Asset integrity solutions

Improve integrity and reduce costs through more effective asset management
### Asset integrity solutions

Companies need a cost effective way of maintaining production capability, preserving the integrity of the assets and meeting the demands of modern legislation.

ABB provides engineering services to improve performance in the areas of operations, compliance, engineering and maintenance to customers in the chemical, petrochemical, oil & gas, power, pharmaceuticals, metals and consumer industries worldwide, utilising our pRIME methodology.

The pRIME approach is a consultancy programme supported by tried, tested, consistent and coherent methodologies and capability. Following pRIME means a beneficial, cost effective sustainable solution. All processes are risk based, ensuring that effort is concentrated on areas that will give the highest return whilst minimising risk. This approach is supported by a set of IT tools (pRIME Toolkit), which provide a consistent and efficient approach.

Companies have spent significant sums of money addressing legislative, regulatory, and safety issues. These demands don’t diminish and increasingly CEOs and site directors not only need to demonstrate they are tackling known issues, but are also being proactive in assessing the health of assets and adopting best practices. Utilising ABB’s approach, the millions spent tackling these issues can achieve more than just legislative compliance. There are also significant benefits to the business such as improved reliability and reduced maintenance costs.

Depending on the entry point pRIME can:
- Help improve the management of safety in production, whether related to people, systems, or hardware
- Focus effort on reliability and sustainability, while supporting the development of asset life cycle strategies
- Benchmark competencies for both the organisation and people, identifying areas for and assisting with improvements
- Enable customers to incorporate legislation and regulation in an optimised way
- Build on any existing risk assessment programmes and initiatives

ABB’s approach is an all-embracing programme of many long-established and recognised services to help companies address asset integrity in a risk based way.

ABB embraces knowledge transfer as a key cornerstone, so customers are better equipped to apply the learning and outcomes as a result. With the ABB approach, companies are able to better understand the:
- Challenges and priorities
- Quick wins available
- Actions necessary to support improvement
- Steps needed to consolidate and ensure improvements are sustained

Wherever your plant or facility sits on the life cycle, ABB provides a consistent and modular approach.

The pRIME methodology can be used for managing asset integrity; recognising symptoms, diagnosing causes, and implementing corrective or improvement action. Adoption of the pRIME methodology will deliver a beneficial, cost effective, sustainable solution, which will result in increased uptime, improved reliability and reduced costs.
What ABB offers

ABB has extensive knowledge and experience of all aspects of the ‘asset life cycle’ and can deliver practical, cost effective solutions to difficult and challenging problems across a wide range of industries.

Our flexible approach ensures the solutions offered are tailored to suit your requirements. We have a broad team of specialists able to provide technical solutions and help you to sustain improvements by developing your own capabilities.

ABB can support customers in one or all of these areas:

- Asset Health Checks (AHC)
- Asset life assessments
- Equipment verification
- Maintenance and reliability
- Training
- Technical audits

Asset Health Checks (AHC)
An AHC identifies the key issues for the ongoing operation of the asset. It gives a complete view of the plant by looking at equipment, systems, procedures and competencies to ensure the integrity of the asset.

ABB’s team of specialists begin by assessing the condition of the plant against world class standards and reviewing compliance with legislation to give an understanding of the current status. The assessment also covers the management processes and organisational competence.

The risk based approach then focuses on vulnerable areas and groups of equipment to ensure that opportunities for improvement are sought out and ‘quick wins’ identified.

The study produces a detailed evaluation, giving overall scores for elements such as the state of assets, spare parts management and inspection management, along with key strengths and areas for improvement. From this, ABB works with the client to generate solutions and action plans for the necessary changes to be implemented.

ABB can then project manage this implementation and where appropriate complete some of the actions by calling upon our broad range of services.

Examples of an asset health check.
Asset life assessments
As operating plants come towards the end of their design life an asset life assessment is vital to identify the investment required to sustain integrity and the required operating performance. This will allow the plant to meet future production requirements for the longer term and provide a focus for both future finances and effort.

ABB can provide an independent detailed assessment of asset life and opportunities for improvement. The study will cover equipment condition, mode of operation, systems and practices, competencies and skills. It will generate a plan for asset life extension, including future requirements to maintain equipment integrity and reliability and improve process operation by:

- Reviewing key issues affecting asset life
- Determining a view of equipment life based on asset condition and deterioration mechanisms
- Highlighting technology gaps compared to ‘world class’ facilities
- Providing opportunities for improvement in operational performance (e.g. energy, yield)
- Providing a detailed profile of future investment required
- Developing recommended actions to maintain integrity

The study can be tailored to meet client needs. Depending on requirements, the study can be focused on an entire production site or on a class of equipment such as boilers or rotating machines. We conduct initial on site discussions with production personnel, followed by a further period of data collection, analysis and evaluation depending on the scope.

Once the opportunities for improvement are identified, ABB can then help in prioritising improvements, generating solutions and implementing actions. We can project manage the implementation process and, calling upon the broad skill set of ABB, can undertake actions ourselves, giving a complete solution to asset problems.

Equipment verification
Critical equipment verification
All companies should now have a critical equipment verification programme, where documentation, design and specification of the critical items of equipment are independently reviewed to ensure they are fit for service.

The programme should include regular reviews during the lifetime of the items, especially when standards change. These reviews need to take into consideration subsequent changes in design and construction standards, deterioration in condition and changes in service conditions.

ABB can offer specialist engineers and consultants with leading technical capabilities, to complete the verification exercise for the critical equipment. Where equipment is not fit for ongoing service we provide a list of required actions to be completed.

Design verification
Often design verification has taken place at the handover / acceptance stage but this can lead to significant costs and delays should an error be found in the design basis. By including verification as a fundamental part of the project philosophy and completing the exercise during the design phase, this could result in a saving of both time and money.

On completion of a satisfactory review the consultant completing the verification exercise will issue a design verification certificate.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Items requiring replacement within the study period</td>
</tr>
<tr>
<td>B</td>
<td>Items requiring major repair</td>
</tr>
<tr>
<td>C</td>
<td>Items requiring significant minor repair</td>
</tr>
<tr>
<td>D</td>
<td>Items requiring routine maintenance</td>
</tr>
<tr>
<td>E</td>
<td>Items requiring further extensive study</td>
</tr>
</tbody>
</table>
WHAT ABB OFFERS

Maintenance and reliability
Effective maintenance and reliability for production requirements at optimum cost. The maintenance of plant equipment is a key activity in any manufacturing organisation. The maintenance organisation must be efficient, well-organised, cost-effective and innovative to deliver:

- High plant availability and reliability
- Safe assets
- Effective maintenance policies
- Legal compliance
- Value for money
- Efficient turnarounds / shutdowns
- Optimum spares management

ABB can provide a total maintenance improvement service which includes both consultancy and the practical implementation of solutions. Our approach is designed to help by being:

- Effective - by using our technical expertise and operational experience
- Focussed - by concentrating time and effort on the areas of greatest potential benefit
- Rapid - by innovative use of our structured, top-down and generic approaches
- Efficient - by making the best use of the time and involvement of the site team
- Driven - by helping to complete the process and gain the benefits as soon as possible

Training
ABB can provide training in a variety of topic areas in relation to improvement programmes or as part of the technical development of engineers. Topics covered include reliability, shutdown, turnaround management, pressure systems design and management and risk based inspection.

Technical audits
Auditing to ensure compliance with regulations, industry standards, company requirement codes and engineering best practice. Using ABB enables our clients to see the things that their organisation either does not know about, or are blind to as a result of familiarity fatigue.

We provide:
- Third party independence and objectivity
- Identification of gaps versus regulatory requirements, company standards and procedures
- Clear understanding of status versus industry standards and engineering best practice
- Prioritised actions to drive improvement

ABB’s auditing process is well established and is underpinned by tried and tested audit protocols aligned to the requirements of the relevant regulations and standards.

ABB has a group of experienced auditors, recognised experts in their particular field, with many years of experience of design, operation, maintenance and good engineering practice.

ABB audits for compliance against a range of regulations and standards including:

- PAS55
- MHSAWR
- PUWER
- PSSR
- Electricity at work
- ATEX / DSEAR
- LOLER
- Asbestos
- Pipeline safety
- Technical Due Diligence (TDD)

Audits are tailored as necessary to address the operational circumstances of the client. ABB have conducted numerous technical audits for a wide range of clients.
Enhancement of RBI+© pRIME tool
All RBI reviews undertaken by ABB have been delivered using the RBI+© pRIME (process Reliability and Integrity Management Excellence) tool enabling an efficient and robust assessment process. This software has now been further enhanced and is available for license as a standalone tool. Consequently, clients are now able to complete RBI reviews in-house effectively and efficiently according to ABB's recognised methodology.

In addition to the existing benefits of ABB’s RBI+© methodology the enhanced tool offers:

- More efficient RBI studies, using less operating team time
- Access to a large knowledge bank of best practice guidance and equipment inspection data

pRIME toolkit
The RBI+© software is one element of ABB’s pRIME toolkit. pRIME is a methodology for managing asset integrity; recognising symptoms, diagnosing causes, and implementing corrective or improvement action. Adoption of the pRIME methodology will deliver a beneficial, cost effective, sustainable solution. All processes are risk based, ensuring that effort is concentrated on areas that will give the highest return.

Key features of the software

- Deployable via web, intranet and Lotus Notes
  The software can be accessed in various ways depending on client and project requirements.
- Secure
  The application is secured using tiered access, meaning that access and edit permissions can be set person by person, module, by module. Data is secured through encryption.
- Access from anywhere
  The application can be accessed through a web browser or by using a local copy from the users PC.
- Data capturing and review
  Several team members can work concurrently in capturing the input data electronically to enable review during multi-disciplinary meetings. Data from the different team members is transmitted through client and browser based applications and aggregated allowing individuals to work separately. This allows the information to be reviewed by specialist engineers outside of the immediate project team.
- Corrosion loops
  The software enables similar items of equipment with similar operating conditions and deterioration mechanisms to be grouped together to form what are sometimes called corrosion loops. This ensures that a range of and changes in process conditions are considered consistently across the complete series of equipment affected. This also minimises the input requirements.
- Consistent workflow and management reporting
  Each equipment item review is subject to a series of secure stage gates to ensure that all of the necessary input data has been collected, analysed and the recommendations captured. This structured work process facilitates the tracking and reporting of project status by means of the progress dashboards.
- Risk assessment according to client’s criteria
  The assessment criteria for likelihood and HSE and business consequences are configurable to the client’s own risk assessment criteria.
- Automated generation of reports
  Summary and detailed reports of each RBI review project program can be created in Word and Excel. The format of these reports is configurable in the field on a project by project basis.
- Portfolios
  Standard templates are available for each sector - oil and gas, refinery, petrochemical, pharmaceutical and power. These templates prompt assessment of relevant deterioration mechanisms for each sector.

To see how RBI+© pRIME software can benefit your business try our free demo at: www.prime-toolkit.com
# Integrity management

Asset integrity is one element of ABB’s overall asset life cycle support offering. We can provide integrity management support throughout the plant life cycle.

## pRIME approach

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<th>Asset integrity</th>
<th>Risk Based Inspection</th>
<th>Inspection</th>
<th>Others</th>
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<td>- ALS</td>
<td>- Vessels</td>
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<td>- Process Hazard Review (PHR)</td>
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<td>- AHC</td>
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<tr>
<td>- Technical audits</td>
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<td>- Relief systems</td>
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<tr>
<td>- Criticality</td>
<td>- Machines</td>
<td>- Pipebridges</td>
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<td></td>
<td>- Ex electrical</td>
<td>- Structures</td>
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## pRIME toolkit software

### Integrity management solutions
- Asset Health Check (AHC)
- Asset Life Studies (ALS)
- Technical Due Diligence (TDD) assessment
- Risk based approaches embracing safety, maintenance, criticality and inspection
- Competency and development training and appreciation programmes
- Integrity management solutions software

### Integrity design services
- Pressure equipment specification and design
- Independent design review
- Fitness for service assessment
- Repair specification
- Materials engineering and consultancy

### ABB inspection services
- RBI+©
- UKAS accredited inspection service
- Preparation of focused schemes of examination
- Civil and structural inspection and consultancy
- Auditing and gap analysis

### Other ABB capabilities include:
- Process safety
- Project services
- Technical engineering
- Technical software
- Technical training and competency