Strong demand for Hewlett-Packard's (HP) personal computers, printers, high-tech health care instruments, and other products has made the company a leader in the computing industry and one of the country's most successful corporations. HP's inkjet manufacturing plant in Corvallis, OR, has played a key role in that growth. The booming demand, however, raised significant challenges for plant infrastructure support, particularly for the 45 facilities technicians at the site.

As the plant expanded rapidly with HP's success, its management team in May 1998 moved to develop a Total Productive Maintenance (TPM) program to handle the additional work and focus on plant asset management. The TPM program would rely on more accurate and timely data to keep the plant running at peak performance and minimize downtime from system and equipment maintenance. But because of the plant's quick growth and increasing age, the TPM program began well behind the curve of a world-class maintenance program.

"Our vision was that improved maintenance practices would measurably contribute to reduced costs and better quality of the finished product," said Thomas J. Woginrich, the plant's maintenance and reliability program manager. "Our goal was to become an organization continually learning about itself, its customers, and its customers' needs."

HP had selected PSDI's, Bedford, MA, MAXIMO computerized maintenance management system (CMMS) to improve operations, but the plant still suffered from work-order backlogs and inefficiencies due to its reliance on paper work orders. To help build the TPM program and confront these productivity issues, Woginrich and Corvallis management turned to SMART for Maintenance, a handheld computing solution developed by Syclo, Barrington, IL. The solution allows technicians to use HP's own Jornada Windows CE-based handheld computers as their electronic clipboards, automating every aspect of data collection and dissemination while providing technicians with real-time information from the CMMS.

The decision to deploy SMART as part of the TPM program came after years of staggering growth at Corvallis. In just six years, the plant expanded from four to 11 buildings, covering 2.1 million sq ft. But the plant's focus was on maintaining manufacturing production throughout the growth, not on cost-competitive maintenance procedures or life-cycle management of plant assets. Corvallis was using its CMMS for project management, which is not its true purpose.

HP realized its paper-based maintenance system was slowing productivity by making inefficient use of its skilled technicians' time. Tradesmen were spending valuable hours handling work orders and data entry. To combat growing work-order backlogs, HP upgraded its CMMS and rebuilt its workflow processes. Then the company deployed the hand-helds and used its support for Ethernet communication to synchronize the connection to the HP network.

Technicians are required to transmit completed work information from the hand-helds twice a day—which immediately updates the CMMS—and then receive any new assignments or changes. With the off-line capability, technicians are able to interact with the CMMS untethered, delivering mobile access for complete automation of maintenance processes.

Rapid deployment of the hand-helds and their easy-to-use technology helped the plant meet its TPM goals, realizing swift productivity gains by giving its technicians more wrench time. Tradesmen benefited from immediate access to critical data to handle both critical-response tasks and preventive maintenance. After implementation, each of the plant's 45 technicians is saving an average of 43 min per day—the equivalent of adding five technicians per day. Those savings have led to the elimination of mounting work-order backlogs.

HP has been able to eliminate the inevitable errors that accompany paper-based work order systems, allowing the company to keep more accurate records on its parts and inventories. With the success of the TPM initiative, asset life reliability at the plant increased by 47 percent, while costs associated with operations and maintenance of the plant infrastructure dropped by 25 percent. In addition, support staff that once handled paper work orders were reassigned to more productive administrative functions.

Woginrich noted that the flexible, collaborative approach to providing HP with a strong maintenance management solution was crucial to the success of its new TPM program.

"Syclo was focused on developing the right solution for our situation," Woginrich said. "With its help, we have fulfilled our commitment to becoming agile and mobile in proactively meeting the challenges of our ever-changing business environment." **MT**

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