Asset Integrity & Reliability (AI&R)
A Key Element in Achieving Sustainable Operations

Operational Risk Management (ORM) Overview

Operational Sustainability, LLC (OS) is a leading provider of Asset Integrity and Reliability (AI&R) consulting services.

OS’s organizational change management and transformational aptitude are at the core of our capabilities. We aid and empower our clients to achieve the goal of bringing it all together. Given the myriad of new regulations, companies must manage change and leverage new technology to stay competitive. In the past, traditional operating strategies allowed for conventional thinking (e.g., certification, routine inspections, compliance management). Currently, leading organizations are migrating to a semi-predictive state. This drives greater value by allowing operations to make timely risk-informed decisions in the field and in the boardroom. Companies consistently in the top quartile of performers recognize the benefits of integrating safety and reliability.

OS’s ORM strategy is focused on improving asset availability, enhancing EH&S compliance assurance, reducing energy use, reducing risk, and minimizing production losses enterprise-wide. An effective ORM system includes policy and procedure development, planning, cultural alignment, implementation, training, performance measurement, and auditing. Getting buy-in to overcome internal barriers leading to sustainable operations requires the interaction of numerous departments including EH&S, maintenance and inspection, operations, automation, human resources, supply chain, capital projects, technical and engineering, and asset integrity.

OS helps companies implement cultural safety, process safety, and operational discipline solutions as part of its asset integrity maturity model leading to EAM coupled with a competency-based culture to minimize overall risks of operation.
Management of Change Overview

Operational Sustainability’s consultants are thought leaders in facility, technology, and organizational change management. Management of Change (MOC) is perhaps the most integral and complex business process to implement as it touches nearly every area of an organization, but is the key to achieving sustainable operations. When done well, MOC becomes a tool for efficiency and effectiveness, and it can significantly reduce the severity, frequency, and likelihood of incidents. Best practices and recently promulgated regulations suggest that both in-kind and not-in-kind changes should be managed together in a program.*

Many clients struggle with integrating change into asset integrity and reliability. In particular, changes in vendors, inspection intervals, composition of streams due to production changes, and operating envelopes of equipment are key to asset integrity. Inability to track changes leads to excessive ordering of parts, inventory and tax carrying costs, over- or under-inspecting equipment, introduction of new damage mechanisms leading to reduced equipment life, and overall shortened asset lifespans.

*The Alberta Boiler Safety Administration (ABSA) AB-512
Asset Integrity and Reliability

Our comprehensive approach to asset risk management and performance improvement helps clients enhance compliance activities, reduce business interruptions, increase asset utilization, prevent and minimize unwanted events, and protect their reputation.

Today, process safety requires operating companies to demonstrate the basis for their compliance (i.e., Recognized and Generally Accepted Good Engineering Practices). One of the keys to maintaining compliance is to adopt a compliance coordination philosophy to enable swift adaptation to changes in regulations. Overall, companies move from time-based to risk-based philosophies as they move their asset integrity culture forward.

To create an effective asset integrity solution, data and records must be maintained including P&IDs, PFDs, equipment lists, piping isometric drawings, corrosion monitoring locations, damage mechanisms, piping specification documents, inspection points, and operating conditions.

OS offers advanced maintenance philosophies and technologies in areas such as Risk-Based Inspection (RBI), Integrity Operating Windows and Reliability Centered Maintenance (RCM). The key differentiator we bring is to ensure these philosophies are sustainable once clients make the investment to implement them. For example, it may take 24-36 months to implement RBI in a large facility, so we want to ensure clients get these programs to return an investment for 15-20 years. The key is sustainability. Augmenting RBI by integrating Integrity Operating Windows can improve asset integrity by automatically recognizing the impact of feedstock variability and process upsets have on risk and profitability. We offer our Operational Insight service to enable you to see changes as they occur and to maintain governance of the process.

Oftentimes, 80% of the risk resides in 20% of the assets.
Our auditing solutions judge the effectiveness of the implementation of management system elements. In addition, we offer powerful fitness-for-service assessment philosophies geared toward identifying equipment that needs to be de-rated, re-rated, repaired or re-engineered. Maintenance is only one component of asset integrity; asset integrity also includes technical safety assurance through technical and quantified assessments (e.g., fire or explosion consequence modeling, dispersion assessments, escape planning). Achieving top quartile performance requires the interaction of numerous departments, including EH&S, maintenance, operations, technical and engineering, and asset integrity. Our OESuite™ solution helps break down some of the traditional departmental barriers created by specialized point solutions (e.g., inspection software, basic maintenance management software).

One of the more advanced Asset Integrity and Reliability focus areas includes defect elimination coupled with production efficiency improvements. The keys are to identify, manage and/or eliminate defects, reduce production deferrals, prevent new defects through proactive monitoring, increase capacity of production chokes, and share lessons learned.

Quality Assurance and Quality Control initiatives minimize defects wherever they may be introduced, from conceptual design to asset handover and operation for the life the facility.
Industry Performance Benchmarking

Range of Performance Improvement with ORM

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<tr>
<th>Best-In-Class:</th>
<th>Industry Average:</th>
<th>Worst-In-Class:</th>
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<tbody>
<tr>
<td>Top 20% of aggregate performance scorers</td>
<td>Middle 50% of aggregate performance scorers</td>
<td>Bottom 30% of aggregate performance scorers</td>
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<tr>
<td>• 30% Reduction in Emissions</td>
<td>• 5% Reduction in Emissions</td>
<td>• 1% Increase in Emissions</td>
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<tr>
<td>• 24% Reduction in Energy Consumption</td>
<td>• 7% Reduction in Energy Consumption</td>
<td>• 2% Increase in Energy Consumption</td>
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<tr>
<td>• 89% Overall Equipment Effectiveness (OEE)</td>
<td>• 81% OEE</td>
<td>• 65% OEE</td>
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<tr>
<td>• 19% Operating Margin Increase vs. Plan</td>
<td>• 8% Operating Margin Increase vs. Plan</td>
<td>• 5% Operating Margin Decrease vs. Plan</td>
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Source: Aberdeen Group, September 2009

Operations Efficiency

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<td>• Efficiency up 20%</td>
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<td>• Production downtime reduced 20%</td>
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<tr>
<td>• Energy consumption down 10%</td>
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<td>• Production capacity up 5-15%</td>
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MRO & Inventory Costs

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<tr>
<th>MRO &amp; Inventory Costs</th>
<th>LifeCycle Engineering Study, A.T. Kearney</th>
<th>Tompkins Associates</th>
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<tbody>
<tr>
<td>• Reduce material cost up to 19%</td>
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<tr>
<td>• Reduce inventory and maintenance storeroom up to 25%</td>
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Maintenance & Labor Costs

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<tr>
<th>Maintenance &amp; Labor Costs</th>
<th>A.T. Kearney</th>
<th>Grant Thornton &amp; PricewaterhouseCoopers</th>
<th>Gartner Group</th>
<th>PricewaterhouseCoopers</th>
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<tr>
<td>• Productivity up 28%</td>
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<td>• Overtime down 10-50%</td>
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<td>• Maintenance labor cost down 10-30% via scheduling</td>
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<td>• Contractor cost down 25-50%</td>
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Making the Case

While compliance is critical to meet regulatory requirements, companies still struggle to execute their overall vision. Contributing factors include: vetting out business processes in isolation, lack of communication between departments, and tools in silos that lack interoperability.

As companies address these issues and move from reactive event-based to asset-based intelligence, they will experience timely risk-informed decision making.
OS Core Capabilities

Enterprise Asset Management
- Maintenance Management System (MMS) design and implementation
- Work outage scheduling
- Maintenance optimization
- Condition-based maintenance through systems integration
- Equipment health monitoring
- Inspection programs
- Asset care center of excellence
- Actuarial engineering
- PAS 55

Extensive experience in plant maintenance, capital projects and infrastructure, planning and work management.

Climate Change / EH&S Management Information System (EMIS)
- Conduct interviews of management, within the operational, risk, internal audit and general counsel departments.
- Understand existing environmental, health and safety management information system (EMIS) and emissions reporting data and documents
- Assess third-party environmental reporting verification requirements and compliance
- Roadmap for implementing or updating EMIS
- Systems integration
- Managed services and application hosting

Operational Sustainability has significant experience in helping customers create carbon management and EMIS strategies, implement technologies inventorying greenhouse gases, and enhancing compliance assurance.

Work and Asset Management
- Business process blueprinting
- Geographic Information Systems (GIS) implementation and integration
- Mobile asset management

Experience with SAP, Maximo, and other solutions from implementation to training and post deployment change management.

Process Safety Management (PSM)
- PSM auditing and gap assessments
- Management of Change (MOC)
- Enterprise Loss Prevention (ELP)
- Mechanical integrity programs (fixed and rotating)
- Process Hazard Analyses (PHA)
- Safety Instrumented Systems (SIS)
- Capital project management
- Operational safety excellence
- Mergers and acquisitions
- Operations management systems
- PSM performance management
- Control of work
- Smart process safety procedures
- Organizational change

Reliability Engineering
- Equipment reliability strategies
- Criticality Assessments (CA)
- Failure Modes and Effects Analysis (FMEA)
- Reliability Centered Spares (extension of RCM)
- Reliability Centered Maintenance (RCM)
- Reliability Centered Design (RCD)
- RAM analysis
- Reliability cost modeling
- Fitness-For-Service (FFS)
- Root Cause Analysis (RCA)
- Risk-Based Inspection (RBI)
- Integrity Operating Windows (IOW)
- Operational Sustainability offers experienced RBI and RCM facilitators.
Operational Sustainability, LLC makes operational excellence simple.

Succeeding in today’s complex, highly-regulated industries depends on how well your company manages operational risk. Our world-class advisory services and our industry-leading cloud-based, mobile-enabled software work together to enable your company to realize operational excellence and sustained operational integrity. We identify and help you solve any issues to move to a real-time, mobilized risk-aware culture. We focus on core areas to enhance visibility, efficiency and reliability. With an average of more than 25 years of industry experience each, our advisors can design a solution tailored to your company’s culture and needs.

Learn how Operational Sustainability can advise, train, and guide your workforce with the most comprehensive and effective operational excellence software and consulting services available today. See our full slate of free webinars, white papers, detailed module information, and scheduled trainings online at os-orm.com.

Schedule your free consultation and demo today.