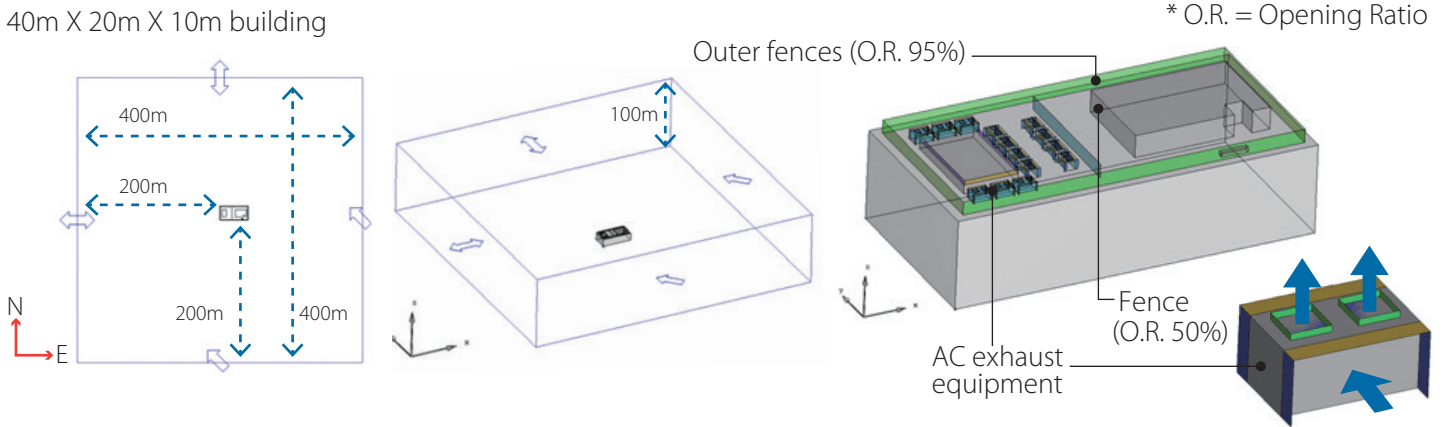# Simulation of Rooftop Air-Conditioner Exhaust

scSTREAM is used to simulate the operation of air-conditioner exhaust equipment at the rooftop of a building. Simulations are performed for different conditions to assess the effect of wind on the operation.
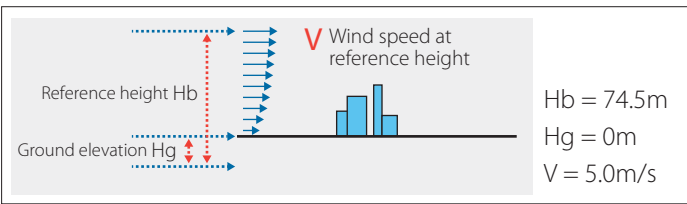
Simulation Model

40m X 20m X 10m building

* O.R. = Opening Ratio

Outer fences (O.R. 95%)

400m
200m
200m
400m
100m

N
E

Fence (O.R. 50%)

AC exhaust equipment

Conditions

Wind conditions: SE or SW wind at 30deg.C

V Wind speed at reference height

Reference height Hb

Ground elevation Hg

$Hb = 74.5m$
$Hg = 0m$
$V = 5.0m/s$

Heater exhaust equipment

14 pieces of equipment on the rooftop

Flow rate	$320[m^3/min]$ each
Inflow	From two sides
Outflow	From two fans upward
Heating capacity	28,000[W] each

Results

Temperature isosurface plots

None

SE Wind

SW Wind
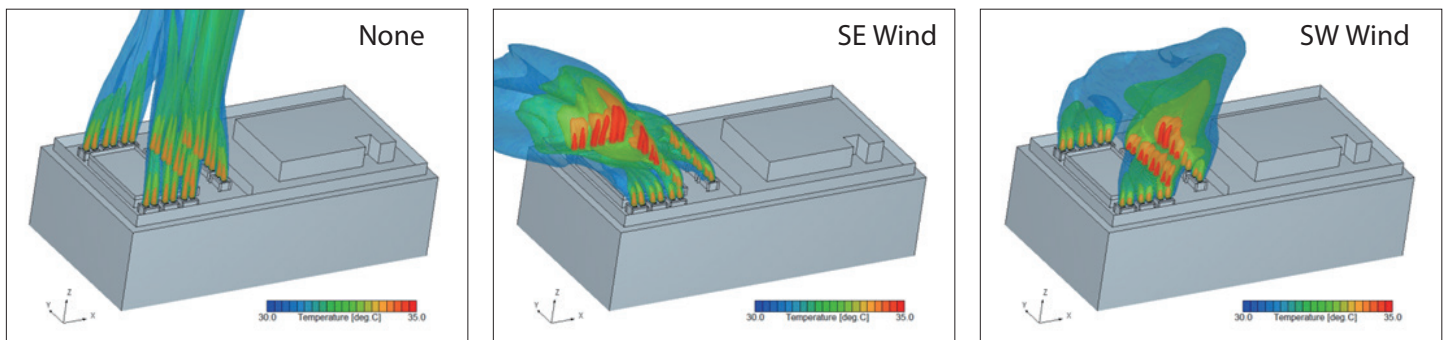
Exhaust temperature of each piece of equipment

[Deg. C]

SE Wind
SW Wind
None
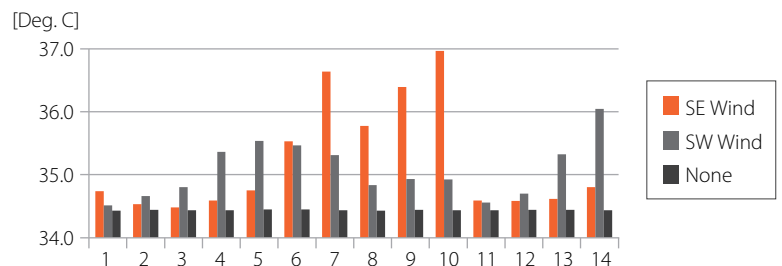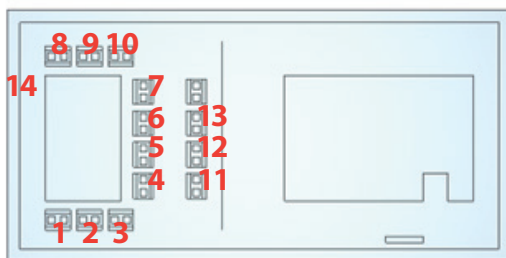
Notes

Using scSTREAM, the effect of wind on the operation of air-conditioner exhaust equipment is simulated. It is shown that the exhaust air temperature becomes higher for the equipment downstream of some other equipment, which means the operation is less efficient.