

# Sustaining Performance of Steam Systems

The Forbes Marshall Approach to Steam Asset Management



# Everything you have should work, all the time.

## Sustained performance of steam system equipment supports company goals.

In today's competitive environment, increasing energy costs, industries want their steam systems running at peak efficiency with least down time.

The shift from reactive to preventive Maintenance, Repair and Operations, for sustained performance of installed products and systems, depends on 3 things-

- Design that enables maintenance, not just performance.

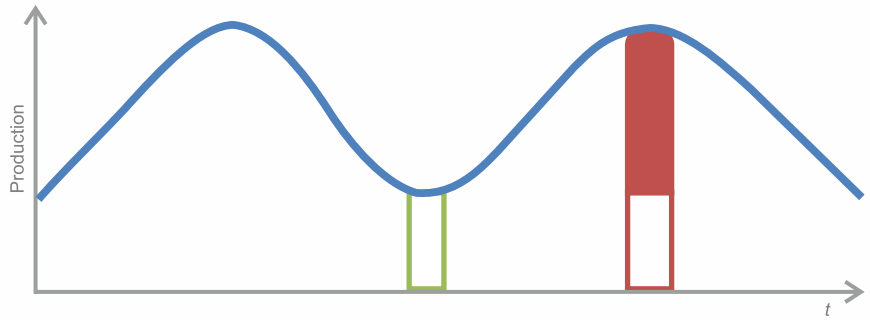
- Selection and sizing that is appropriate for current loads

- Operation and maintenance practices that prevent failures

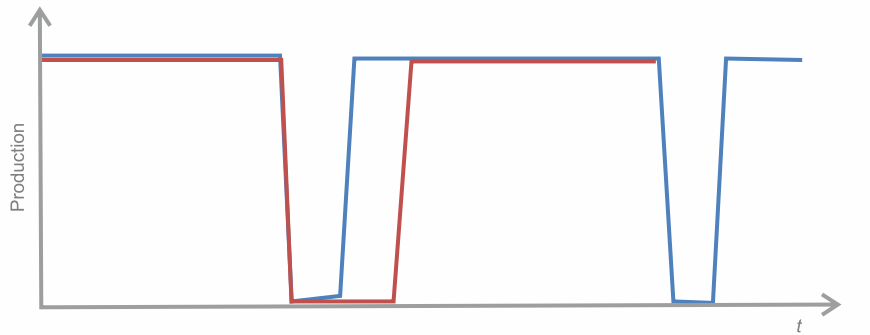
Disciplined continuous improvement in O & M practices can only go so far. If design for maintenance doesn't enable best practices, or component sizes are mismatched to the load on the system, shortened service life and other problems will occur, impacting plant-level and company-level results, such as reliability, safety, and energy efficiency.

## Prevention Benefits to Production

Unplanned maintenance due to critical failures can be costly at times of peak production.



Continuous production requires a strategy for maximizing maintenance and repairs during shutdown periods and minimizing impact.



### Plant-level Key Result Area Impacts:

**Reliability excellence**  
Process uptime

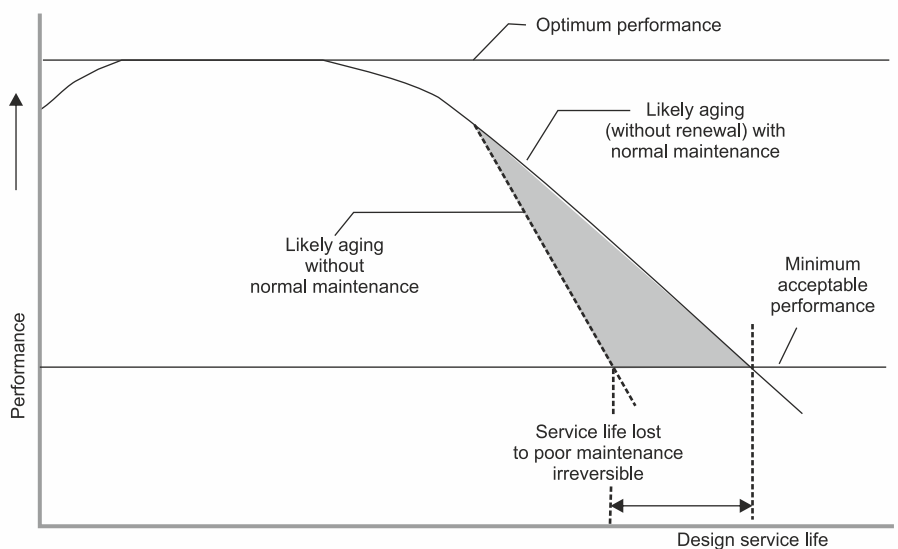
**Safety**  
Mean time to failure of critical items

**Operational effectiveness**  
Fuel cost

**Environmental care**  
Water consumption and discharge

**Product and process quality**  
Quality of batches in continuous processes

**Capital effectiveness**  
Service life management



# Forbes Marshall Steam Asset Management

## A total approach to performance.

As a Forbes Marshall customer, you will experience our total team approach to supporting customers' goals. In addition to our energy efficiency and improvement services, Forbes Marshall's approach to sustained performance of your plant's steam system performance is backed by 70 years of service and innovation.

These activities are just part of the Forbes Marshall experience for our key customers, and allow us to serve your needs through knowledge, service and products.

Forbes Marshall is committed to helping our customers achieve sustained performance of their steam utilities, supporting their goals for reliability, operational effectiveness and risk management.



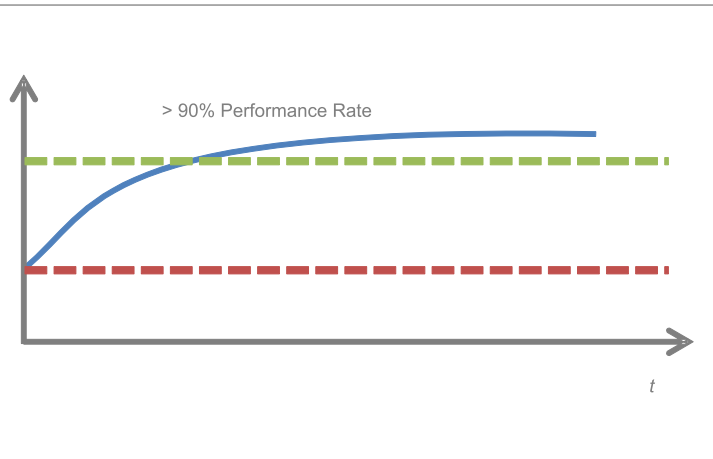
### 1. Frequent inspections of your assets

Forbes Marshall Steam Asset Management engineers inspect your steam system, one subsystem at a time, noting status and performance of key components including Forbes Marshall products.

Regular inspections of steam system assets, covering the entire system several times each year

Monitoring critical component parameters

Immediate, onsite reporting of performance rate and critical issues to sustain performance



Progress toward sustained performance happens over several visits from Forbes Marshall's Steam Asset Management engineer and team.





## 2. Knowledge and training for your team

We share knowledge to help you and your team learn how to sustain performance, through in-person consultation, performance reporting, tips and training.

Troubleshooting and root-cause analysis of non-working Forbes Marshall components.

On-the-spot training for plant personnel.

Learning gap assessments and trainings.

Best-practices and advice, such as proper isolations that shorten service shutdowns and response time.

Access to knowledge assimilated over 70 years through our engineers and their team at Forbes Marshall.

## 3. Actions and plans for prevention

We work with you to identify actions to meet goals including repairs, preventive maintenance schedules, stocking spares and lifecycle planning.

Performance reports including recommendations for- Immediate actions such as repairs

Ongoing best practices

Design, sizing and selection changes

Maintenance schedule development, considering the criticality of your equipment and process.

Prevention vs predictive approaches.

Suggested training courses and custom programs.

Coordination with the same Forbes Marshall team of experts in energy, environment, and process control that you rely on for improvement-related needs.

Stocking genuine Forbes Marshall spares.

Replacements for components near end of life.





### **A pharmaceutical plant learns of equipment risk for premature failure upstream of process.**

During our routine inspection of customer's pressure reducing stations, including thermal readings of Forbes Marshall and other installed parts nearby, we found a clogged moisture separator that will cause corrosion and premature failure of the pressure-reducing valve, a process uptime risk.

We reported it right away with our checkup summary as well as a recommended fix.

### **Common Steam System Performance Issues**

A single non-functioning or unmaintainable trap can waste energy, or lead to process downtime.

Steam loss through packing leaks, failed open traps, open bypass valves, and valve gland leaks.

Cold / jammed distribution trap lines.

Low condensate recovery factor.

Scaling and corrosion.

Improper pressure control.

Inefficient process production due to lower quality of steam.

Reduced equipment reliability and life.

Increased downtime/equipment repairs.

### **A chemical plant gets water use under control at the pump through maintenance practices.**

We found, at a customer, nine condensate pumps working and one overflowing. We advised personnel onsite in maintenance procedures, and found they had not cleaned the motive steam strainer since commissioning, causing a lack of pressure in an otherwise working pump unit.

After cleaning and replacement, the plant's water-discharge was reduced. In addition the customer's team learned pump repair to prevent further issues.

### **A food plant learns to design trap hookups that minimize downtime**

We worked with the customer to plan and prioritize a series of actions to first modify the mainline hookups to facilitate online trap maintenance, performed in a scheduled shutdown along with other repairs.

This was followed by a series of planned trap maintenance during normal production to restore trap performance to 100%, regardless of the traps' non-Forbes Marshall manufacture.

Innovation Experience

**70** years

Total Plant Audits

**6000**

Customer Visits Yearly

**100,000**

**Forbes Marshall helps customers keep their steam systems working to meet their goals.**

**Customer Testimonials**

“Bypass valve opening has been completely eliminated in the plant. Without opening the bypass, temperature has been achieved effectively and repeatedly. We are constantly monitoring the steam consumption in the plant with the help of the required vortex flowmeter. In case the consumption goes up, corrective action is taken immediately.”

Utilities Manager  
Solvent extraction plant  
Gorakhpur, Uttar Pradesh, 2015

“Forbes Marshall Steam Systems Pvt Ltd has provided (us) very well with after-sales service and we are happy with the services of FMSSPL.”

Manager  
Brewery plant  
Uttar Pradesh, 2015

“We are quite happy with the technical support from Forbes Marshall and recommend Forbes Marshall boilers and products to all steam users for sustaining and enhancing boiler efficiency.”

Chief Engineer  
International hotel chain  
Karnataka, 2013

“Since phase one of implementation of the program, steam trap performance rate went from 55.5% to 98.7% remaining above 95% for at least 6 months. Forbes Marshall has executed the contract with thorough professionalism and to our complete satisfaction.”

General Manager - Operations  
Oil refinery  
Maharashtra, 2009



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