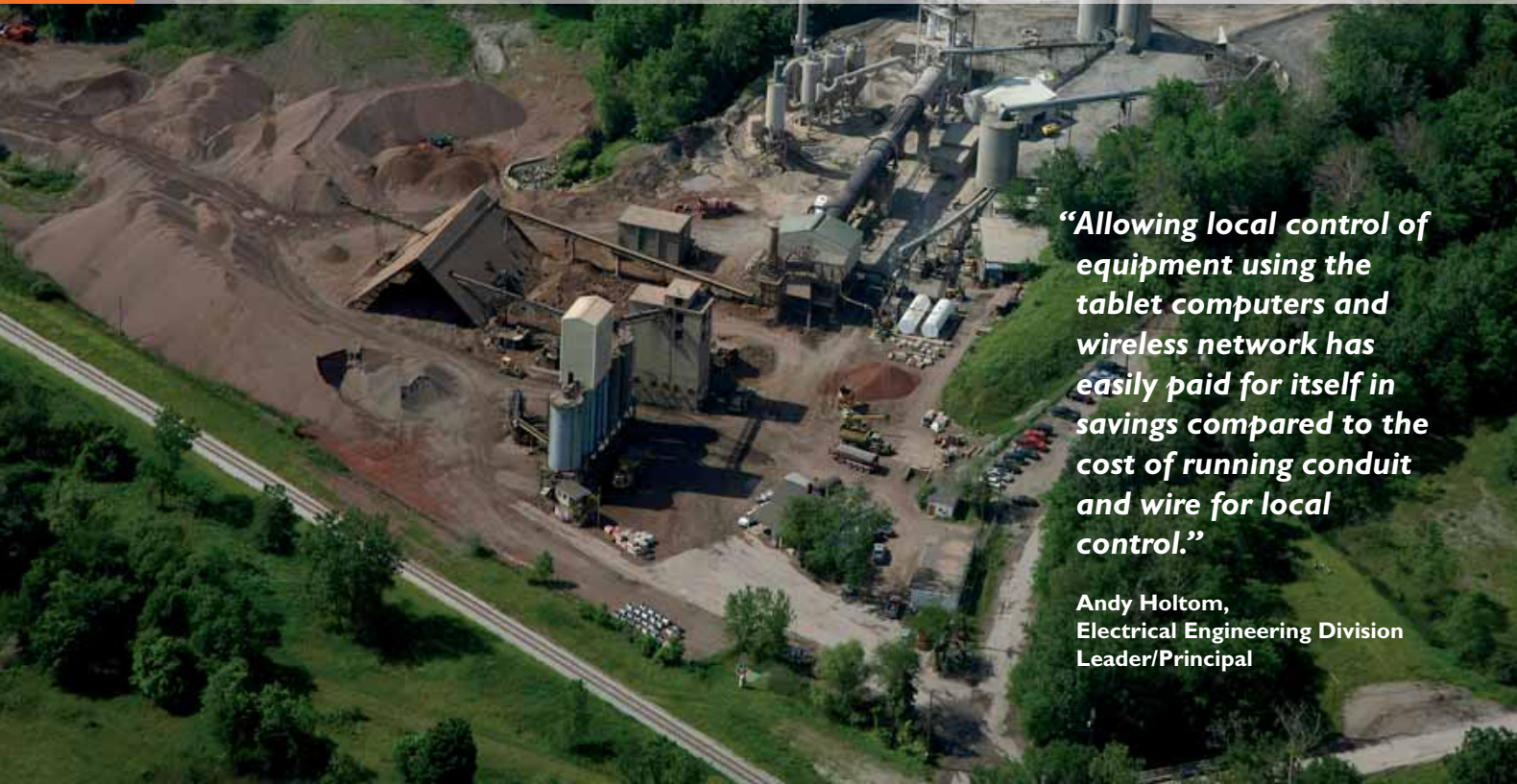


Industry: Construction, General Process Manufacturing, Mining

DiGeronimo Aggregates

www.digeronimoaggregates.com



“Allowing local control of equipment using the tablet computers and wireless network has easily paid for itself in savings compared to the cost of running conduit and wire for local control.”

**Andy Holtom,
Electrical Engineering Division
Leader/Principal**

Wonderware Software Brings Aggregate Plant Up to Date and Enhances Operations

by Wonderware

Goals:

- Transition fuel system from oil/gas to coal;
- Comply with EPA regulations and reporting guidelines;
- Improve product quality and consistency;
- Expand plant and ensure future scalability.

Challenges:

- Facility built in the 1800s, operating with outdated electrical systems and equipment;
- Plant is spread out over 65 acres;
- Huge power requirements to operate kiln;
- End-product uniformity dependent on consistent kiln temperature.

Wonderware Solution:

- ActiveFactory software;
- InTouch HMI;
- Wonderware Industrial Computers (InTouch HMI embedded);
- Wonderware System Platform.

Results:

- Energy and time savings through Wonderware-enabled proactive maintenance of kiln and other equipment;
- Ability to plan and schedule maintenance brings cost savings of \$5,000 each time a pre-heat/re-heat of the kiln is avoided, resulting in total savings of over \$100,000;
- Remote monitoring added for improved visibility and management of overall operation;
- Operators more efficient due to at-a-glance ability to assess plant conditions;
- Scalability and standardization ensure quick and easy equipment additions and expansion.

Independence, Ohio – Just a couple of years ago, a time traveler from the 1800s visiting the DiGeronimo Aggregates plant would have been in familiar surroundings. The operation was burning gas and oil and operating as it had for the last 150 years – crushing raw shale and bringing it to the kiln where it is heated, then cooled, ground and graded. The process yields a versatile end product that is used for high-performance, lightweight structural concrete and masonry, professional turf, horticultural applications and geotechnical fills.

But the plant's new owners had a more modern vision and aspirations to improve productivity and product quality while planning for future expansion. They set about transitioning the facility to coal fuel, upgrading the electrical system and other equipment to better meet EPA regulatory requirements, and improving the overall efficiency of the enterprise.



Figure 1: DiGeronimo Aggregates HMI screen.

Managing a Multifaceted Project

The management team at DiGeronimo Aggregates wanted to implement the new system in the most cost-effective and timely manner, so they decided to supervise the project internally, enlisting a number of key partners to assist. Wonderware Cincinnati, the regional Wonderware distributor working closely with the management team recommended Hull & Associates, Inc. a Wonderware ArchestrA-certified system integrator with experience in electrical engineering and control systems automation.

DiGeronimo agreed with the selection of Hull & Associates, Inc. because they could provide standardization through the Wonderware software solution that would enable coordination of the many suppliers, which was vital to the teamwork and ultimate success of the complex implementation.

Besides the economic advantages of switching from oil to coal, the initial analysis uncovered an opportunity to design and deploy a centralized manufacturing automation solution incorporating programmable logic controllers (PLCs), supervisory control and data acquisition (SCADA) capabilities, and a human machine interface (HMI). The resulting system was projected to decrease energy use and deliver operational cost savings as well as a higher quality, more consistent product.

Challenges for Operators and Management

Because of the age of the plant and its 65-acre size, operators faced a number of impediments. Their primary means of monitoring the kiln was visual; if the size of the flame seemed steady, the temperature should be in an acceptable range.

More accurate, real-time data was not available and conduit running between the numerous stations was used for wired communications. Operators had to travel to remote stations to determine whether they were functioning properly and to record and report data.

Additionally, the plant management office was across town, so executives did not have the ready access to current performance data that they needed for informed decision making.

The Kiln is the Key Component

The centerpiece of DiGeronimo Aggregates is the kiln, which heats the crushed shale, altering its cellular structure to form a material which is light, yet extremely strong and durable.

To produce consistent product batch after batch, the kiln temperature must remain as stable as possible at around 2,200 degrees Fahrenheit.

Saving Energy Means Saving Money

Energy consumption is a major concern for the plant because the kiln operates 24/7 to produce up to 700 tons of product each day. Maintenance is critical, because unplanned shutdowns are extremely costly. Returning the equipment to its very high operating temperature requires a large amount of fuel and takes time, lowering productivity.

Conversely, the ability to plan kiln maintenance can save energy and money while maximizing output. Now, with Wonderware software, sensors in the kiln alert operators to changes that might indicate the need for a future repair. And the system enables management to schedule required maintenance.

Eric Dombrowski, Vice President for DiGeronimo Aggregates, puts it into perspective, *“It costs about \$5,000 for each pre-heat or re-heat of the kiln. Since going online with Wonderware, we’ve been able to plan for maintenance, rather than having forced shutdowns, which has helped out tremendously.”*

Consistency is Crucial for Quality

Because different fuel sources burn at different temperatures – and because temperature has a significant affect on the quality of DiGeronimo’s product – the switch to coal had to be made carefully. The Wonderware solution gave management and operators the ability to set benchmarks and make needed adjustments during the transition so the new system was running consistently in a short time. PLCs provide feedback that helps prolong the life of equipment by monitoring corrosion, which can be caused by temperature fluctuations.

Complying with Strict EPA Requirements

DiGeronimo Aggregates is subject to stringent Environmental Protection Agency (EPA) Title V regulations. The plant is required to report daily, monthly, peak and low average measurements for dust emissions, lime injection statistics and coal-feed rates.

In the past, these records were kept manually, and it was time-consuming and slow to compile the EPA-required reports. But with the addition of Wonderware Historian software, collected data is now downloaded, processed and charted for submission quickly and easily.

For out-of-compliance events, the Wonderware solution shows on-screen alarms, plus it enables operators to generate reports to show how quickly corrective actions were implemented and operations returned to compliance.

Improved Efficiency Through Remote Monitoring and Real-time Data

Another benefit of the Wonderware solution is that its central control station has improved operator productivity. In the past, operators had to travel around the large DiGeronimo campus to inspect each motor station. Now, with the central station and remote monitoring capability, operators have real-time information on which stations need attention, and they can make most corrections without having to visit the actual equipment.

Additionally, Wonderware Industrial Computers (InTouch HMI embedded) and a wireless network have been deployed, so when an operator is required to go to the site of a motor, bearing or temperature element, the operator can view the Wonderware screens on the tablet and make adjustments immediately in the field.

Operator communications abilities have also improved with new docking stations in each electrical room and radios. Cameras display critical equipment and conveyor belts to provide visual verification of operations. All of these capabilities help DiGeronimo remain as productive as possible and head off problems before they happen.

The Wonderware solution’s remote access has also helped Hull & Associates, Inc. serve DiGeronimo better when it comes to remote configuration, continued development and maintenance. Even though the integrator is over 100 miles from the plant, changes can be made over VPN immediately.

Ease of Use and Standardization

With the Wonderware solution, all of these capabilities have come together to form a standardized system that has been well-received by DiGeronimo's operators and managers.

Dombrowski says, *"We were able to identify critical values and ask Hull & Associates, Inc. to customize our screens very quickly."* New equipment can be added simply and easily and operators are already familiar with the corresponding on-screen objects and commands. They can see the entire plant in one glance and make immediate judgments, rather than having to generate and then interpret spreadsheets.

A Modernized System with Scalability for the Future

So if that same time traveler visited DiGeronimo Aggregates today, they would be impressed with the operation's 21st Century capabilities. Operators could explain how much more efficient they are, since they can view the entire plant on screen and

do much of their jobs from the central station. They could report on their increased ability to proactively repair equipment and avoid unexpected and costly shutdowns. And management could talk about how better real-time and historical reporting is enabling them to make better decisions for the profitability of the enterprise.

Just as importantly, Wonderware software has provided DiGeronimo Aggregates the flexibility to meet the needs of the current transition as well as to plan for expansion. Hull & Associates, Inc. installed a limited number of servers during the initial development and deployment. In the future, they will be able to help DiGeronimo scale up by adding servers and more licenses, but without the need to invest in a lot of additional development time and hardware.

Some might even say that – with help from Wonderware – DiGeronimo Aggregates is taking advantage of the best of both worlds: 150 years of heritage and experience along with the most advanced manufacturing operations management systems of today.

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Wonderware Cincinnati.*