Oil and Gas Industry
Asset Maintenance Solution

Background

The oil and gas industry has undergone major changes since the price of crude oil crashed in 1986. Crude and product prices have fluctuated substantially and in directions opposite to that predicted by most industry analysts. Deregulation in Europe and major mergers and acquisitions continue to create new business challenges for the oil and gas industry. Cost cutting, downsizing, and restructuring are just some of the challenges the industry has had to meet in order to grow and to remain globally competitive.

The regulatory climate has also become more challenging. Government regulations affecting the refining industry continue to increase, requiring further investments to meet new product specifications. Indeed, more product specifications may be set by government sanction in the future. In addition, product tracking and monitoring requirements are likely to become more stringent. It can also be expected that more detailed monitoring and recording of process conditions will be mandated. Society will also demand safer operations from oil companies with fewer major incidents and environmentally undesirable events.

In light of the current business climate what are the overall business objectives of today's oil industry, particularly from a plant maintenance management perspective? For both the downstream and upstream side of the industry, the objectives in a nutshell are:

- Be safe
- Meet plan
- Run economically

Over the last decade, running economically has meant two things: downsizing and re-engineering of business practices.

Since the early 1980s, employment in U.S. petroleum businesses has been reduced by more than 400,000 jobs, or approximately 26% of the work force, while at the same time the industry is producing and delivering more products and energy than it did 15 years ago.

Increased efficiency is, in part, an outcome of re-engineered processes, flattened bureaucracies, reduced operating costs, and the adoption of information technologies that allow individuals to do better work more efficiently.

Successful players in today's oil and gas industry have learned to manage technology as an asset. Through corporate-wide technology linking, work groups can share best practices and transfer technological experience world-wide.

Around-the-Clock Operations

Effective management and maintenance of core business assets is a key component of enhanced business efficiency. Multinational oil companies today operate facilities on every continent, including hundreds of offshore and onshore production platforms, gas fields, petrochemical plants, thousands of miles of pipelines, along with rolling stock and off-site utilities.

With such a tremendous investment in capital equipment, 24-hour-a-day operations are mandatory and any downtime either offshore on the platforms or onshore at production facilities represents a major financial loss, and not just because of lost production. Unforeseen equipment failures represent increased safety risks to workers and a potential threat to the environment.

The drive to optimize production and refinery assets has led oil companies to adopt enterprise software systems that have the power to integrate knowledge across all the organization's business units—with the result that plant maintenance has gained more visibility than ever before. Enterprise databases give oil companies the ability to monitor the performance of their asset base and to assure that personnel, contractors, and materials are procured in time for planned maintenance and that contingencies are in place for unplanned maintenance events.

The Mobile Technician

Production and refinery facilities are frequently located in demanding environments and can span hundreds of acres, posing enormous logistical challenges to maintenance managers. Consider an example: Texas City, a refinery constructed in 1934, spans 1200 acres of shoreline along Galveston Bay, has a workforce of 1900, and processes up to 460,000 barrels of crude oil per day.

Maintenance technicians are frequently miles from supervisors, equipment documentation, tool cribs, and spare parts. They seldom have wired network access to enterprise data. To stay in touch, they rely on an *ad hoc* system of beepers, cell phones, lap tops, fax machines, and paper forms to both receive and convey maintenance orders, requisitions, reports, specifications, drawings and other data required to perform both routine preventive and unscheduled maintenance tasks.

The Inroad Wearable Thin Client™

Although enterprise software enables an integrated view of business operations real time, maintenance technicians, on the front lines of asset optimization, are not connected to the enterprise. The solution? The Inroad Wearable Thin Client (W-T-C), is the missing link that provides full computer functionality, including inter/intranet access. It connects mobile workers to enterprise data and the facility's work control center.

The Inroad solution is a wearable, battery-powered, full-function client that networks to the existing enterprise server via a wireless LAN. The uniquely designed user interface—speech recognition/speech synthesis—means that the operator can access enterprise data while his or her hands and eyes remain free to perform the task at hand —increasing safety and efficiency.

The Inroad W-T-C is easy to set up, easy to use, small, comfortable, light weight—and rugged enough for the most demanding production or refinery environments. The thin client is worn on a belt or holster and has a wired connection to a headset equipped with a noise canceling mike. A wired remote control allows placement of the thin client anywhere on the worker's body.

The full color, micro-miniature SVGA display sets the Inroad W-T-C completely apart from all other wearables or mobile computing devices currently on the market. Mounted to the headset on a boom similar to the microphone, it floats unobtrusively a few inches in front of the user's eyes. Patented, built-in optical magnifiers make the tiny display appear as large as a bright, high-resolution, 17-inch monitor. This patented design allows the user to focus on the display when needed, or to look past the display when the eyes are required for other tasks.

The mobile worker equipped with the Inroad thin client is as fully connected to enterprise data as his or her deskbound co-worker. It enables real-time dispatching, messaging, work assignment, and asset location. While performing maintenance tasks, an equipped worker can easily access and view company information such as inventories, maintenance histories, schematics, assembly drawings, procedures, and safety guidelines. At the same time, management can locate, communicate with, and dispatch information to the mobile worker.

Maintenance Workflow

Under typical maintenance work flow procedures, technicians depend heavily on "sneaker net," that is, face-to-face hand-offs of information and documentation - often miles away from where the maintenance work is required.

Whether performing scheduled preventive maintenance or responding to an unscheduled malfunction, the maintenance worker typically receives a hardcopy work notification. Collateral documentation such as maintenance manuals, technical drawings, parts lists, safety bulletins, and specifications for parts and materials must also be obtained. After completing the repair, the technician turns in a hard copy report documenting the repair and the condition of the asset.

When responding to unplanned maintenance requests, the worker must make a trip to the job site to evaluate the situation and then return to the central workstation to make a report, get a work order, obtain the necessary documentation and materials, then return to the work site to make the repair. When the task is complete, the worker must return to the central work station to submit a report and close out the work order.

Connecting mobile workers to the enterprise can dramatically streamline maintenance workflow, improve worker safety, and asset utilization. The

Inroad solution makes information available at the time and place it is needed:

- Maintenance orders, along with collateral documentation such as SARA title 3, equipment specifications, MSDS procedures, dismantling procedures, drawings, and equipment history, can be viewed on the heads-up display as needed.
- Information regarding repair time, materials used and status of repair can be made available to the enterprise in real time. This allows management to analyze the true cost of a piece of equipment at any given time.
- Materials can be ordered immediately while at the job site.
- A digital camera and barcode scanner can provide instantaneous asset evaluation and tracking.
- Information from handwritten lists, notes, and reports does not have to be manually keyed in later, saving valuable time and minimizing the risk of transcription errors.
- Enhanced information access at the job site increases worker efficiency, consequently leading to decrease in downtime of equipment. By being able to access complete work history for a particular piece of equipment, the worker is able to perform better repairs, thereby minimizing the need for future repairs of the same equipment.

In the oil and gas industry, information is a critical business asset. Enterprise software provides strong processing power and the ability to
distribute high volumes of graphics and data among deskbound workgroups. Now with the Inroad W-T-C, mobile workers on the front lines of asset management can be connected to these same resources.

Profitable oil and gas production and refinery operations depend on around the clock operations of complex machinery and infrastructure—often in challenging and potentially hazardous
conditions. Effective facilities maintenance is vital to achieving this goal. The Inroad W-T-C can be a valuable asset in helping to improve maintenance workflow processes.

The Inroad solution gives mobile workers the information they need to perform a task as they actually perform the task. It integrates procedures, information, and tools to help users perform their work more safely and efficiently, eliminating interruptions and redundant data entry.

In addition, it allows managers to have immediate access to the latest operations data from
anywhere in the plant enabling them to utilize their personnel and resources most effectively.

The Inroad Wearable Thin Client can provide the capabilities your maintenance organization needs to operate at peak efficiency and potentially to become a “best practices” work force.

Specifications

- Rugged and light weight (24 ounces), splash and spray resistant.
- Headset with integrated display, noise-canceling microphone, and antenna.
- Ergonomic harness designed for worker comfort and safe cable management.
- Industrial environment speech recognition and speech synthesis with application-specific vocabularies for hands-free operation.
- Optically enhanced micro-display emulates 17-inch, high resolution monitor.
- High capability RF LANs allow facility-wide freedom of movement.
- High speed RISC processor with extremely low power consumption.
- Four-hour minimum battery operation.
- Full support of Network computers standard. JAVA compatible.

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