CONTROL

Take control of
condition information

Why centralized machinery health management isn't just for the biggest companies.

by Michael Harmata

AS budgets tighten and experienced personnel get harder to find, organizations worldwide are seeking novel ways to optimize machinery health management. At Hexion (www.hexion.com), we're no different. Because we operate sites around the globe, often in remote locations, we've quickly become accustomed to increasing effectiveness with existing resources.

Hexion is a global leader in thermoset resins. From our Columbus, Ohio, headquarters, we manage more than 50 industrial facilities worldwide. Providing our customers with the best high-performance phenolic, epoxy and unsaturated polyester resin technologies is our core business, and we're always looking for safe, reliable ways to improve our production process.

When looking for ways to improve machinery health management, it frequently helps to look at the newest technologies and how the biggest industrial companies implement centralized monitoring and, in the case of the largest companies, integrated operations (iOps) centers.

Using these technologies, organizations can centralize resources, ensuring that even their farthest-flung facilities are no more than a satellite link away from 24/7 machinery health management, expert data analysis and clear organizational directives in problem situations.

Of course, the largest firms have access to the largest budgets. So for most of us, these types of technologies seem out of reach. But what if I told you that smaller organizations can manage similar centralized machinery health control on smaller scales with smaller budgets, and achieve many of the same results? This is exactly what we've built at Hexion, and it's dramatically changed the way we operate.

Run-to-failure fails

Years ago at Hexion, we decided the way we collect and use data needed to change. We operated at times with a run-to-failure mentality. With sites worldwide, many in remote and difficult-to-access locations, staffing all our plants with

onsite reliability experts was challenging. As a result, we had unexpected equipment failures that could leave a plant down and losing revenue for extended periods until machines were repaired or spares were delivered.

There were problems associated with operating this way. First, unexpected shutdowns had a terrible impact on our inventory management; we'd have to allocate resources to repair broken equipment, and also redirect inventory so outages wouldn't impact delivery requirements. Second, unexpected failures can be critical, requiring more downtime and far more expense for repairs. More importantly, critical failures increase exposure to safety-related incidents. In addition, not knowing when a failure was coming meant not knowing we needed parts. If necessary parts were slow to ship or on backorder, outages could be extended significantly.

In 2010, individual sites began allocating resources from their maintenance budgets to deploy route-based, condition-monitoring, data-collection processes. Meanwhile, another Hexion staffer created a downtime analysis, and determined that failures in our plants' process blowers were causing a lot of downtime (Figure 1). Using this data, coupled with grassroots, route-based data collection already going on at many sites, the machinery health team secured management's agreement to implement a comprehensive machinery health monitoring plan.

Single system needs consistent data

When we began to plan our organization-wide machinery health monitoring plan, we learned that our grassroots data collection initiative created some problems of its own. Many sites were collecting valuable vibration data, but needed

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expert assistance to properly analyze that data. Many sites worked with contractors for collection and analysis, with varying levels of quality in results. Also, using many different contractors worldwide meant inconsistency in information types, collection of historical data, information backups and report formats. This made it hard to consolidate data and practices organization-wide.

In 2013, Hexion began implementing our comprehensive monitoring plan with a key first step—taking back our data. We developed a multi-phase rollout that, by the end of 2017, plans to standardize and consolidate contractors, data collection, analysis and reporting practices for machinery health management—all from our headquarters.

THERE SHE BLOWS
Figure 1: Condition-based planned maintenance on critical process blowers results in better repairs and avoids the costs of reallocating product, and prevents thousands of dollars in added damage that can result from running to failure.

Focusing on five to eight plants per year, Hexion standardized machinery health data collection. We started with equipment, rolling out Emerson CSI 9420 wireless vibration transmitters on critical equipment at all sites, which lets us perform hourly monitoring of that equipment, and provides extra data at any time without needing a consultant to visit the site. We also surveyed each site, and built route-based vibration databases to allow monthly walk-around vibration data collection. In addition, we provided Emerson CSI 2140 portable machinery health analyzers to some sites that were interested in performing data collection in-house. Other sites used local contracting with compatible hardware to collect their data. This approach allowed reliable, standardized, route-based data collection.

Ensuring that all sites use equivalent equipment means all data is collected in the same format. We now have one Emerson local business partner that provides all new equipment organization-wide. It's configured and labeled the same by our contractor. When equipment arrives onsite, all devices are ready to go, and are exactly the same as the equipment everywhere else, regardless of country or continent.

Either I or our vibration data analyst visits every site as it's set up to ensure each system is built using the same industry-standard best practices. There's only one way to upload and download routes, and written procedures walk users through the steps. Whether it's a Hexion employee or a contractor collecting data, standardization is required and enforced.

Collected data is uploaded onsite, and delivered via wide-area network (WAN) to Emerson AMS Machinery Health Manager software at our headquarters. The key criterion for selecting Machinery Health Manager was its ability to integrate different technologies, giving us the flexibility to collect data from any future sources.

After upload, data is immediately available for analysis

We never have to worry that the contractor who holds our critical data is "closed for the weekend." Machine faults don't limit themselves to business hours, and now, neither do we.

by our vibration specialist, who has 24/7 access to all the worldwide data sets he needs at his office in Florida. After performing analyses, he issues standardized reports, and delivers standardized SAP notifications for work required, ensuring employees worldwide always see documentation in a familiar format.

Saves more than money

Moving to centralized machinery health management has provided significant benefits. The most obvious is the way we handle issues with our blowers. Repairing a catastrophic failure on a blower can easily cost $70,000-$80,000, but fixing a similar problem with planned maintenance can save $30,000-$75,000 on one repair.

For example, we have identical blowers in four plants across North America. For these blowers, we maintain one spare because we can see a problem coming, ship the spare to the location, briefly bring the plant down (on our schedule), and swap out the bad one. We send the problem blower for repairs, which are less costly because the device didn't run to failure, and update our CMMS with the new serial numbers, making the repaired device the hot spare. This process reduced our downtime, but it wouldn't have been possible without the robust machinery health analysis we have as a result of our centralized maintenance model. In the past, the spare blower would likely not have been on its way to a facility until after a failure occurred.

Before implementing our system, when a device would crash, we would have low inventory and would have to transfer product from around the region to meet customer commitments (at high freight costs), while simultaneously

trying to complete a repair as quickly as possible (and likely not getting as good a repair as we could if we'd had more time), all the while racking up costs and pressure. Now that we can anticipate necessary repairs, we can practice reasonable inventory maintenance to ensure outages don't impact delivery.

In addition, having our data in one place means guaranteed, 24/7 access for anyone who needs it, which is critical for a business that runs 24/7. We never have to worry that the contractor who holds our critical data is "closed for the weekend." Machine faults don't limit themselves to business hours, and now, neither do we.

Our new method of machinery health management has dramatically changed the way we do business. We're accomplishing things we didn't think were economically feasible without a way to consolidate our data for use. All these benefits will only grow as we expand our capabilities in the future. When we build a new plant, Emerson helps us carefully consider where we place our wireless gateways to allow for the most coverage, so that in the future we can begin to add temperature, flow and acoustic monitoring, as well as devices for monitoring seals on pumps and steam traps for energy conservation.

Centralizing and taking ownership of our data has provided benefits that can be seen in every plant. We run leaner, more efficiently and more reliably, with the confidence that we can access any data we need wherever and whenever the need arises. ∞

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