What is the problem? What can be done to prevent it from happening again? A deep RCA approach will enable to better understand and analysis of the underlying causes of failure. Our cause and effect based solution techniques helps to identify and implement the most effective solutions.



## Value Chain and Value Added Analysis

Failure to achieve daily production throughput targets can be linked to issues beyond physical equipment problems. Fully understanding the value chain process can be just as critical to meeting business targets. Thorough analysis of value chain process helps you to understand business losses and reduce costs.

## Quality Management

End-End Quality Management approach allows you to exceed your compliance requirements, streamline and improve your control over the quality of processes and drive down costs. Our support incorporates the best quality practices – 5S, TPM, TQM, SMED and Lean Manufacturing practices which add significant value to your business.

## Life Cycle Costing

Analysing the cost of an asset over its lifetime can be an important element for assessing different potential solutions before the project begins, including developing a maintenance budget. It can be also useful in analysing whether to repair or replace an asset. We can provide expert solutions for estimating your life cycle costs.



## EXISTING PLANT

## NEW PROJECT

Approach zero  
unplanned downtime  
Minimise operational  
and maintenance costs  
Reduce risks to your  
people

### RELIABLE OPERATIONS

Prove Design  
Capability

Step to ISO 55000  
Improve asset  
performance

### PROACTIVE ASSET MANAGEMENT

Define Asset  
Management  
Processes

Prioritise Plant  
Modifications &  
Additions, Budget  
Forecast, Resource  
profiles

### COMPLETE COST ANALYSIS

Equipment  
Procurement  
Decisions,  
Predict resources

# RAMS STUDIES

A high level study of assets focusing on their availability, reliability, maintainability and impact on safety is the ideal place to start on the road to prioritising asset improvement action and achieving operational excellence.

RAMS Studies are performed to justify the amount of equipment, amount of redundancy, risk and optimal maintenance strategy. By pooling all system data into a simple representation such as reliability Block Diagram, simulations can be performed to identify those assets which cause the highest contributions to loss of availability, process capacity and impact to safety, operations and environment.

To keep the process simple and relatively quick, we can identify single dominant failure modes for each asset and compare simulated results to actual. Once there is confidence that the simulations are reflecting reality, then the pareto of loss contributors becomes the tool for providing direction.

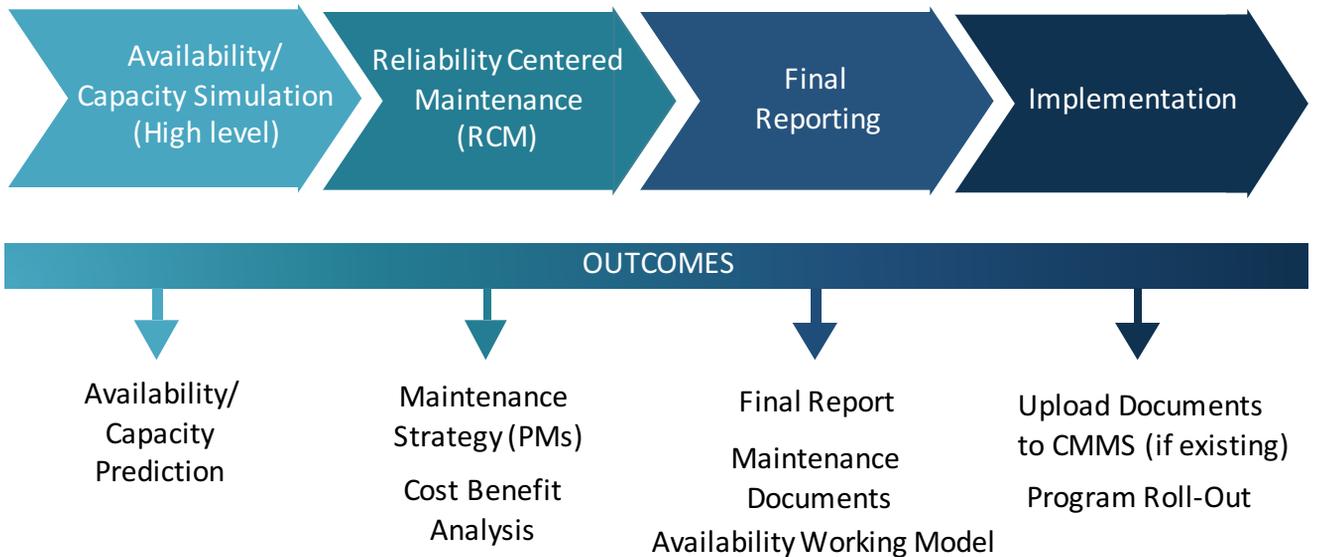


**Can the plant design meet the business case?**

**What availability can I expect or Are stockpiles sufficient?**

**What is the optimum shutdown frequency?**

**Have I got the right level of redundancy & What resources will be required?**



#### Typically generated documents:

- FMECA reports
- RCM summary reports
- Budget forecasting reports
- Spares usage and holding level optimisation reports
- Preventive maintenance task instruction documentation
- Direct integration of RCM to your CMMS (if existing)

## RELIABILITY CENTERED MAINTENANCE (RCM) APPROACH

Maintenance strategy development and optimisation through Critical Asset Ranking and RCM approach ensures you the best approach to maintenance of your assets.

The detailed maintenance assessment is now performed through combining Failure Mode and Effect Criticality Analysis (FMECA) and Maintenance Task Assignment into a single RCM approach. RCM employs preventive, predictive, reactive and proactive maintenance techniques in an integrated manner such that the equipment runs over its design life cycle with a minimum level of maintenance. Arrelic expertise over different industries ensures you the optimal RCM approach to add significant value and asset performance of your business.

**Which assets are critical and can cause significant downtime?**

**What failure modes and effects are likely?**

**What is the optimum maintenance strategy?**

**What is the most effective grouping and frequency of tasks?**

**What tasks are to be performed on each job?**

### Maintenance Strategy Assessment

Prioritising which assets require detailed maintenance assessment and which could simply receive OEM based maintenance can be judged by the way of a Maintenance Strategy Assessment.

Utilising the detail within the assessment, our Subject Matter Experts(SMEs) and consultants provide enough support to enable development of Maintenance Strategy Assessment summaries and then support the maintenance strategy outcome requirements.

### Maintenance Master Data

Clean and consistent master data structure support an organisation ongoing reliability improvement efforts through an efficient analysis and update path, along with the ability to leverage learnings on common assets across different locations.

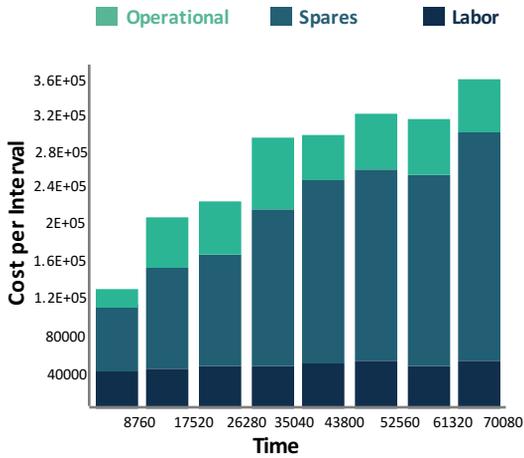
We have extensive experience in cleansing and preparing maintenance data and developing maintenance strategies across numerous projects and industry groups for existing and new assets.

**We have the ability to support the rapid creation and deployment of maintenance structures and maintenance strategies for an organisation through the use of Arrelic technology and IoT resources.**

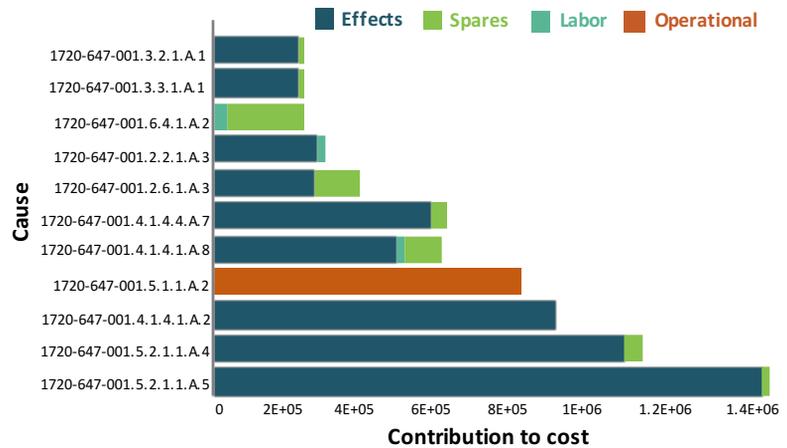
## Maintenance Strategy (Site Project Example)

Task Group	Failure Mode Id	Description	Interval (hrs)	Stat ?	Type	Dur	Crew
Mech Insp Heating Ramp 1Y	26295220ABB001.1.1.A.1	Inspect Steel frame for corrosion, physical damage and wrapping	8760	False	Inspection	0.5	Millwright
	26295220ABB001.1.1.A.2	Inspect welds for corrosion, visual cracks and lack of anti-corrosion coating	8760	False	Inspection	0.5	Millwright
	26295220ABB001.1.1.A.3	Inspect Structural bolts for looseness or missing bolts	8760	False	Inspection	0.5	Millwright
	26295220ABB001.1.1.A.5	Inspect walkways for corrosion, physical damage and loose fixings	8760	False	Inspection	0.5	Millwright
Cont Insp Heating Ramp 1Y	26295220ABB001.1.1.A.6	Perform Magnetic particle inspection in conjunction with regularly requirements on all suspension eyes, welds and pins.	8760	False	Inspection	0.5	Contractor
Elec Insp Heating Ramp 1Y	26295220ABB001.1.1.A.7	Inspect cable tray for looseness	8760	False	Inspection	0.5	Electrician
Mech Insp Heating Ramp 1Y	26295220ABB001.1.1.A.8	Inspect fixing flange for corrosion, physical damage and deformation	8760	False	Inspection	0.5	Millwright
	26295220ABB001.1.1.A.9	Inspect base plate for corrosion, physical damage and wrapping	8760	False	Inspection	0.5	Millwright
	26295220ABB001.1.1.A.10	Inspect spring feet for corrosion, visual cracks, broken spring and deformation	8760	False	Inspection	0.5	Millwright

### Cost Profile



### Contribution





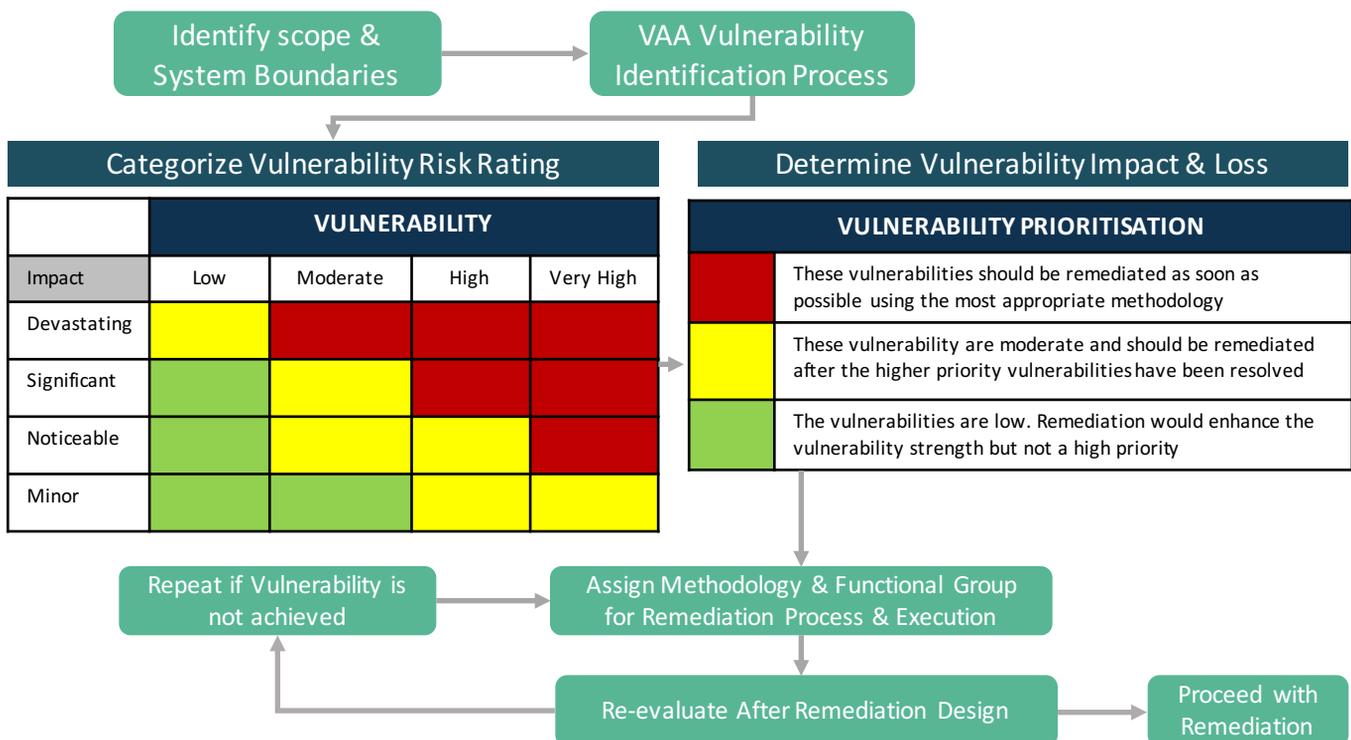
# RISK BASED INSPECTION

Category Reporting tool and questioning-and-capture technique from expert facilitator will help you to identify and prioritise your vulnerabilities and provide an action plan to minimise their risk.

Applicable at any stage in the asset lifecycle, the expert facilitator and Subject Matter Expert(SME) conducts a formal, holistic hazard study through Questioning and capture technique and category reporting tool to identify areas of serious risk to operational interruption, safety, environment or any other unwanted consequence.

RBI analyses risks/vulnerabilities that can be rectified through proper inspection and analysis. This helps to ensure the more reliable equipment and plant operation, increased safety to employees and cost optimisation.

- Where is our operations vulnerable to loss events?**
- What are the critical vulnerabilities that need urgent attention?**
- What actions can be taken to reduce exposure to vulnerabilities?**
- What vulnerabilities emerge, how do I know?**



# ROOT CAUSE ANALYSIS AND DEFECT ELIMINATION

The identification of defects through obvious breakdowns, undesirable availability and recurring problems can be achieved through RAMS and Process Reliability Studies. These studies will prioritize the defects that have the biggest impact on the business.

Arrelic Reliability has dedicated facilitators and mentors to carry out and educate others to effectively problem solve through a structured approach that is consistent and reliable. The results of a defect elimination exercise creates a common reality with more buy-in from stakeholders, identification of all possible solutions and clarity over when a problem is solved.

We can provide facilitators, engineering support, mentoring, training, dedicated software, and even entire defect elimination process implementation to support your goal of improving defect elimination in a systematic, justified solution.

- **What are the root causes of faults/problems that affect the asset performance?**
- **How can these defects can be eliminated in a cost effective method?**



## VALUE CHAIN AND VALUE ADDED ANALYSIS:

Through analyzing the losses in process capacity, contributions due to either production or reliability failings can be understood. Once categorised, actions can be prioritised to make the biggest impact to improved capacity.

Arrelic Reliability has dedicated experts to analyse (Weibull distribution analysis) and pinpoint areas for improvement. Nameplate production ratings may be specified( similar to concepts originating from six-sigma methodology) and compared with demonstrated production data, which will be compared to different plants or different time periods.

- **How to improve asset utilisation over value chain?**
- **How to eliminate loss events and reduce exposure to potential loss events?**
- **How to reduce system losses and reduce high cost of maintenance?**

## QUALITY MANAGEMENT

Instead of conventional quality management, Arrelic expertise in diverse industries ensures optimal asset performance through sustainable quality management. This allows to exceed your compliance requirements, streamline and improve your control over the quality processes and drive down costs.

Our Quality leaders and Subject Matter Experts(SME) provide support to incorporate the best quality practices – 5S, TPM, TQM, SMED and Lean manufacturing practices which can significantly add value to your business.

- **How to incorporate optimal quality management to drive down costs?**
- **How to streamline and improve your control over the quality of process?**



## LIFE CYCLE COSTING

Life cycle costing is a tool for assessing different project options that have been proven to meet the operational needs and determine the lowest overall cost to your business, lowest capital intensive solution or lowest operational costs through its life time.

It can be also a useful tool for assisting in making decisions on whether to repair or replace an asset by modelling when the repair costs for a set lifetime will exceed the capital cost of replacement. These results are essential when developing asset management plans.

Arrelic Reliability can provide analysts, engineering support, mentoring, facilitation, training and powerful and easy to use software to support life cycle costing analysis in your business.



# ARRELIC RELIABILITY PROVIDE GLOBAL SERVICES ACROSS 38 LOCATIONS IN INDIA AND MIDDLE EAST COUNTRIES

## Industries

Airline |Automobiles |Cement |Chemical |Defence |FMCG |Marine  
Glass Manufacturing |Metal |Mining |Oil & Gas |Pharmaceuticals  
Power |Pulp & Paper | Facilities Management

## Expertise

Asset Performance Management |Reliability Management  
Industry IoT & Big Data Analytics| Predictive Maintenance  
Consulting Services |Training & Development

**Together, We can ensure optimal Asset Performance and Operational Excellence for your Industry.**

**Pick our brains before Making your next move**

We would be happy to schedule a no obligation 30 minute consultation to discuss any performance improvement. For any query, please contact us.