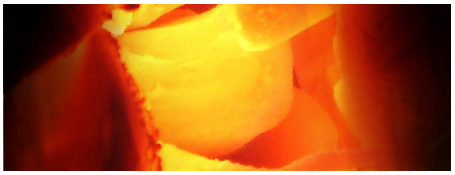

STATISTICA reduces emissions spikes at steel producer's major coking facility; pays for itself in six months

KEY POINTS

Business
World-class international steel producer

Overview
- Serves needs of various industries
- Its operations include one of the USA's largest coke facilities
- Seeks to manage production costs and fines, and to reduce emissions of particulates

Challenges
Coking oven batteries share emissions stacks, so in addition to predicting potential spikes based on opacity sensor readings of particulates, the StatSoft solution would also need to trace back to specific ovens.

StatSoft *STATISTICA* Solution
- *Enterprise Server™*
- *Base with Quality Control*
- *Extract, Transform, & Load (ETL)*
- *Monitoring & Alerting Server (MAS)*

Results
- Quantification of process-to-parameter relationships reduced guesswork
- Automated data extraction improved predictive monitoring
- *STATISTICA* paid for itself in six months through cost savings

"What stands out about STATISTICA is the ability to actively model processes and set up alarms, working with batch and continuous process data. So ETL has been really helpful; using MSPC (Multivariate Statistical Process Control); [and] getting into MAS...The software paid for itself within six months."

— Area Manager
International Steel Producer

BACKGROUND

Our customer (the Company) is a U.S.-based, integrated steel producer with major production operations in the United States, Canada, and Central Europe and an annual raw steelmaking capability exceeding 25 million net tons. The Company manufactures a wide range of steel sheet and tubular products for the automotive, appliance, container, industrial machinery, construction, and oil and gas industries.

The specific manufacturing facility (the Plant) targeted by this project operates multiple coke oven batteries that produce several million tons of coke per year. The Plant ranks among the USA's largest coke facilities, serving commercial customers as well as the Company's own steelmaking facilities.

MISSION

This project's goal was to optimize the Plant's monitoring and reporting in order to manage costs and reduce emissions of particulates into the atmosphere during coking operations.

CHALLENGE

Typically, coking emissions are measured at the stacks with opacity sensors. Cracking in the oven walls of any individual coking chamber, for example, could cause significant particulate emissions, resulting in ppm violations detectable at the sensor. StatSoft's challenge was to detect signature patterns of developing cracks before these cracks would cause emissions spikes. However, because each sensor's continuous stream of data would reflect numerous ovens in multiple oven batteries, the critical analytic task was to trace these patterns back to specific ovens. Armed with this predictive analysis, Company engineers could then preemptively apply oven repairs, thus reducing maintenance expenses, downtime losses, government fines, and the number of harmful emissions spikes.

HOW *STATISTICA* HELPED

In general, the complexity of modern, data-rich, continuous processes requires advanced data mining and predictive pattern detection tools to avoid costly downtime or spikes in harmful emissions. A successful predictive program that can identify maintenance requirements before they impact process quality, yield, or emissions will improve the robustness of the process and can significantly contribute to the bottom line.

StatSoft's statisticians performed iterative analyses of data provided by the Plant's subject matter experts. Based on their guidance and advice, the first set of analyses identified:

1. Useful relationships between key process parameters and opacity measurements and violations (for both stack and opacity) related to push-and-travel operations.

2. Specific analytic workflows that enable more efficient trending of key performance parameters by oven and across time.
3. Trends (across ovens) for coke mass temperatures.
4. Methods for analyzing and monitoring opacity (observations and violations) related to push-and-travel operations.
5. Methods for implementing advanced, model-based process monitoring techniques that automatically identify and classify patterns of elevated opacity during leveling and coking and that identify specific root causes associated with those patterns.

After this initial report and review, StatSoft performed additional analyses and recommended key modifications or control limits designed to reduce opacity observed at the stack and during push-and-travel observations.

Further *STATISTICA* analyses of independently collected data sets identified relationships between coal quality, coke temperature, and coke quality parameters.

Based on their exploratory findings, StatSoft's configuration engineers determined what analytical process should be used to best monitor the Plant's manufacturing process and proceeded to implement a data collection system to extract relevant data. They automated data extraction at defined intervals, applying the data model to alert Company employees when key characteristics were (1) no longer within required specifications, or (2) predicted to go out of spec. The *STATISTICA* solution enabled Company employees to perform additional user-defined analytics on the same data—and, optionally, other data sources—for quality assurance purposes.

RESULTS

STATISTICA helped the Plant determine the specific relationship between coal moisture and loss of degrees in the final product temperature. With this newly defined pattern, the Plant's personnel can now adjust for final temperature with precision rather than educated guesswork. This procedural change alone produced cost savings that allowed *STATISTICA* to pay for itself within six months of implementation.