



# Case Study

## Enabling Connected Workers at Texmark Chemicals' Refinery of the Future (RotF)



### CHALLENGES

**130**  
chemical pumps

**35k**  
person-hours  
spent per year  
monitoring plant

**>\$1M**  
inspection  
program costs

CBT integrates an innovative Connected Worker solution to deliver greater efficiency, productivity & safety for Texmark's chemical plant workers.

### Background

Changing demand patterns, complex initiatives, an aging & retiring workforce, & exponentially increasing data volumes are just a few of the challenges facing the highly competitive oil & gas industry. In order to overcome these complicated issues, companies like **Texmark Chemicals** (a petrochemical manufacturer in Galena Park, Texas) are **turning to advanced Industrial Internet of Things (IIoT) technologies to modernize their business.**

In tandem with a robust team of industry-leading partners (including Hewlett Packard Enterprise, Aruba, PTC, Intel & more), **CBT built Texmark a Refinery of the Future**, featuring advanced IIoT capabilities. One of the five core solutions included in the Refinery of the Future project is CBT's **Connected Worker, delivering superior worker efficiency, productivity & safety.**





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*Texmark makes chemicals for the world. For nearly 50 years, we have been the benchmark of quality in our industry.*

DAVID SMITH  
FOUNDER, TEXMARK

## Problem

Texmark is a crucial link in the petroleum product supply chain, & **because it works with flammable, highly regulated materials, safety is paramount.** Texmark's chemical plant workers are tasked with conducting their duties in & around volatile environments, requiring them to be near process machinery handling high pressure, high temperature, toxic fluids/gases scattered across acres of landscape. **Texmark must ensure that its facility is managed in ways that put worker & community safety first.** However, due to the exceptionally competitive nature of their industry, **Texmark must simultaneously drive plant efficiency & productivity.**

**Historically, Texmark has depended on physical inspections of process equipment** to ensure all systems remain in working order. In most cases, the plant operator will need information about the equipment's performance at that specific moment, information about workflow conditions leading to/from an asset, data about that equipment's last maintenance service, or historical trends that might provide insight into its present condition. To access that data, the **plant worker must call the Control Center & request a verbal read out of performance characteristics on the equipment being inspected.** Thus, these **plant walk-throughs can be time-consuming & labor-intensive,** meaning workers can only reach a certain number of pumps per day. They're **forced to visit all pumps in a routine order** (for example, pumps 1-10 on Mondays & 11-20 on Tuesdays, etc.) **rather than utilizing real-time data to focus on the pumps that require critical attention & maintenance.** Plant workers **also have to juggle communications gear while manually adjusting equipment settings,** further slowing the process.

Depending solely on **physical inspections also carries risk, because it relies on employees who** – based on years of experience – **can tell if a pump is starting to malfunction by recognizing slight variations in its noise & vibrations.** But what happens if an employee with that skill is out sick, or reaches retirement age? **Texmark needed ways to institutionalize that type of knowledge & find ways to streamline these highly-manual processes.**





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*This innovative IIoT technology will help us become safer, more competitive, and better at everything we do.*

DOUG SMITH  
CEO, TEXMARK



*CBT has a fantastic team. Everybody I work with at CBT is a great listener. They're good at gathering intel and learning about what our challenges are, what our pain points are, and really what the solution is that we're trying to drive towards.*

LINDA SALINAS  
VP OPERATIONS, TEXMARK

## Solution

Texmark's vision for next-generation worker safety, productivity & efficiency hinged on the emerging promise of IIoT: sensed data collection combined with advanced analytics software and connected devices. **CBT integrated an innovative Connected Worker Solution into Texmark's Refinery of the Future to help generate insights, automate the worker's environment, & reduce the risk of human error.**

**Step one** was establishing the digital foundation by **enabling edge-to-core connectivity**. CBT & Aruba engineers deployed a secure wireless mesh network with Class 1 Div 1 access points & ClearPass for secure network access control. The wireless solution cost about half of what it would have cost to deploy a hardwired network.

**Step two** was utilizing that full-campus connectivity, combined with advanced data capture from distributed IoT sensors, & **integrating advanced wireless devices & software to enable instant access to critical, real-time plant information**. These devices completely overhaul the aforementioned maintenance procedures, **making inspections & correctional adjustments much faster, easier & safer**.

**Handheld Devices:** Handheld **tablets with custom, menu-driven software** provide the Chemical Plant Workers with the **ability to view live data on all connected assets**.

- **Sensed data** streaming from plant assets **in real-time** (e.g. temperature, pressure, fluid levels, vibration readings, etc.)
- **Operational data** as reported on the Digital Control System in the Control Center
- **Historical data** such as schematics, diagrams, inspection/maintenance reports, analyses, etc.
- Additional software adds **capabilities such as augmented reality (AR)** asset displays, 3D modeling, digital measurements, risk analysis, predictive maintenance & more

**Hands-Free Devices:** Voice controlled, **hands-free wearable** android compute integrated in the workers' safety helmets enables them to interact with people & machinery in a more productive manner

- Unintrusive, eye-level display shows **key performance data dashboards** for assets





technology with a human touch

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*When we committed to investing \$4B in the Intelligent Edge, we had confidence because of partners like CBT, who have the talent to help achieve our vision of what's next.*

ANTONIO NERI  
CEO, HPE

- Microphone enables verbal commands to the SW applications in use & **connects worker with the Control Center/other remote experts** hands-free
- Native **noise-cancellation** ensures wind, machinery & other background noises are not a distraction. The device's voice command capabilities are also unaffected by loud environments.
- Camera enables asset identification via a UPC code, **voice-enabled picture/video capture** and **bi-directional video sharing with remote experts**
- Conferencing technologies (Zoom, WebEx, Microsoft Teams, etc.) augment the remote expert capabilities by enabling **one-to-many audio/visual conversations as well as one-to-one**

## RESULTS

75%

reduction in time to assess asset process condition

90%

decrease in time necessary to file compliance evidence

## Results

Utilizing the Connected Worker Solution, Texmark's workers are radically more efficient. **Workers now have instant access to, & an optional hands-free visual representation of, all relevant information** tied to any connected plant asset. They can approach an asset (ie. a mechanical system such as a vacuum pump) & use QR code recognition to **identify the asset's related documentation, view real-time & historical information** about the performance of the asset in question, **verbally collaborate with the Control Center or remote experts hands-free**, & (if necessary) manually adjust controls on the asset (e.g., valve wheels, pressure devices, variable switches, etc.). All this while **viewing live changes** to associated key performance attributes of the asset **on their AR screen**.

**Connected Worker also improves Texmark's worker safety** by enabling full use of both hands at all times (especially important when climbing or lifting). Resulting improved efficiencies **reduce a worker's time in the hazardous plant environment**.

After implementing CBT's Connected Worker, Texmark saw a **75% decrease in the time it takes their staff to assess asset process condition**. Additionally, they saw a **90% reduction in time taken to file compliance information** such as picture documentation of completed procedures.

