

Application for Simulation Technologies in different phases of the lifecycle of structural steel production plants



TTS - Technology Transfer System S.r.l. Contact: www.ttsnetwork.net | tts-info@ttsnetwork.com

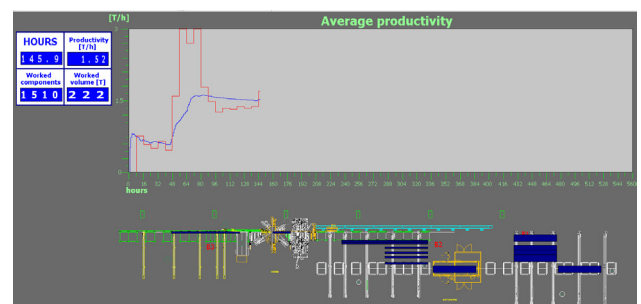
The company was founded as a spin-off of a Research Institute involved in the development of innovative manufacturing technologies and automation systems. The company business profile has been widened during time complementing traditional research activities in the area of simulation and knowledge management with the development of proprietary and customized IT solutions for manufacturing companies and technology transfer actions. Recently, company business has incorporated consultancy on business development, support to innovation management and quality and environmental assurance.

Manufacturing scenario description

One of the main businesses of the company is the design, fabrication and delivery of complete steel production plant design. These plants are delivered on an engineered to order basis and the investments can range from 2-30 Mio. €. Traditionally, the sales department presented the proposed layouts on printed paper, providing rough estimation of the final plant productivity based on the productivity of the single machines. What lacked in this estimation were the evaluation of machine buffers saturation and the forecasting of possible inefficiencies in part dispatching through the plant. Two pilot cases were selected and a simulation model of both the plants was commissioned TTS. The simulation models were realized with Rockwell Arena and were able to use a real production plans (provided by the final customer as input), and provided some KPI such productivity, machine saturation, wipe and buffer saturation. The models were also enriched by a graphical animation of the plant, which was used to present the whole project to the customer and increased the effectiveness of the presentation. Both the plants were sold, paving the way for future endeavors.

Approach and results with simulation technologies

The realization of a simulation model for each newly designed plant became a standard in the company workflow. The quality of simulation models increased and the data obtained were each time more reliable. The company started to modify the design of plant layouts relying on data obtained from simulation. The use of simulation models became a key element in the launch of a new "automatic piece unload system", because the use of simulation convinced the customers of the increased productivity of the machines equipped with the newly developed device.



Simulation of the average productivity

Some validation tests were run by processing specific production plans on an actual working plant, and by then processing the same plans with the simulation model: today the productivity obtained from the simulation is used. Besides the plant simulation, the company also provides their customers with a set of software tools. What was still missing in the suite (and was often sought after by customers), was a loading sequence optimization tool. The Arena simulation models were used as a feedback tool to a sequencer based on genetic algorithms. From this prototype, a dedicated optimization tool integrated in the software suite has been developed.

Benefits for the Company

- Increased credibility in negotiations with the customers, which considers reliable the productivity of the plant if estimated with a simulation model
- Greater success in sales, on 42 plants simulated 70% were sold , though we don't know the previous acquisitions to sale rate, the company considers it very satisfactory
- Development of new products
- Development of new plant design know-how
- Directly in contracts, with a 10% tolerance

Key Success Factors

-
- Commitment of the top management
- Close partnership with the simulation expert
- Use of real production data from customers
- The company is able to test the plant with different production plans and tune some configuration parameters without the intervention of the experts