

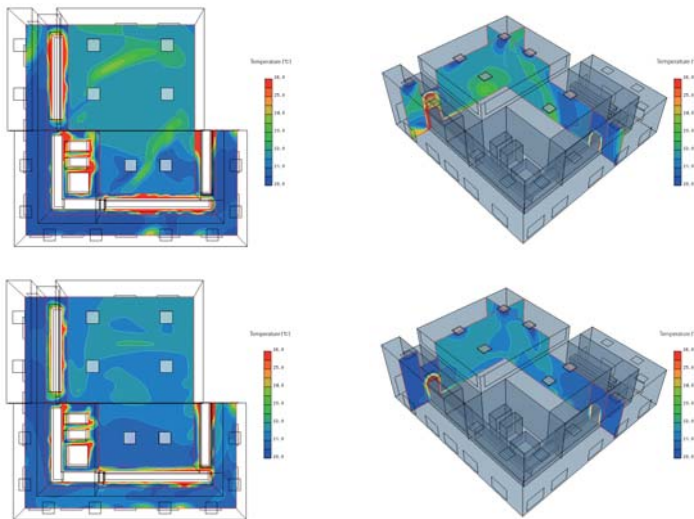
Airflow Control in a Cleanroom

Improving ventilation effectiveness and temperature control in a room containing heat generating equipment

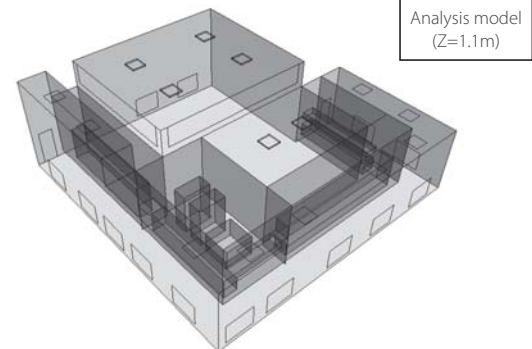
Temperature Control in Operational Area

The airflow is improved by adjusting the opening ratio of the ventilation orifice on the lower part of the wall.

Indoor temperature distribution



- Existing plan (upper diagrams) and revised plan (lower diagrams)
- The airflow is adjusted to minimize turbulent interactions with other air supply jets within operational area



Analysis model (Z=1.1m)

Setting Conditions

Air Exchange Rate: 40 times per hour
Measure of Efficiency: SVE3*
Indoor Heat Generation: 92 [kW]

Calculation Conditions

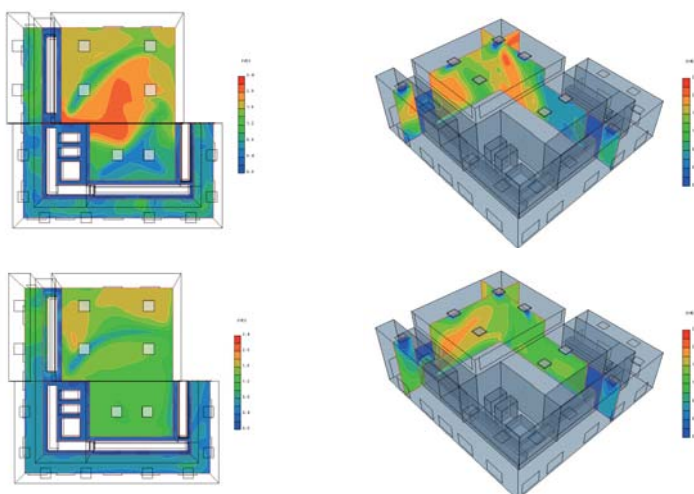
No. of Mesh Elements: 3,303,720
Calculation Time: 500 cycles, approx. 5 hours (8 cores), steady state analysis

* SVE 3 is the index of the age of air is represented by a ratio of concentration of diffusive species to that of contaminants which are diffused instantaneously and uniformly over the entire room.

Enhancement of Cleanliness by Applying Airflow Control

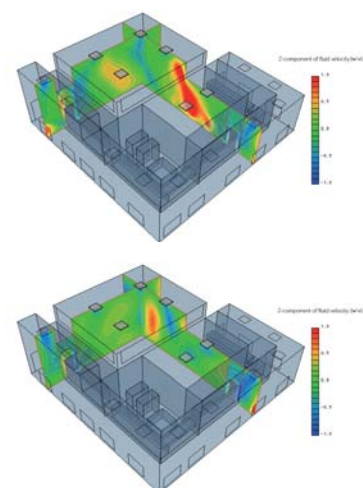
The degree of cleanliness can be assessed using ventilation efficiency index in scSTREAM.

Ventilation efficiency distribution



- Existing plan (upper diagrams) and revised plan (lower diagrams)
- Removing eddies from the airflow improved ventilation efficiency

Vertical velocity of indoor airflow



Notes

A cleanroom can contain physical objects and temperature generating equipment that challenge achievement of a well-ventilated, air space. Using scSTREAM to predict the complex airflow patterns inside the cleanroom and assess solutions early in the design process can simplify installation set-up and ensure robust operation during production.