Complex Repairs Made Simple

SOLUMINA

MRO
For Visibility

One of the top concerns for maintenance operations managers is the ability to have reliable, accurate feedback from the depots and back shops. Progress against scheduled inspections – both from a percent completion as well as from a cycle-time-perspective – is critical. Recording findings or non-routine events is the bread-and-butter activity of a maintenance facility.

Documenting findings must be easy, in real-time and properly structured so that maintenance engineers can easily classify them as either included in the contract or “over and above.” All critical players must be online using their desktop computers or mobile tablets. Problems that take assets out of the “fast lane” must be quickly reported and acted upon.

For Reliability

Customers appreciate the way Solumina helps the shop become more consistent and reliable. The software ensures that all of the work is completed in the right order and signed off prior to closure. Critical steps are never missed because the work is performed exactly to the planned standard-work steps and instructions. Once non-routine findings are documented and approved, they can be easily converted to standard-work processes for reusability. Standardizing work processes can make a big difference toward providing consistent results and keeping assets in the fast lane.

For Productivity

There are significant productivity advantages to paperless processes. Shops have been getting by with paper processes for many years, but productivity and regulatory pressures are demanding more efficient and agile processes. The paperless processes in Solumina are designed to increase productivity by eliminating many wasteful clerical and manual verification steps, while providing quicker turnaround for non-routine work approval and issue resolution at the shop floor.

The software is easy to use, not only for managers that need to track work in process, but also for inspectors and mechanics on the shop floor that need to accomplish inspections and log work progress.

Solumina adapts as organizations change – whether a business process changes or there is a critical engineering change that affects units in process. Solumina ensures that technicians on the shop floor are always looking at the correct and latest drawings and supporting-document revisions.

Solumina’s Operations Process Management software solution for Maintenance, Repair and Overhaul (MRO) operations enables new levels of visibility, productivity and reliability within organizations. Solumina provides a platform for planning work, and executing and tracking processes online, creating a paperless environment that allows for quick visibility and response to any issue that arises on the depot floor.

Solumina adapts as organizations change – whether a business process changes or there is a critical engineering change that affects units in process. Solumina ensures that technicians on the shop floor are always looking at the correct and latest drawings and supporting-document revisions.

Solumina adapts as organizations change – whether a business process changes or there is a critical engineering change that affects units in process. Solumina ensures that technicians on the shop floor are always looking at the correct and latest drawings and supporting-document revisions.
SOLUMINA MRO FEATURES

Solumina’s MRO solution is leading the way for new innovative technology and supply chain strategies. iBASEt built Solumina’s MRO solution on a foundation of industry best practices and is consistently improving its software offering. Solumina transforms MRO processes into a highly visible system by providing real-time visibility of work in process on the shop floor and a real-time problem resolution system that extends into the supplier network.

A Complete Information Kit for the Technician

Solumina work orders are more than just job or task cards; they are complete information kits that improve accuracy and save time. Technicians no longer have to search for documentation, and the information kits eliminate the chance of a technician working to the wrong specifications. The work task information kits include work instructions, inspection requirements, engineering specifications, tooling and approved parts lists, and links to specific sections of manuals — all online at the technicians’ fingertips.

Illustrated Interactive Work Instructions

Solumina offers a rich set of tools to illustrate work instructions. These work instructions can be designed to be as simple as text and illustrations, or can be more sophisticated containing slide shows with marked-up drawings, 3D model animations and videos. The interactive slide shows stop at specific points of a movie or animation sequence to display instructions and prompt for data collections.

Work instruction illustrations can come from external manuals or PDM system

Standard Text and Operations

Reusable work instruction segments are managed in the Standard Text and Standard Operation library. Tools are provided to propagate and incorporate revisions to these library segments into new revisions of work plans and work orders.

Paperless Processes

Solumina eliminates the need for most of the paper documents used on the shop floor, including manuals, books of standard procedures, work orders, task cards, printed work instructions and drawings. A paper-lite implementation phase can be supported to help facilities transition to a paperless process.

The transition to a paperless system for process management will yield these immediate benefits:

- Eliminate clerical work needed to update, distribute and replace documents
- Ensure consistent job performance using the correct and latest versions of drawings, instructions, tools and parts
- Display real-time data, status and metrics

The technician easily learns to sign on and click the “Next” button

Figure 1

Work instruction illustrations can come from external manuals or PDM system.
Figure 2 ▼
The technician easily learns to sign on and click the “Next” button.

Change Approval and Control
Configuration and change control are daunting tasks when planning the maintenance or overhaul of complex assemblies with intricate work processes. Solumina streamlines and expedites these procedures, facilitating the fast deployment of instruction revisions to the shop floor.

A complete history of “who,” “what” and “when” is recorded for each changed object in every work plan revision and work order alteration. The configured workflow steps control the number and order of groups involved in the authoring, review and approval processes. Solumina Communications record and preserve discussions and recommendations among different functional groups.

Depending on the urgency of a change and the work already completed, process planners can choose to supersede work instructions entirely, write special upgrade instructions or allow the unit to be completed to earlier specifications. The visibility of work order statuses and the ability to place in-process units on hold facilitates tasks for the process planners.

Disposition of Inspection Findings and Discrepancies
Inspection requirements are specified as part of work instructions, and include data collection and certification requirements. During execution, based on the results of inspection measurements and observations, inspectors can decide to record an Inspection Finding for out-of-tolerance conditions, cracks, corrosion or other concerns. These conditions are usually found during inspections but can be discovered at any time during a maintenance process. Discrepancies are quickly documented and routed for disposition along with annotated digital photos, marked-up drawings or diagrams.
Solumina saves time with an easy one-click command from the service task. The disposition, review and approval workflow handles complex routing requirements for different types of discrepancies. Special cases are routed to a designated engineering representative or component manufacturer for disposition, and additional work scope is routed to customers for approval. Online communications can further complement the process, documenting review and discussion threads.

**Non-Routine Tasks**
Disposition of an inspection finding or discrepancy can increase the work scope by either adding planned standard service or repair tasks, or adding non-routine tasks that require on-the-fly definitions. If required, the non-routine tasks can be routed to a designated engineering representative for special instructions, and routed to other personnel or the customer for approval. Non-routine tasks requiring new instructions can be accompanied with preliminary engineering dispositions to guide the author.

A subassembly or component disposition can include instructions to rework, repair or scrap the component. Authoring and approving of supplemental work instructions are a part of the disposition process. A defective installed component or subassembly can be fixed in place or removed. When a defective component is removed, the defect history stays with the component.

**Supervisory and Production Control Tools**
Shop floor management is enhanced with real-time visibility of schedules, resources and constraints. The Solumina graphical dispatch compiles all of this information for supervisors using Gantt charts, histograms, alerts and tabbed pages with additional information about each job. Supervisors will know which jobs are ready to move forward and which jobs are held up, and can easily assign and reassign work to accommodate unplanned absences or machine downtime.

**Straightforward Execution**
Routine and non-routine operations (aka. task cards) are dispatched on the same screen to the shop floor. Excluding the “non-routine” label, there is no procedural difference to the technician: they are both maintenance tasks that need to be completed – each with specific data and certification requirements.

The “Next Task” button is the main button to learn in the application. It is an application wizard that guides and prompts technicians to complete the work as planned, ensuring that work steps, verifications and signatures are not skipped.

Solumina makes it easy to jump between sub-work orders and original work orders, or among linked drawings, manuals and back to the work instructions. All of the information required by a technician or inspector is only a click away.

**Figure 4**
Work scope changes can include planned repairs or unplanned non-routine tasks.
Figure 5 ▼
The Unit Information screen keeps track of the statuses for removed components.

Figure 6 ▼
Technicians are prompted with easy data collection sheets.

Process Control
Solumina provides process control that ensures:

- Only technicians with current skills and certifications perform jobs
- Proper tools are used with current calibration dates
- Complete and latest process documentation is used
- Controlled change procedures for process instructions between engineering and manufacturing

Solumina’s integrated system enforces inspection requirements during process execution. Work order operations cannot be completed until all data collection requirements and signatures are fulfilled. Data points outside of the control limits are immediately highlighted for the technician.

In addition, Solumina ensures that all technicians have the required certifications for each job. Technicians are also warned about certifications that are approaching expiration.

Verification and Signature Data Collection
Solumina alerts the user to what data entries are outstanding to complete a job. Solumina provides easy data entry with a range of options including support for barcode readers, measurement devices, and data collection forms that are easier to use than spreadsheets for elaborate data entries. Technicians are alerted instantly when recorded measurements are outside specified control limits.

Technicians and inspectors “stamp” work completion and approvals online as electronic signatures. These buyoff stamps are stored as part of the device/unit history. Inspectors can point out oversights or initiate discrepancy reports directly from buyoff points within a work order.
Liens

Liens act as virtual red tags, identifying open findings, discrepancies, rework or incomplete work. Special authorizations can be given to specific units, allowing work to proceed up to a certain point with these lien conditions. Visibility of liens is never lost throughout the process, even when they are inherited from installed subassemblies.

Unit/Device Work History Records

Solumina stores history on each unit, including work instructions, data collection, buyoff signatures, discrepancies and repairs. Solumina tracks the materials, components and subassemblies within each unit, making it easy to determine where a suspect component or material was used.

Solumina maintains both removal and installation records. The history for a subassembly and its components moves with that subassembly when it is removed.

Performance Metrics

One of the big advantages to Solumina’s paperless system is its real-time visibility of work in process. This visibility allows management to quickly respond to issues, resolve constraints and make informed decisions.

Solumina provides reports and charts to view real-time metrics, which provide visibility of shop floor statuses, metrics, exceptions and trends. From summary reports or graphs, you can also drill down to the detailed data in work orders or discrepancies.

Corrective Actions

Corrective Actions can be used to manage investigation, root-cause analysis and resolution of issues on the shop floor. The Solumina Corrective and Preventive Action process supports the compliance of regulatory standards and best practices, including the 8D (Eight Disciplines) problem solving process.

Adaptability

Solumina is configurable to specific organizational structures and practices. Configuration features include:

- Information presentation
- Functional roles and workflow
- Work center dispatch lists
- Extendible integration interfaces
- Secure access controls

Solumina also supports different input devices, including barcode readers, touch screens and mobile devices.

Standard Interfaces to MRO/ERP/MRPII Systems

Solumina is delivered pre-configured for MRO activities in the complex, discrete world. This includes aircraft, ship, space operations, nuclear and ground-assault vehicles. These environments rely on mission-critical MRO-ERP-MRPII systems to govern work orders, material lists and BOMs, material issues and vendor returns. Solumina comes pre-bundled with more than two dozen standard XML Business Object Documents (BODs) to facilitate interfacing with these mission-critical systems.

Figure 7

Planned vs. Unplanned work.
Solumina is an Operations Process Management (OPM) software suite that manages work and quality processes for the manufacturing and MRO (Maintenance, Repair and Overhaul) of highly engineered products. Solumina functional modules include Process Planning (CAPP), Manufacturing Execution System (MES), Quality Management System (QMS, CAPA), Supplier Quality Assurance (SQA), and Maintenance, Repair and Overhaul (MRO) in one integrated system.

Solumina is uniquely designed to manage the product life cycle, beginning with product and process quality specifications into the supply chain, continuing with the manufacture of component parts, the assembly of product, and the aftermarket service of each product unit until retirement.

Solumina functional modules include:

- **Solumina Operations Process Management for Manufacturing**
  - Manufacturing Execution System
  - Quality Assurance System (QA, Discrepancies, CAPA)

- **Solumina Operations Process Management for Maintenance, Repair and Overhaul**
  - Maintenance Requirements Planning
  - Maintenance Task Planning
  - Maintenance Online Execution, Non-routine Execution

- **Solumina Supplier Quality Assurance**
  - Supplier Inspection Planning
  - Receiving and Source Inspection
  - Discrepancy Reporting and Corrective Actions

More papers and resources available for download at the Library section of our website: www.solumina.com.