

# KJWW Uses CFD Analysis to Improve Working Conditions

## The Organization

KJWW Engineering Consultants specializes in designing sustainable and high-performance building infrastructure systems for mechanical, electrical, technology, structural and architectural lighting. KJWW focuses on providing clients with options-oriented solutions and offers market-focused leadership and expertise in the unique demands, code compliance, and trends in different industry sectors.

## The Challenge

### Ensuring Employee Comfort and Safety While Minimizing Costs

KJWW was hired to design a heating and ventilating system for a new 400,000-square-foot manufacturing facility that its client was adding to an existing building. The client wanted its employees working on the assembly lines located in the core of the new building to have a comfortable environment in terms of temperatures.

This was challenging for two reasons:

1. Various overhead doors would be located around the perimeter of the new structure, and during the winter months would introduce very cold gusts of air into the facility when opened.
2. The client required an energy-efficient ventilation solution to meet sustainability and project budget initiatives.

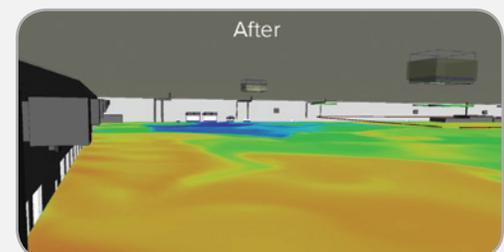
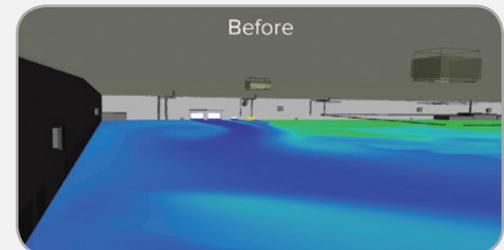
To address these concerns and identify the best possible solution, KJWW recognized that they needed to analyze the temperature variance in the building under different conditions. The team decided to hire an outside firm to conduct a computational fluid dynamics (CFD) study to gain confidence in the chosen strategy prior to finalizing detailed design documentation and equipment procurement. Since the client requires three bids for work, the team sent RFPs to different vendors, including Rand Simulation.

“We evaluated different companies that could provide the CFD analysis, looking for a firm that had extensive expertise in this area and could meet the tight schedule requirements for the project in a cost-efficient manner,” said Steve Mumm, a senior engineer at KJWW. “We needed to complete the full analysis with iterations within one month. Rand Simulation was the best fit for this project’s needs.”

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Steve Mumm  
Senior Engineer  
KJWW

Thermal profiles around the roll-up doors



## The Solution

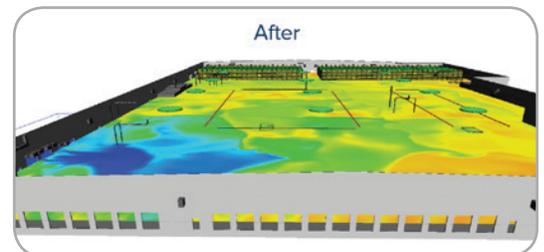
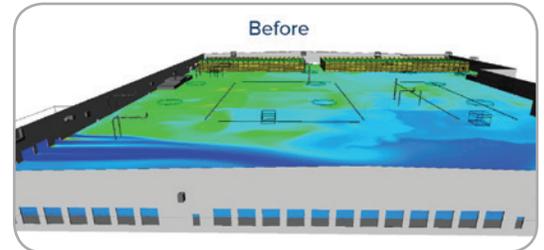
Rand Simulation ran the CFD analysis under different scenarios. The team found that the base bid ventilation concept, which was determined from general conditioning guidelines for a facility of this size, would be insufficient during mid-winter conditions.

The assembly areas would be around 50 degrees Fahrenheit, which was unacceptable for occupant comfort and safety. The primary factor driving the internal temperatures was the roll-up overhead doors. KJWW considered different solutions to this issue, ranging from building large vestibules around the doors to adding heating capacity to the ventilation system.

However, based on the results of the CFD analyses and very close collaboration with the Rand Simulation CFD team throughout the project, another option was suggested: installing air curtains over the roll-up doors. The models suggested that the curtains would increase the temperature in the facility by 20 degrees Fahrenheit. “The air curtains were considerably less expensive than the other options that had been considered,” said Mumm. “In addition, the CFD analysis gave us confidence that this solution would work before we moved forward with procurement of the air curtains, and that it would mitigate the production downtime of any post-installation retrofits.”

The manufacturing facility is now under construction and the air curtains are part of the building plan. KJWW was pleased with Rand Simulation’s innovative solution to the heating challenge as well as the experience of working with their CFD Analysis experts. “The Rand Simulation team was flexible in the face of aggressive schedule expectations and easy to work with,” said Mumm. “The impact of this collaboration has not only reduced upfront capital costs but will also improve ongoing utility costs by eliminating the need for larger-capacity systems.”

Plant level thermal profiles



## About Rand Simulation

Rand Simulation is focused on helping organizations bring their product vision to reality through incorporating engineering simulation technology into the product development process. Rand Simulation caters to product development organizations looking to compress the design process, maximize innovation, strengthen competitive differentiation and grow bottom-line profitability. Rand Simulation serves as both a North American reseller of Ansys engineering simulation software and as a trusted design consultant offering insights gained on over 3,000 design projects using engineering analysis software to balance design performance with size, cost, DFM and aesthetics.