

Manufacturing Case Study

FOUNDRY

THE CLIENT

Our client is one of the largest foundries in the Southern Hemisphere. Each year it produces 129,000 high-quality cast iron automotive components, or over 46,000 tonnes, at its plant. The plant has an annual melting capacity of 110,000 tonnes.

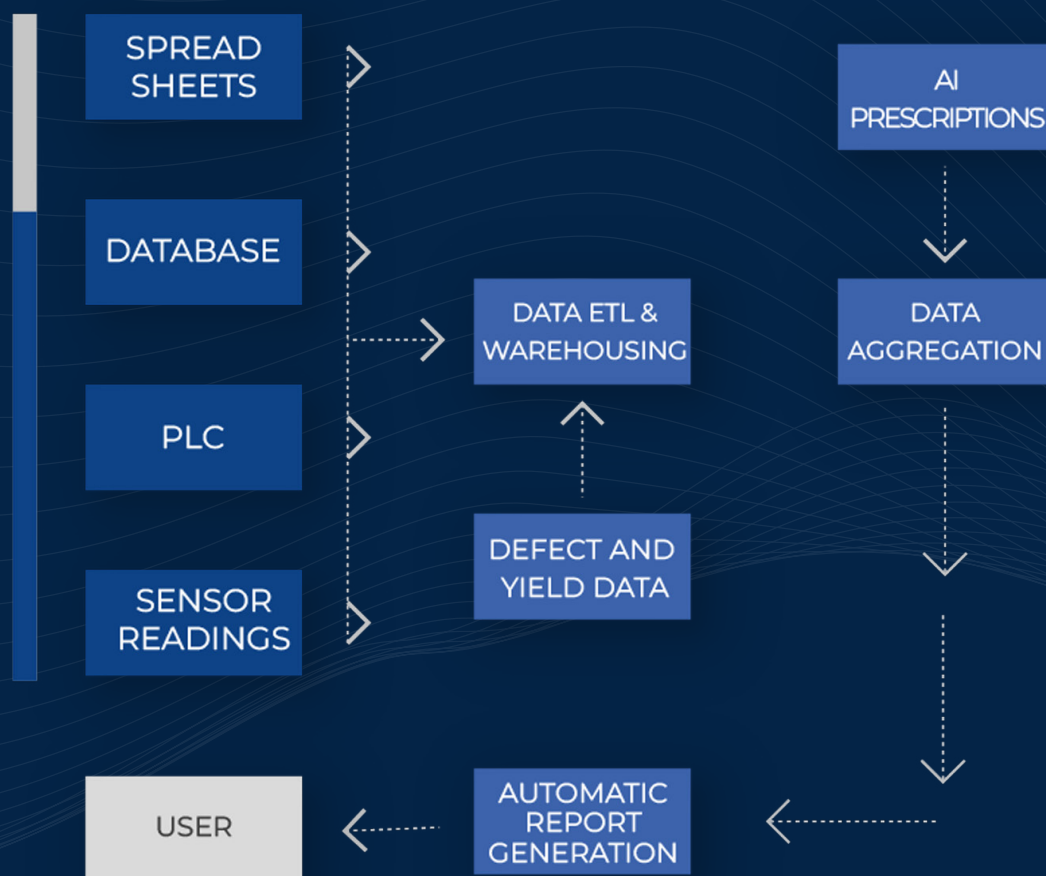
In order to compete globally and to achieve its vision to be the best foundry in the world, our client embraced the opportunities of Industry 4.0. As a result, it has become one of the most innovative and advanced foundries in the world. They “embraced the information flow and sharing principles that underscore what is commonly referred to as Industry 4.0,” our client explained. “We upgraded and increased digitization and the acquisition of information across all stages of production. A natural outcome of this strategy was to use the production and quality data to enable plant engineers and managers to make better, more informed decisions.”

THE SOLUTION

*Building a unified view of the **plant's process data***

DataProphet simultaneously implemented the extraction, transformation, and loading (ETL), as well as the warehousing, of data from across the entire plant. Historical production data was gathered from stakeholders across multiple departments, from PLCs and from the plant's central SCADA systems. The data existed in a number of different formats, including handwritten forms, excel files, proprietary databases, and CSV files.

DataProphet then digitally transformed this process history into a single view spanning 15 months of historic production data, 173,000 records, and 400 unique process variables. The extraction of data from these disparate sources was as important as its analysis.



*The Expert Execution System, **enabled by AI***

Once digitized, DataProphet fed the process and quality data into the DataProphet PRESCRIBE system. Through the application of advanced supervised and unsupervised machine learning methods, DataProphet PRESCRIBE automatically discovers the optimal operating regime for the client's complex, multi-step, industrial process. PRESCRIBE uses a deep, monolithic model of the process, which encapsulates the correlations and interactions between approximately 1,000 parameters from across the plant.

DataProphet PRESCRIBE optimizes production at the client by providing continuous prescriptions to operators across the entire manufacturing process.

The client uses DataProphet's prescriptive setpoints to operate the plant within, or very near the identified optimum region, allowing for a minor degree of variability due to non-controllable process parameters. The prescriptions are updated every five minutes based on data that is continuously ingested from the process.



THE INTELLIGENT WEB INTERFACE

DataProphet PRESCRIBE provides each operator, engineer, and plant manager with a customized view of the relevant control parameters through its interactive web interface. Each report intelligently prioritizes prescriptions for those parameters that are most important to improving productivity, taking into account both upstream and downstream changes.

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Our investment in Industry 4.0 is essential to maintain an optimum level of efficiency and quality, and to remain ahead of the continuous developments,” said the Chief Executive Officer. *“We partnered with DataProphet to achieve and maintain advancement and manufacturing excellence”.*

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THE RESULTS

ACHIEVING THE VISION

The client is now recognized as one of the best foundries in the world after having won a prestigious award in 2019.

REDUCED SCRAP AND DEFECTS

For the first time in the history of the company, DataProphet enabled the client to reduce defects down to 0.5% for periods of up to three months and achieved an average reduction of 40% over the long term. The plant halved its scrap rate in the first month of deployment. Within the first three months, the client achieved an external scrap rate of less than 0.1% on an ongoing basis.

INCREASED REVENUE

Since deploying DataProphet PRESCRIBE, the client saves around \$100k per month.

INCREASED YIELD

The client achieved record production outputs in 2018 and 2019.

SUSTAINABILITY

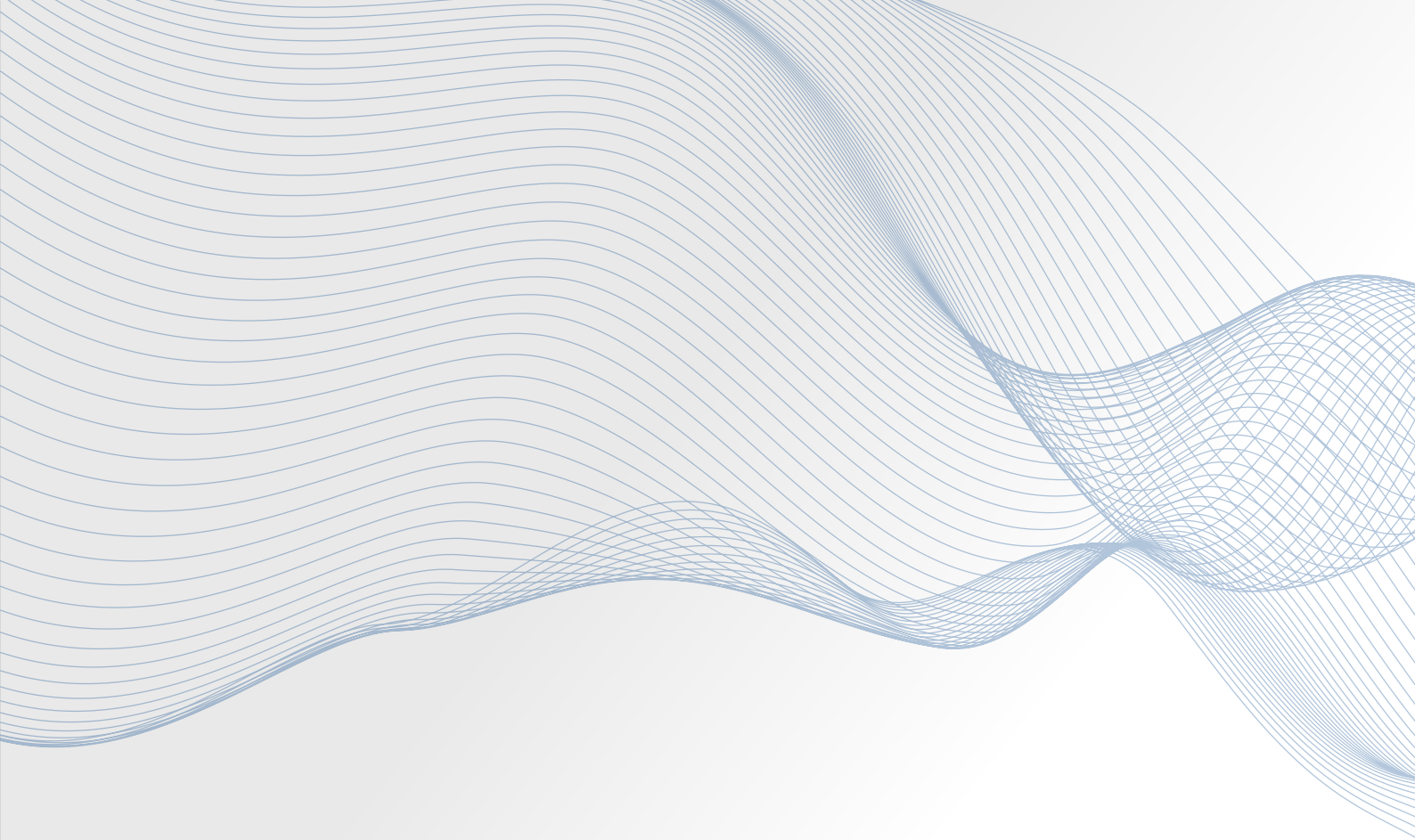
The optimization of process control parameters to achieve zero external defects additionally reduced waste, lowered the plant's production energy usage, and prevented the unnecessary transportation of large defective engine blocks. The client saves an estimated 135kg of carbon dioxide emissions for each defective block not shipped.

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“We might have been able to achieve similar results in the past, but we had absolutely no clue what we did to achieve the good result. With artificial intelligence, we have a really good idea of what we need to do to improve production,” said the Chief Executive Officer. “DataProphet’s prescriptions have resulted in a significant reduction in scrap and rework, making a positive impact on our bottom line.”

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