SAS® Asset Performance Analytics
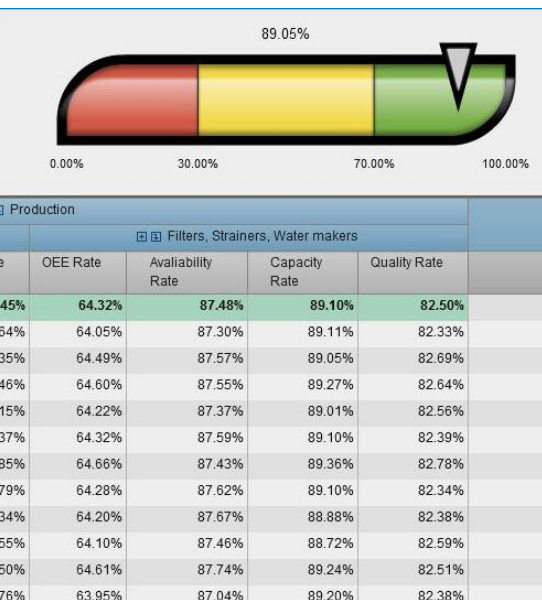
Achieve production targets, lower operating costs and minimize environment, health and safety risks

§sas
THE POWER TO KNOW®

89.05%

| 0.00% | 30.00% | 70.00% | 100.00% |

Production

	Filters, Strainers, Water makers			
OEE Rate	Avaliability Rate	Capacity Rate	Quality Rate	
64.32%	87.48%	89.10%	82.50%	
64.05%	87.30%	89.11%	82.33%	
64.49%	87.57%	89.05%	82.69%	
64.60%	87.55%	89.27%	82.64%	
64.22%	87.37%	89.01%	82.56%	
64.32%	87.59%	89.10%	82.39%	
64.66%	87.43%	89.36%	82.78%	
64.28%	87.62%	89.10%	82.34%	
64.20%	87.67%	88.88%	82.38%	
64.10%	87.46%	88.72%	82.59%	
64.61%	87.74%	89.24%	82.51%	
63.95%	87.04%	89.20%	82.38%	

What does SAS® Asset Performance Analytics do?

Maximize your high-capital assets and facilities by avoiding unplanned downtime. Machine sensor data feeds to analytical models help predict failures and alert staff days in advance. Root-cause analysis tools enable engineers to easily and accurately diagnose the issue.

Why is SAS® Asset Performance Analytics important?

Capital-intensive industries rely on their vital assets. Equipment failures mean missed production schedules and lost revenue. And planned downtime often consists of just-in-case maintenance and part replacements. We allow you to achieve optimized, sustainable maintenance strategies and run assets at peak performance.

For whom is SAS® Asset Performance Analytics intended?

It's designed for capital-intensive industries or anywhere equipment performance is critical to success. Users are typically in operations and maintenance and are responsible for achieving quality, productivity and cost targets throughout the supply chain.

The performance of your high-capital assets can make or break your operation. To meet your goals for profitability, safety and environmental compliance, you must maximize equipment utilization without increasing maintenance costs or the risk of failure.

Most organizations still rely on standard, preventative maintenance and basic monitoring consoles from equipment manufacturers to track performance and maintenance. These consoles are limited and provide little analytics. The result is a narrow view with reactive maintenance that is resource-intensive, time-consuming, prone to false alerts and driven mostly by intuition and biased judgment.

Sensor data provides a wealth of information. As sensor and communications capabilities evolve along with the maturity of the industrial internet of things, the amount and richness of your data will grow. We harness this sensor data and provide analytics to reduce unplanned downtime and optimize

maintenance cycles and costs. Predictive models can identify leading indicators of pending breakdowns. Models are stored in a single knowledge base to speed problem resolution and support ongoing monitoring, learning, analysis and best-practice sharing.

Using unseen patterns that predict future asset failure, we analyze billions of machine-to-machine and sensor data points generated within the industrial internet of things. Status dashboards and automatic alerts notify operations staff, managers and leaders of an impending failure. Alerts can trigger an auditable workflow to investigate the issue, supported by integrated case management.

Key Benefits

- **Maximize output.** Fewer unplanned disruptions due to equipment breakdowns increases your OEE and means you can consistently meet production targets and achieve or exceed revenue goals.

- **Optimize maintenance cycles.** Move toward predictive and prescriptive maintenance strategies to address known sources of failure and performance degradation without driving up costs due to just-in-case preventative part replacements.

- **Improve root-cause analysis.** Advanced analytics, data mining and data visualization tools enable engineers to identify real root causes and develop ideal corrective action plans faster and more effectively.

Overview

SAS Asset Performance Analytics is part of the SAS Quality Analytic Suite that provides an enterprise view of quality performance to help you manage the cost of quality, achieve quality excellence and increase customer satisfaction. It helps to improve the utilization of high-capital equipment. It analyzes data from the industrial internet of things, including sensor data and machine-to-machine data, to identify hidden patterns that indicate probable failures. This foresight gives operations personnel time to bring the equipment down gently to address the issue: helping to avoid unplanned downtime, revenue losses and environment, health and safety issues. SAS Asset Performance Analytics also helps you reduce personnel and maintenance costs by pinpointing problems and aligning resources. It also allows you to detect and correct issues earlier to mitigate the risk of failures and outages.
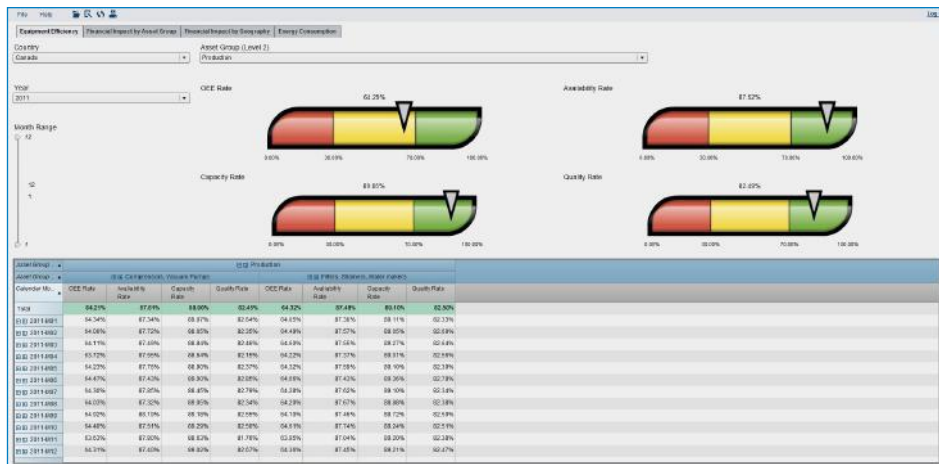

Figure 1: Executive dashboards enable a clear view of asset performance KPIs and allow you to compare across geographies, organizational units, functional areas and asset types.
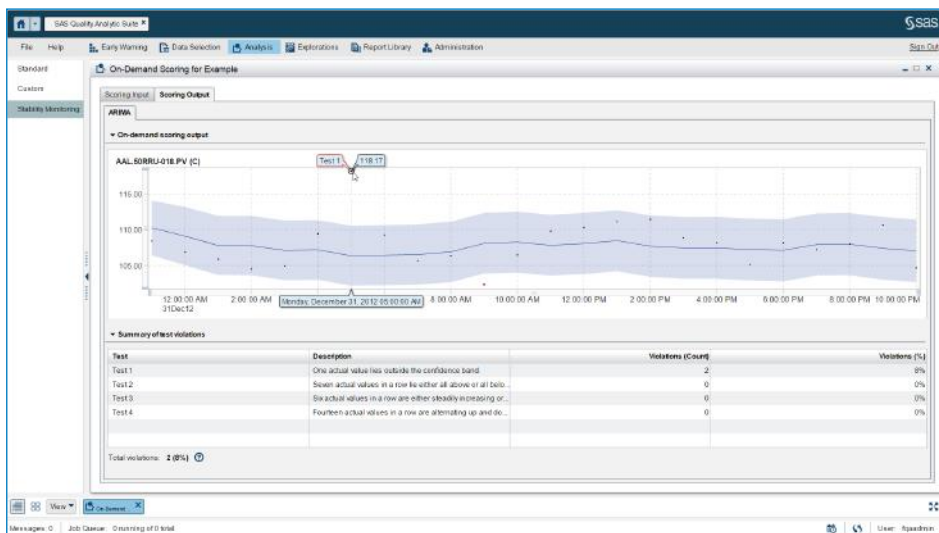

Figure 2: The analysis workbench enables engineers to quickly build new analytic models through a visual interface to identify stable data, align data and choose the best-fit analytical method.

Highly Scalable Data Integration and Management

Our data model helps remove the barriers imposed by siloed operational systems, and enables full visibility into what is happening on the shop floor and out in the field. It allows comparisons between entities, such as facilities, production lines, fleets, etc. Now with direct support for storing your data in SAP HANA or Hadoop, our data integration is even more flexible to meet your needs.

Automatic Monitoring and Alerts

Users can focus on issues that need speedy problem resolution. Alert notifications can be sent via email, text or pager, as part of a workflow or integrated into your information portal. Alerts guide engineers directly to the supporting control charts and supplemental reports can be supplied for analysis. Users can easily drill down to better understand the root cause of the issue. Corrective and preventative action (CAPA) workflows are initiated and case management provides a knowledge repository for standardized problem resolution, enabling an audit ability for asset and process changes.

Predictive Modeling

Advanced predictive modeling can accurately and reliably find hidden patterns in the data that indicate an impending failure or performance degradation. New models are developed based on historical events. In the dawn of the internet of things era, high-performance analytics ensures virtually limitless scalability to continuously monitor the health of your assets. You can test new sensor data against defined rules, thresholds and predictive scoring models to give you ample time to take the appropriate corrective action.

Self-Service Data Visualization and KPI Dashboards

Robust reporting capability provides access to standard and customized reports and KPI dashboards with drillable views, snapshots

and trends. You can easily create ad hoc reports with interactive data selection and parameter definitions. All reports and graphs can be easily shared. An executive dashboard enables reporting on current performance at various levels and dimensions (e.g., geographies, organizational units, functional areas, asset types, etc.).

Advanced Analytics

Advanced analytics means faster root-cause definition, higher first-time-fix rates and fewer repeat failures. Whether a casual user or an advanced statistician, users can easily drill into data and reports to explore the conditions, correlations and causality of events and future events. Through CAPA workflows, the root cause is quickly identified and preventative action taken to keep the operation running smoothly.

Asset Replacement Decision Support

The system supports your repair or replace trade-off analysis. Downtimes, production losses, parts costs, labor costs, probabilities of events, etc. are all considered and optimized to find the most profitable course.

Contents of detail tables can be seamlessly launched in other SAS products such as SAS Visual Analytics, SAS® Enterprise Guide® or SAS® Enterprise Miner™.

Deploy Models into SAS Event Stream Processing

Streaming data can be processed in the SAS Event Stream Processing engine. Results are then sent to the application to perform further analyses. (Additional software purchase required).

Key Features

Enterprise, maintenance-centric data model
- Direct support for data storage in Hadoop and SAP HANA.
- Measurement data provided in both continuous and categorical measures for sensor and tag data, events and alarms.
- Asset and equipment data.
- Physical failure analysis data.
- Failure data.
- Inspection records.
- Maintenance records.
- Environmental data.
- Cost attributes.
- Organizational data.
- Textual information from any source (optional).

Automated monitoring and alerting
- Drill down by organization.
- Drill down by asset group.
- Drill down by functional area.
- Execute workflow.

Predictive modeling
- Decision trees.
- Neural networks.
- Regression analysis.
- Clustering.
- Scoring.
- Stability monitoring:
  - Automatically builds prediction models based on user-selectable predictors.
  - Models can be scheduled for continuous scoring.

Descriptive analysis
- Reliability analysis.
- Pattern analysis.
- Repairable systems analysis.
- Correlation analysis.
- Regression analysis.
- Asset analysis:
  - Flexible framework to support any stored process(es) in the user interface.
  - Handles user interactions.
  - Surfaces and manages outputs.
  - Persists status between sessions.
  - Supports independent as well as dependent stored processes.
  - Facility integrity and reliability delivered as "blueprint" (specific to the oil and gas industry).

Reporting and KPI dashboards with drillable alerts and reports
- Interactive KPI dashboard.
- Interactive web-based reports.
- Interactive web-based graphs.

Key Features (continued)

Support for asset replacement decisions
- Uses historical data.
- Allows manual intervention.
- Includes scenario analysis.

Seamless integration with the full SAS Quality Analytic Suite 6.2, including SAS
Field Quality Analytics and SAS Production Quality Analytics.
- Common code base and data model simplify enterprisewide operational improve-
  ments and allow a modular approach to adding analytic capability as the organization
  matures.

Figure 3: Visual data exploration enables engineers to easily spot correlations and inter-
dependencies of tags, and draw early conclusions for model building and root-cause
analysis.

SAS THE POWER TO KNOW.