

RELIABILITY CONSULTING AND SOLUTIONS



INNOVATION

ENGINEERING

OPTIMIZATION

Asset Life Cycle Management

Background and Methodology

In today's operating and production environment, plants and equipment must perform at levels that were not thought possible some years ago. Expectations towards increased safety, product quality, availability, throughput and agility to meet challenging governmental, business and social requirements elevate the speed and pressure on manufacturers to manage their assets effectively.

The necessity to maintain – and often increase – operational effectiveness while simultaneously reducing capital and operating expenditures is the challenge manufacturing enterprises are currently facing. To overcome this contradiction a significant change from past culture, processes, management and organizational concepts is mandatory and has to be carefully balanced.

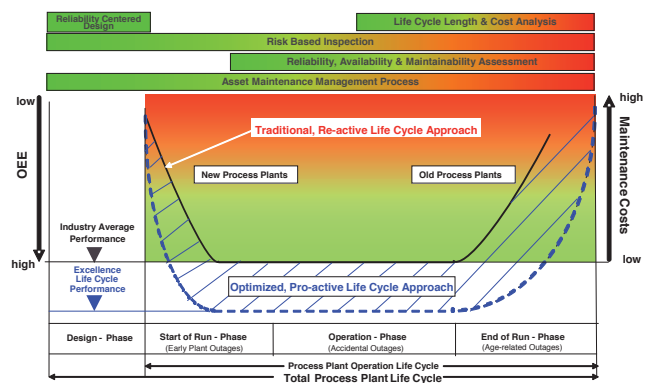
The advanced and continuously reinvented approach for Asset Life Cycle Management by Bayer is a comprehensive, fully integrated process, directed towards gaining greatest lifetime effectiveness, value and profitability from production and manufacturing assets.

Our Asset Life Cycle Management assures systematic implementation of processes, practices and technical improvements to ascertain sustained compliance with Health, Safety, Environment, and Quality (HSEQ) targets as well as availability and performance targets at lowest possible cost under consideration of current and future operating and business requirements.

Our Asset Life Cycle Management builds from current strengths of plant operation and maintenance to gain Best-In-Class effectiveness. The implementation of standards and processes results in a subsequent continuous improvement to steadily enhance plant performance even further.

The Bayer Technology Services Approach

Our Asset Life Cycle Management is a proactive and comprehensive approach which covers the entire life span of an asset from commencing during the early engineering phases until final decommissioning.



Bayer Technology Services Asset Life Cycle Management

The main elements of the Bayer Technology Services Asset Life Cycle Management are:

- Reliability Centered Design (RCD) which assures that reliability and maintenance issues are addressed appropriately already during early engineering phases;
- Asset Maintenance Management Process, an integrated, risk-based loop process, ensuring that predefined availability, reliability, and maintainability targets are met without jeopardizing any HSEQ or commercial targets;
- Reliability, Availability & Maintainability (RAM) Assessment, addressing RAM topics at any point in time of the asset life cycle;



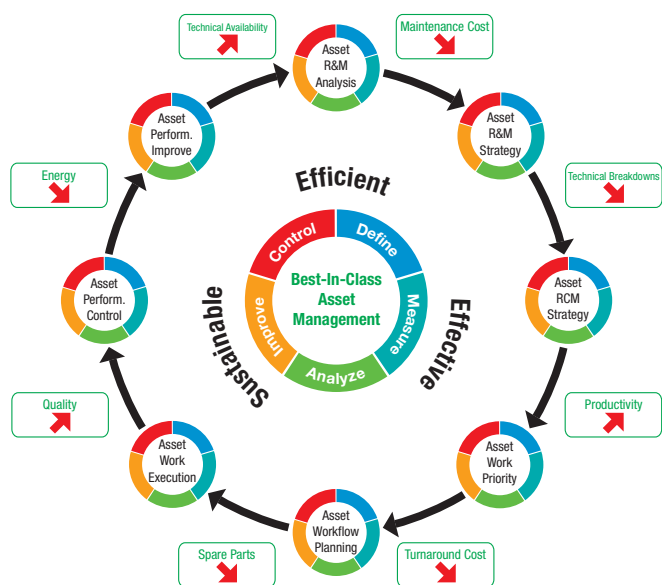
Bayer Technology Services
Powering Your Performance

- Risk Based Inspection focused on the risk-based optimization of the inspection scope;
- Life Cycle Length & Cost (LLC) Analysis, oriented towards determination how medium to long term targets can be met under consideration of RAM issues coming up as part of the aging process of facilities.

The completeness of this portfolio enables us to implement tailor-made solutions to improve asset performance driven by customer needs. The execution of an Asset Reliability & Maintainability Analysis (ARMA) is recommended to identify those needs. During the Asset R&M Analysis the current performance status is determined, gaps to best practices are identified and opportunities to close those gaps by applying advanced concepts are presented subsequently. We will support and assist customers with the implementation of improvements until an agreed status has been achieved.

Asset Maintenance Management Process

Bayer Technology Services has developed the proprietary risk-based Asset Maintenance Management Process, built upon the operating experience of the Bayer Group.



Asset Maintenance Management Process

This process comprises a comprehensive optimization of maintenance and reliability at any point of operation utilizing state-of-the-art methodologies, techniques and tools like:

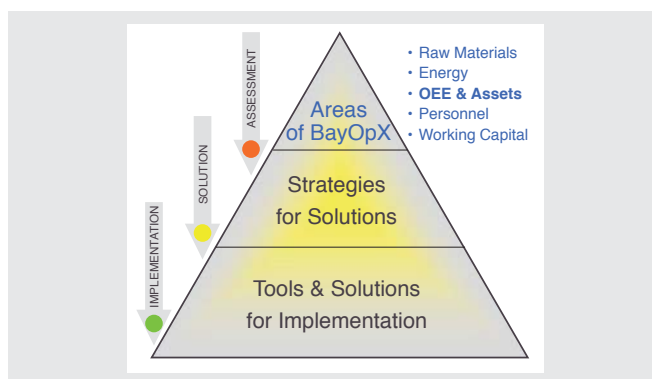
- Risk Management
- Reliability Centered Maintenance (RCM)
- Failure Modes and Effects Criticality Analysis (FMECA)
- Root Cause Failure Analysis (RCFA)
- Condition Monitoring (CM)
- Bottom-Up Budgeting

Bayer Technology Services – The Asset Life Cycle Management Experts

Our Asset Life Cycle Management approach and its associated elements and processes have proven its excellence and usability for years in the day-to-day operation inside the Bayer Group. We have assisted during the implementation of respective processes in the form of an owner/operator. Therefore, an intensive know-how and experience exchange between the operating units and Bayer Technology Services as service provider and knowledge manager is part of our continuous improvement process. This hands-on operator experience brings us in the unique position to provide first class front line support to our customers, helping them to achieve world class performance.

The wide range of experience of Bayer Technology Services is at our customers' disposal. In conjunction with BayOpX® – our Operational Excellence approach – our customers obtain access to our full portfolio of services targeting optimum plant reliability and efficiency.

As a result of our continuous work as project consultants in close cooperation with plant personnel in production facilities, our know-how is transferred in both directions, from development to practice and from practice to development. Our consultants have a high level of experience with methods and tools applied and utilized in our Operational Excellence approach.



BayOpX® – Our Operational Excellence Approach

References

Our customers profit from our broad product range based on the wide-ranging expertise of a global player.

Our global experience includes:

- Global improvement programs in the Bayer Group
- Numerous Turnaround Management projects
- 60+ Risk Based Inspection projects
- 50+ years of materials and corrosion consulting

We implement a culture of efficiency. Let us discuss how we may team up with your organization for optimal results and profitability of your company.