BACKGROUND

LKAB is a world leading producer of processed iron ore products and minerals. Optimation AB is a specialized consultant firm that focuses on optimization and innovative solutions for the process industry. The goal of the project was to improve outlet designs in LKAB's pelletizing processes. LKAB, Optimation, Umeå University and Algoryx cooperated to produce a tailored software solution and a robust and efficient work method for simulation based design of the drum outlet.

CHALLENGE

The pelletizing process is one of the most critical and expensive process steps at LKAB. Optimizing this process is very important for improving the energy efficiency and product quality. Previous drum outlet design was conceived through difficult and expensive trial-and-error tests, with a risk of production downtime.

Optimation AB was contracted to design a new outlet for a new drum installation in LKAB's pelletizing plants, using the solution for simulation based design.

OUR SOLUTION

A new simulation tool, based on Algoryx's AgX Dynamics and Dynamics for SpaceClaim tailored for granular and bulk material simulation, was developed during the project.

Using the tool, Optimation could easily import and modify existing CAD-models of drum outlets and conduct virtual testing, involving several millions of pellet particles and using calibrated material models from real world experiments.

BENEFITS

Two new and optimized designs were created, one of which has been constructed and is ready for production. The simulation tool enabled rapid design evaluation at small cost, without risk of production downtime.

Design flaws were detected in the virtual experiments that otherwise would not have been seen until deployment. Large retrofit costs were thus prevented.

The visual nature of simulations resulted in improved communication and understanding between process designers and plant engineers, which led to an improved design process.