

CASE STUDY: OPTIMIZING A NEW INDUSTRIAL SITE FOR MINING LEADER



About the Customer

The customer is a leading American industrial sand supplier and mining corporation. The sand and coated sand products produced by the customer are used in a variety of industrial and environmental applications, including in oil and gas production, metal casting, construction, recreation, filter media, glass and agriculture.

Project Summary

As the customer was getting closer to opening the gates to their new state-of-the-art sand processing facility in Texas, they had questions about how to maximize truck throughput and equipment utilization. Engineering USA's Digital Industry team leveraged advanced technology for manufacturing plant simulation to help the industrial leader better plan and optimize the layout of their new site.

Project Activities

- » Utilized Siemens Tecnomatix Plant Simulation software, along with information and estimates provided (production rates, facility layout, processing times, etc.), to build a complete Digital Twin model for the customer's new site.
- » Ran "what if" scenarios with different inputs and analyzed simulation results to validate the customer's plan for new site layout, resource allocation and capacity planning.
- » Delivered final executive presentation and report detailing project results, what information was gathered and how it was used.
- » Implemented new enhancements after site go-live to further extend accuracy and value of simulation model.

Business Drivers

- » Optimize new site layout
- » Maximize productivity of new sand processing facility
- » Lower investment risks through early proof of concept
- » Minimize inventory levels
- » Maximize use of manufacturing resources and equipment
- » Maximize new site throughput

More About the Project

A long-standing American industrial sand supplier, the customer has been committed to producing high-quality products since 1979, operating their dispersed U.S. facilities for sand processing, coating, transloading, and R&D in an environmentally responsible manner, in order to ensure the health and wellness of their employees and of the communities in which they operate.

Engineering USA's team of Manufacturing Plant Simulation experts were brought in to help the customer better plan and optimize the layout of a new sand processing facility in Texas. As the customer was getting closer to opening the gates to this location, they had questions about how to maximize truck throughput while keeping cycle times at a reasonable level. The customer provided us with a cluster of raw data, including desired production rates, new site layout constraints, sand estimated processing times and other variables. Our team then utilized the information provided for the new facility to create a customized simulation model leveraging Siemens Tecnomatix Plant Simulation software.

Our first aim was to estimate the production capabilities at the new facility. A layout drawing of the facility was utilized as the starting point for the simulation model. The simulation objects were then overlaid on the map, creating a 3D representation of the facility. To mimic the movements of trucks through the facility and to be able to track the backups, the model was scaled to replicate the actual distances. Once the detailed layout was completed, each station received the required processing times. Custom logic was developed and applied to some stations to mimic the automated processes of the production facility, including the lane assignment of a truck dependent on the type of the truck, the filling station queue and the capacity of the filling station.

Once the simulation model was completed, production estimates and truck arrivals were utilized to provide initial throughput and bottleneck feedback for the new site plan. Then, additional simulation runs were completed using different truck arrival patterns. The simulation results determined that **an approximate 31.4% increase in truck throughput** and **a 60.8% decrease in cycle time** could be achieved.

After the new facility opened, our team was able to further enhance and extend the value of the model. The customer started recording actual time data to help determine areas of the simulation that could be improved. Processing times in the model were updated based on recorded times and the custom logic was updated to reduce assumptions in the model. The simulation was then run again to determine maximum truck throughput while still keeping cycle time within a reasonable timeframe. With this next decrease in processing time, **the simulated truck throughput increased an additional 37.8%** and **the cycle time decreased an additional 52%**.

Engineering's Advantage

The plant simulation model built by Engineering USA completely transformed the real-world layout and processes put in place at the industrial mining leader's new sand processing facility. Having better understood the effect of all inputs, the different options available, as well as the costliest bottlenecks for business, the customer was able to make smarter decisions and enforce processes that would maximize output, minimize inefficiencies and costs, and optimize the utilization of all of their resources. This is the power of manufacturing simulation.

Would you like to learn more about this customer case study? Contact us at info@engusa.com.

ENGINEERING USA DIGITAL INDUSTRY

We deliver the power of the Digital Thread for Industry 4.0. Leveraging our unique experience implementing and integrating the entire spectrum of digital tools for manufacturing, our team facilitates the adoption, implementation, integration and transformation journey for manufacturers across all industries worldwide. Engineering USA, formerly Hyla Soft Inc., is the North American business division of the Engineering Group.

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