

Q3-INTELLIGENCE
SUCCESS STORY
NUCOR STEEL
TUSCALOOSA

NUCOR

DANIELI AUTOMATION





THE CUSTOMER

Built in 1985, Nucor Steel Tuscaloosa, Inc. (NSTI) was the first U.S. steel mill to employ Steckel mill technology to produce high quality wide coil and plate products. NSTI produces over 1.2 million tons per year of carbon and high-

strength low-alloys steels, as hot rolled coil and cut-to-length plate for structural and pressure vessel applications. The company is committed to total quality and continuous improvement. As a leader in the carbon coil and plate markets Nucor

continues to invest in equipment, training, and technology to ensure that its products are of the highest quality.

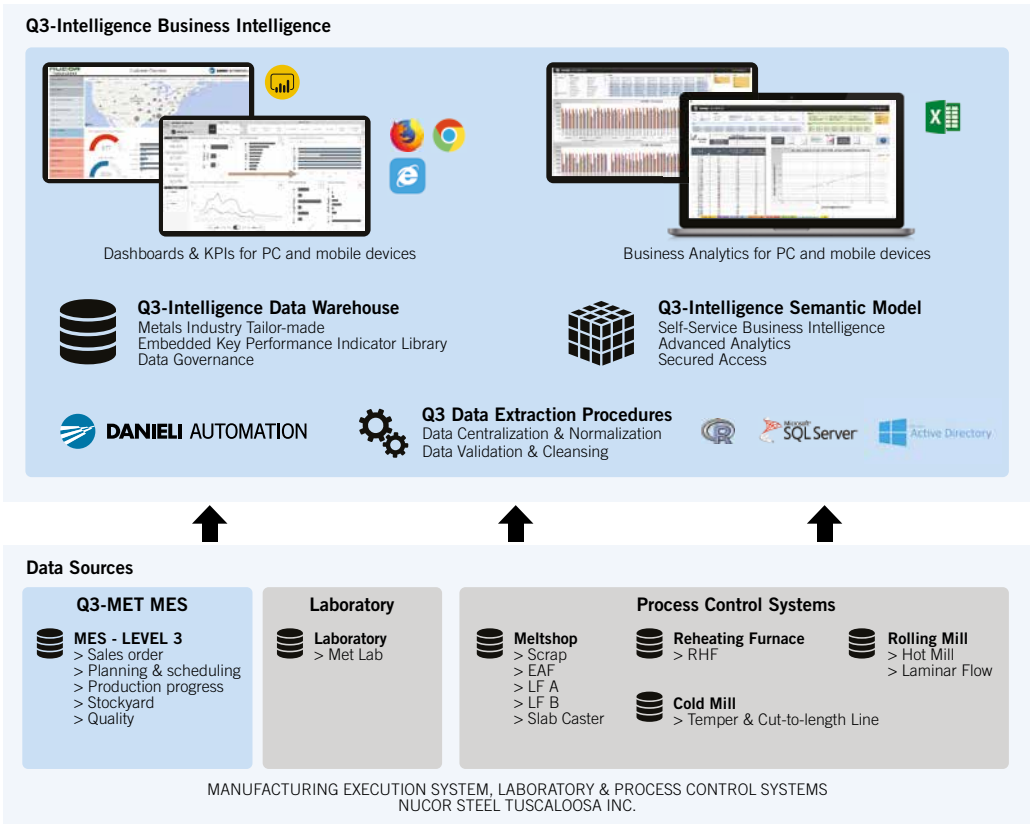


Production at Nucor spans process areas from the melt shop to the finishing lines, comprising: Electric Arc Furnaces, Ladle Metallurgy Furnaces, Slab Caster, Steckel Mill and Temper & Cut-to-Length line. Each of these plant areas relies on distinct Level 2 systems provided by different suppliers, which store data in differing formats by means of different technologies. In the search for a solution to address the problems of the paucity of aggregated

data derived from the various individual area process control systems, the co-existence of different storage systems, unification of front end analysis tools and internal maintenance of system architecture, Q3-Intelligence was chosen for a centralized Business Intelligence solution, also due to Danieli Automation's worldwide steel-making knowledge and experience embedded in the Q3-Intelligence product.

THE CHALLENGE

THE SOLUTION



The Q3-Intelligence Business Intelligence (BI) vertical solution for the metals industries developed by Danieli Automation is a real-time data monitoring system and data analysis platform. Q3-Intelligence is based on the Microsoft BI and Analytics platform using SQL Server to support IT-developer-centric data management, reporting and administration requirements, while business-user data analysis are delivered by the web dashboards and through Microsoft Excel and Microsoft Power BI via the custom Q3-Intelligence data analysis templates and the exhaustive KPI library. Q3-Intelligence extends information delivery systems

towards being complete decision platforms by combining operational data streams with advanced analytical tools. **Q3-Intelligence setup and methodology** The Nucor plant selected for two major Q3-Intelligence projects. The first was executed in three main phases. Firstly, an analysis phase was performed, together with the customer, during which all the available data sources and existing reporting tools and capabilities were considered. The output was the complete description of the systems and data available across the different production areas, together with a summary of actual analysis capabilities with its pros and cons.

This was the input necessary for the second phase: the Q3-Intelligence customization. This started with the data interfaces definitions for the various Nucor Level 2s and MES systems, and continued with the Q3-Intelligence Data Warehouse and Data Models customization, and adapting the Q3-Intelligence front-end to the Business User's needs. Lastly there was the commissioning phase for system installation, Go-Live and tuning, as well as training for the end users, starting with the Melt Shop and casting areas and proceeding to the Rolling Mill and Quality Laboratory. Given the success of the first project, Nucor Tuscaloosa upgraded the MES system with Danieli Automation's Q3-MET

MES suite, which is natively integrated with Q3-Intelligence, hence, the second project focusing even more on the analysis, keeping continuous contact with the Business and expanded the data sources and the analysis to integrate the MES in one integrated BI solution, to allow the business to take into consideration also the state of the order, and of the stockyard

during the discovery of insights, and of process and laboratory performances.

Custom-tailored management of data

Gigabytes of information that were previously stored across several independent relational databases are now inserted into a custom-tailored data warehouse and analysis data

models. One-click access to process data which had previously taken hours to track down is now instantly available, both locally and from the web, thanks to the Q3-Intelligence portal and the integration of Power BI providing the most modern and flexible solution for data analysis and visualizations.



“The interfaces designed during the software engineering phase allow new data points and data sources to be easily integrated into the existing data model.”

J.T. Thomas, Nucor

Enhanced real-time production monitoring

Real-time, fully configurable web dashboards provided for all plant areas immediately react to individual user requests. Visualization is enhanced with the adoption of a top down dashboard design that starts with the automatic evaluation of individual Key Performance Indicators (KPIs) and then tracks the production down to single day/heat details, with ready access to already existing or newly added custom reports.

model which permits tracking of individual products from the creation of liquid steel to the finishing rolling operations. From anywhere within the company network, users with varying responsibilities have the possibility to explore the data via ready-to-use custom Excel dynamic analysis templates. Furthermore, thanks to the cloud nature of Power BI, on-the-go analysis can be performed on the ready-to-use Power BI customized templates, tailored specifically for the business users.

functionalities, based on Active Directory. Access to the Q3-Intelligence system and information is provided through customizable privileges for each user, this also preventing unauthorized accesses to sensible information.

Boosted data analysis capabilities

Data warehouse and data models are constantly updated with fresh production data thus building up a historical data

Role-based access to data

The need for high level restrictions to certain information is easily fulfilled using the Q3-Intelligence integrated security

“The Q3-Intelligence system allows us to efficiently capture and make available all the necessary process information our teammates need to make profitable and timely decisions.”

J.T. Thomas, Nucor

Power BI to boost manager’s productivity to improve the business processes

Nucor Steel Tuscaloosa recognizes the additional value Q3-Intelligence brings to its users.

This is guaranteed thanks to the use of a wide-ranging data analysis platform comprising multiple data analysis tools for different needs, which permits

the correct analyses of the data that is gathered.

Q3-Intelligence is a powerful and proven tool for production teams, quality assurers, process engineers and other business process key users, and allows such to focus on the monitoring and analysis of process data, thus reducing the time needed to reveal the underlying reasons for business anomalies.

The advantages of having an always connected analysis system like Q3-Intelligence with Power BI, are conspicuous and glaring to managers of all business process, specially thanks to the ability of making analysis between the process control systems and the MES system allowing for quality cross reference among lab results and process variables.



THE BENEFITS

Q3-Intelligence leveraged the value of the existing process data to achieve a real-time and unified view of actual and historical plant performances. All users from the melt shop, caster and mill areas, together, have now the possibility to readily browse production information thanks to a centralized repository of integrated data from multiple sources.

In addition, thanks to the integration of the data in the Q3-MET system, all user from business related to the production, such as Sales Order, Stockyard and Quality Management have access to meaningful production data and all the information related to their business.

Q3-Intelligence includes fully customizable advanced statistical tools which offer short

learning curves for first time users.

Q3-Intelligence has transformed reporting at Nucor by eliminating the previous manual aspects to such and delivering a centralized real-time view of the production.

- > Centralized production data generated from multiple process control systems
- > Improve ease of access to data in terms of front-end analyses, system performance and maintenance by internal IT personnel
- > Significantly decreased time to access internal data streams, via a unified methodology
- > Real time monitoring of plant production data together with the integration of existing reporting tools
- > Customization of advanced dynamic data analyses
- > Enhanced capabilities in tracking the production histories

of individual products

- > Analysis independence for users thanks to the ease of front-end usage
- > Self-service BI that permits users to query data independently without needing extensive IT skills
- > Archiving of historical data that is purged from the source systems
- > Optimize complex data accesses while avoiding any impact on the operational source systems
- > Simplified Quality operations, reducing the number of retest necessary thanks to automatic test conversion
- > A single data model for all data regardless its source
- > The support of Machine Learning let Q3-Intelligence provide a data driven approach to further improve operations and performances

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