

STERLING STEEL INCREASES EQUIPMENT AVAILABILITY AND THROUGHPUT WITH IVARA EXP RELIABILITY SOFTWARE

Sterling Steel produces 450,000 tons of wire rod for its parent company, Leggett & Platt. The long products mini mill utilizes a 415 ton Electric Arc Furnace; two Ladle Metallurgy Facilities; an eight strand Billet Caster and a single strand Rod Mill to produce the wire rod for Leggett & Platt's Wire Mills.

The Situation

Sterling Steel is a leading manufacturer of wire rod that is committed to offering the highest quality product. To strengthen its competitive position, the company is focused on containing costs while increasing output at its plant in Sterling, Illinois.

Corporate profitability and employee compensation is based on the amount of quality tonnage produced, with increased throughput representing increased profits for all. As a result, the condition, availability and reliability of its assets have a direct impact on Sterling's bottom line. Equipment failures represent a lost financial opportunity.

The company recognized that improved asset reliability was critical to its long-term success. In order to achieve its goal of increased throughput, Sterling required a solution to optimize asset reliability, through improved maintenance effectiveness.



Figure 1: Arc Furnace in action

The Challenge

Sterling operates in a very lean production environment with limited maintenance resources. As a result, the maintenance team was focused on work execution, rather than the proactive monitoring of asset health. While the company had established a solid enterprise asset management foundation of

planning, scheduling and executing maintenance work, unscheduled downtime persisted. Sterling recognized that in order to reduce downtime they needed a solution to support a proactive approach to maintenance.

While Sterling leveraged some predictive maintenance technologies, the company was not fully maximizing the effectiveness of these tools. Predictive data resided in separate systems and there were limited resources available to conduct the time-intensive task of collecting, consolidating, analyzing and acting on the volumes of condition data resulting from their PdM technologies. The company required a solution to consolidate this data and systematically monitor equipment performance and conditions.

In addition, Sterling had not formally developed technically based maintenance programs for their critical assets. Much of the maintenance work conducted was not value-added and did not mitigate the consequences of failures. Sterling required a work identification methodology that would allow them to create technically sound maintenance programs quickly and effectively.

Sterling also recognized that they would need more than just a quick technology fix to improve asset reliability. They would require a complete solution to implement and sustain a disciplined business approach to maintenance.

The Solution

To achieve its goal of increased throughput and improved maintenance efficiencies Sterling Steel selected the Ivara EXP Reliability software solution.

The solution replaces traditional reactive maintenance work with technically-based proactive equipment maintenance programs. By implementing Ivara EXP enterprise software, Sterling was able to bring together a wide range of equipment condition data including maintenance inspections, operator

rounds and online information. Sterling now has a complete picture of their equipment health and performance - online in real time.

The initiative began with the development of a business case to establish the justification and opportunities that existed through reliability improvements. The business case revealed that significant financial and productivity gains could be achieved by implementing the Ivara solution. Once the business case was accepted by management, Sterling worked with Ivara to define the scope of the reliability project. During this project definition phase, the resource requirements, implementation plan, and measurables of the reliability initiative were established, providing Sterling with a clear and detailed project roadmap.

A key activity of the project definition phase is to identify and secure the Core Team – a cross functional group which act as the internal change agents for the reliability initiative. The core team includes participants from maintenance and operations that gather information from equipment experts to develop maintenance programs.

With the project plan and core team in place, knowledge transfer activities began with Ivara consultants working with management, maintenance and operations to gain consensus on the detailed process tasks, roles, responsibilities and training plans required to execute and support the asset reliability process. In addition, both leading and lagging metrics were established to help keep productivity and performance on target.

Knowledge transfer activities also involved prioritizing assets, assessing the risk and criticality of each, to identify those that would be targeted in the reliability improvement initiative. It was determined that the first implementation would take place on the crane, a critical asset that was recognized as a bottleneck in production. As a high tonnage overhead crane, performance failures could not only result in production losses but more importantly pose significant safety consequences.

Implementing Ivara EXP reliability software, Sterling now had an efficient way to collect, store, display, analyze and manage all maintenance program and asset health information. Ivara EXP software serves as the “control panel” for maintenance and operations to manage the performance of Sterling Steel’s equipment online in real time, not just

analyzing equipment failure, but avoiding it. As inspection data is collected on electronic handheld devices, EXP identifies potential failures and recommends the right maintenance task to be executed at the right time in Sterling’s enterprise asset management system.

Using Ivara Maintenance Task Analysis, (MTA) the team quickly developed asset management programs. MTA leverages historical and readily available knowledge about the reliability and performance of equipment. EXP served as the repository for this equipment and maintenance knowledge – critical at a time where an aging workforce left Sterling exposed to knowledge loss.



Figure 2: Sterling Steel Core Team

Using MTA, the core team worked with at the sustaining team to define the maintenance program of the first targeted asset – the crane. The sustaining team is comprised of equipment experts that are the most knowledgeable maintainers and operators of the asset at hand. Together the core and sustaining teams identified all potential crane failure modes by reviewing existing PM activities, the asset’s work history and their own knowledge of the crane. Once the failure modes were identified, each one was examined to determine the appropriate action necessary to mitigate the consequence of the failure. The resulting tasks were organized into a complete maintenance program and captured in Ivara EXP.

With core team coaching, the sustaining team was then responsible for the execution of the newly developed maintenance program for the crane. This included conducting the inspections, utilizing the

asset health dashboard—acknowledging alarms and identifying the right work to be executed via the CMMS. Once the sustaining team was able to execute the new reliability program independent of the core team, the core team began the implementation on the next highest impact system identified in the asset prioritization exercise.

While the implementation continues, to-date Sterling Steel has developed asset reliability programs for several critical assets including the crane, the arc furnace, and bar mill.

The Results

With the Ivara EXP Reliability software solution, Sterling Steel has achieved a significant increase in throughput, through the reduction in un-scheduled equipment downtime. Downtime at the company's rod mill was reduced by 88% and throughput at its meltshop increased by 30%. The company has adopted a reliability-driven maintenance strategy that goes beyond planning, scheduling and executing reactive maintenance work. Sterling is now focused on managing asset health to support business goals.

Additional benefits include the following:

- Downtime on the crane is virtually eliminated, from several times per month to only minutes of downtime per month. This is a significant benefit since performance failures on this asset would disable operations and pose safety risks. The overall reduction in un-scheduled downtime was 66%.
- Downtime of the arc furnace, reduced from an average of 5% - 7% per month to 1.5% per month in only the first 6 months of applying the Ivara EXP Reliability software solution. This has had a positive impact on Sterling Steel's production, while significantly reducing the cost associated with maintaining this asset.
- Savings in excess of \$100,000 per year due to improvements in the cost of maintaining belts and bearings of a major system. This is a result of a re-design driven by the MTA program facilitated by Ivara.
- The Ivara WorkSmart implementation methodology addressed Sterling's resource constraints by focusing on improving reliability one system at a time to quickly raise the plant's

effectiveness rather than blanketing all of the assets at once.

- With Ivara EXP, the collection, storage, display and analysis of asset condition data is now consolidated and automated. This not only helps Sterling to better leverage its predictive technology data, it also ensures a sustainable proactive maintenance approach.
- Since MTA leverages existing asset performance information, Sterling was able to quickly and effectively create technically based maintenance programs for its critical assets utilizing asset data already available.
- Both maintenance and operations have a greater understanding of how their assets function, how they fail and what actions are required to ensure asset reliability due to the collaborative nature of MTA.

Conclusion

With compensation directly linked to throughput levels, the Ivara EXP Reliability software solution is a critical part of Sterling Steel's long-term business strategy. Maintenance is now an active contributor to Sterling's corporate goals through its focus on reliability. The asset 'repair' culture has been replaced with an asset 'care' philosophy driven and sustained by the Ivara solution.

As the implementation moves forward, Sterling Steel continues to realize the financial and operational benefits from improved asset reliability.