

SECTOR:  
CONSTRUCTION

OFFERINGS:  
ENGINEERING SIMULATION  
SERVICES

TECHNOLOGY:  
FLUID DYNAMICS &  
THERMAL

## RECIRCULATION ANALYSIS OF DRY COOLER DISCHARGE IN NARROW ALLEY

Our customer is a US based global company engaged in HVAC consulting. They received a problem of installation of dry coolers in a narrow alley due to the space constraints. There were concerns about the recirculation of hot discharge within the alley. Initial observations showed that part of hot discharge would likely get sucked back into the dry cooler. To alleviate this problem, a cowl was designed & placed near the discharge. The customer engaged Zeus Numerix to simulate this flow & thermal phenomenon to confirm the efficacy of this cowl-based solution.

The building has three dry coolers installed in the narrow alley. Zeus Numerix performed a CFD study to evaluate the flow and temperature profile inside the alley based on dry cooler suction and discharge characteristics. It was found that without cowl piece, the hot discharge impacts the opposite wall, loses the momentum & gets sucked back into the dry cooler. It was noticed that the use of deflector significantly changed the temperature profile, reducing the maximum temperature by 19 deg C.

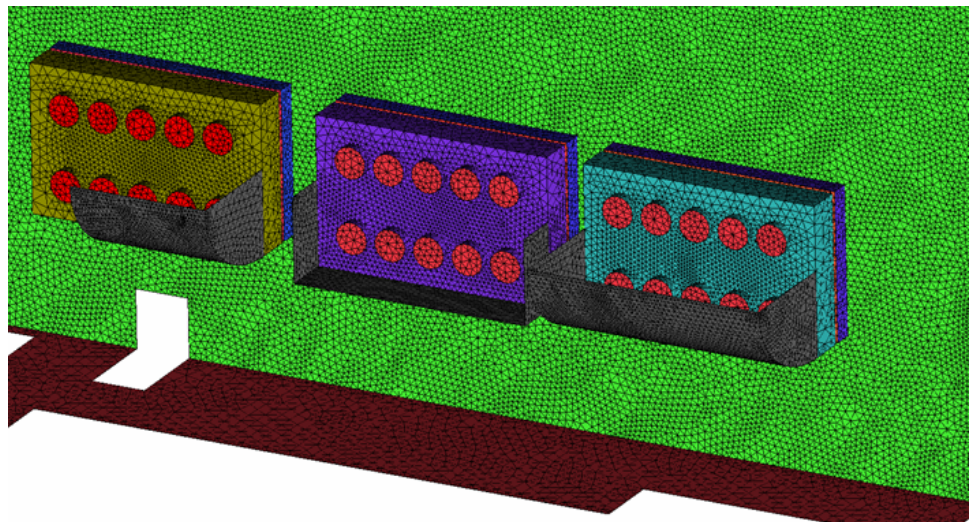


Figure 1: Mesh over the three dry coolers with cowl

Having established the simulation model, various cowl designs were simulated. Temperature and pressure distribution were compared for each of the solution. A comparative analysis of the original and modified design was provided to the customer in form of contour and color plots, streamlines, temperature and pressure distribution. Based on our comprehensive report, the modified cowl has been installed.