PREDICTIVE MAINTENANCE

Predictive maintenance uses informed engineering decisions to determine whether maintenance is required, with the ultimate objective of eliminating or delaying scheduled preventive maintenance.

Operations & Maintenance (O&M) costs represent the greatest expense in owning and operating a facility over its life cycle. In the past, the approach to reducing budgets has been to reduce O&M costs. However, this often results in fewer available resources to maintain the facility. An unintended consequence may be cost increases from unexpected equipment failures. By viewing O&M as an opportunity to improve performance, instead of as a cost line item, facilities can:

· Reduce unscheduled shutdowns and repairs – reducing maintenance costs.
· Extend equipment life, thereby extending facility life and reducing capital expenditures.
· Lower insurance costs by reducing the risk of interruption of plant and processes.
· Provide safe, functional systems and facilities that meet design intent.

Effective maintenance programs use a blend of corrective, preventive and predictive maintenance strategies to improve reliability in a cost-effective manner. Maintenance Optimization is the process of developing the appropriate balance for the facility. Typically, it involves moving an existing maintenance program from a *corrective approach* where maintenance is performed as a result of unexpected failures, or a *preventive approach* where maintenance is performed on a scheduled basis, to a *condition-based approach* where the required maintenance is performed at the most optimum time.

The PlantView® Predictive Maintenance module (PlantView/PdM) is the key to a condition-based maintenance approach. PlantView/PdM applies diagnostic technologies to plant equipment to evaluate the present operating condition of the equipment prior to a scheduled maintenance outage. It has the goal of determining specific maintenance requirements, including whether the equipment will operate reliably until the next scheduled outage or if maintenance will be needed at that time. If maintenance is required, PdM helps determine what specific steps are necessary.

PlantView/PdM facilitates a condition-based approach to maintenance by collecting and storing diagnostic technology results, facilitating the analysis of multiple technologies into an overall assessment of the equipment and making the results accessible to a broad group of staff to support maintenance decisions. PlantView/PdM can help you set up and run a predictive maintenance program at your facility.

Benefits

- Makes data accessible across the enterprise to a wide variety of users.
- Maintains the authoritative listing of all equipment in the PdM Program.
- Monitors adherence to the defined PdM Program.
- Facilitates establishing and maintaining an "Equipment and Condition Indicator" (E&CI) matrix. This matrix cross-references equipment with their diagnostic technologies and establishes the frequency of collecting data.
- Provides a listing of scheduled work (collecting data and assessing equipment) required to implement the defined PdM Program.
- Facilitates and speeds the data entry process to ensure value-added information and insights are recorded.
- Improves transparency and facilitates historical analysis and data mining.
- Provides displays that summarize diagnostic data, enabling quick determination of equipment conditions.
- Maintains a "Condition Status Report" (CSR) matrix representing a visual summary of the overall equipment condition at a facility.
- Provides many views, listings and reports of the collected data and equipment condition to keep all users informed of the latest equipment health at a facility.

Features

- Stores all information in a centralized, structured Oracle database.
- Search function enables query of historical information to aid technical staff with troubleshooting and operational analysis.
- Fully user configurable to match facility hierarchy. Users define plant systems, diagnostic technologies and the equipment participating in the PdM Program.
- Completely customizable security model to control various levels of user access and privileges in the system.

PlantView/PdM Process Flow

On a periodic basis, a trained technician collects data concerning the health of their equipment and enters this information into PlantView as a **Technology Exam**. Each entry includes an evaluated condition, a summary of any problems, appropriate analysis and a series of recommendations.

Technology Exams also contain detail items such as Action Taken Chronology, E-Mail and Attachments. The Action Taken Chronology is a sequence of actions resulting from the Exam. E-Mail allows the technologist to notify an individual of their findings and to include a URL link. Attachments allow files such as pictures, documents or spreadsheets to be uploaded, providing additional information or documentation.

Multiple technology exams are performed for each component – reflecting the different diagnostic tools available such as vibration, thermography, leak detection or lubricant analysis.

A companion desktop application and web services are available to directly import technology exam data from outside test results or on-line systems with a minimum of effort.

For predictive maintenance to be successfully employed, all necessary information is gathered on a regular basis. The data is analyzed for signs of equipment degradation or incipient failures. Appropriate corrective action can be taken in response to the indications provided by the diagnostic systems. PlantView contains summary displays tracking the status of the data collection.

When the information collection has been completed, a System Owner or Subject Matter Expert reviews the recommendations of the trained technicians and forms an integrated opinion, also known as an **Equipment Assessment**. Equipment Assessments are typically performed monthly.

For a quick read of the overall equipment health of a facility, all the Equipment Assessments can be viewed together in a condition status matrix which combines the equipment conditions with their respective supporting technologies.

Equipment Assessments can be searched to locate patterns of maintenance problems on a single piece of equipment or a group of similar equipment. It is also possible review the changes in equipment condition over time with a matrix display that lists all the equipment assessments, with their supporting technology exams, for a user defined historical period.

When a significant problem is detected, the Technology Exams and Equipment Assessments are assigned to a **Case History**. Actions are tracked, and pertinent information is added as attachments to the folder. As maintenance is performed and the case is closed, the Case History is archived to support future maintenance decisions.

The PlantView® Suite

PlantView Logbooks is a part of a suite of integrated modules supporting the maintenance, operation, training and performance knowledge management processes that help facilities sustain optimal reliability, efficiency and safety. Each module automates information entry, storage, management and reporting for numerous facility functions. The software transforms internal work processes, enabling users to move efficiently from managing information to understanding the implications of that information, and ultimately to action. The PlantView Suite is divided into four disciplines: Maintenance, Operations, Continuous Improvement and Training. It consists of the following modules:

Maintenance	
Predictive Maintenance	Facilitates condition-based maintenance by collecting and storing diagnostic technology results, and facilitating the analysis of multiple technologies into an overall assessment of the equipment.
Maintenance Basis Optimization	By combining rigorous Reliability Centered Maintenance (RCM) analysis with pre-defined templates and a flexible approach to determining criticality, MBO helps develop a sound maintenance basis that balances maintenance tasks and equipment reliability.
Reports Library	Serves as a basic document repository targeted for major equipment maintained on an annual basis. As reports are received from engineering teams, they are assigned a status and uploaded to PlantView.
Engineering Inspections	Standardizes the inspection of components and their associated evaluation criteria. Information is summarized in a grid representing the most recent evaluation that has been performed.
Operations	
Operations Logbooks	Replaces traditional paper logs, text documents, spreadsheets and home-grown portal solutions with a dedicated operator logs system. Assists in tracking and managing any problem from initial diagnosis all the way through remediation.
Risk Assessment	Supports Risk Informed Decision Making by using a 5x5 Risk Matrix that can be viewed across the enterprise to assess and prioritize risks.
Reliability Index Module	Replaces manual spreadsheets and monthly reports with a continuously updating Equipment Reliability Index that can provide a snapshot on a daily, weekly or monthly basis.
System Health	Keeps a running log of issues and concerns for a System or Program. Within a particular instance of a report, the responsible individual identifies issues, snapshots metrics and assigns action items.
Continuous Improvement	
Event Reports	When an event occurs at Site "A," other sites are notified through an event assessment providing a mechanism where the event is reviewed and it is determined if a similar event could happen at their site.
Corrective Actions	Documents how a particular problem/issue is corrected at a site. Once a Corrective Action Report (CAR) is created, it is assigned to a Champion and Team Leader until a solution is determined.
Self-Assessments	An Excellence Grid divides business objectives into categories, elements and sub-elements. Questions are defined with each, and an assessment is completed by multiple users. Management can use the results to focus on areas requiring improvement.
Observations	Observes activities to identify trends in safety, human performance and plant operations to prevent injuries and improve reliability.
Training	
Automated Training Manager	Creates training courses consisting of Lessons and Elements; each element has associated content, questions and skills. Profiles provide trainees with a cross-section of content focused on their job description.

The PlantView® Suite can be installed in your own IT environment or externally hosted.
For additional information, please e-mail info@power-vision.com.