scSTREAM

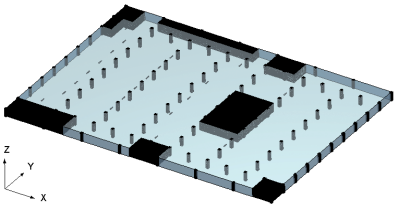
Cradle
MSC Software Company

Ventilation of a Parking Lot

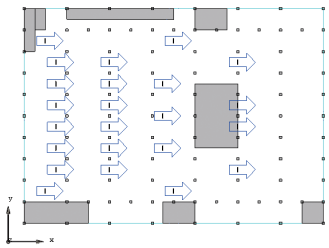
scSTREAM is used to perform a ventilation assessment of a covered parking lot with a ventilating blower layout. The Index for age of the air is used to assess the blower system's effectiveness for ventilating vehicle exhaust from the structure. A modified layout with an additional blower is suggested to improve effectiveness.

Simulation Model

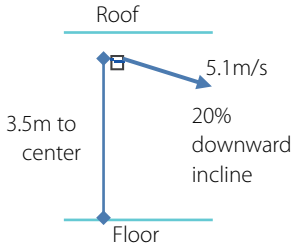
126m X 90m X 4m roofed parking lot:
Sides are open to the surroundings



Blower layout:



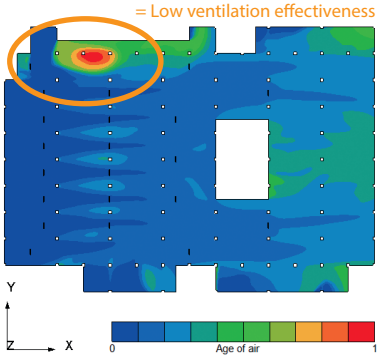
Blower specifics:
2.0m wide X 0.25m high



Simulation results

Contour plot of index for age of air

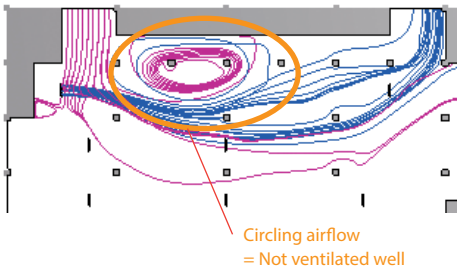
High index for age of air
= Low ventilation effectiveness



Index for age of air is high in one area, meaning ventilation effectiveness is low. This is caused by circling air flowing from outside through the nearby opening and from the closest blower.

Streamlines

From nearby opening (magenta)
From the closest blower (blue)

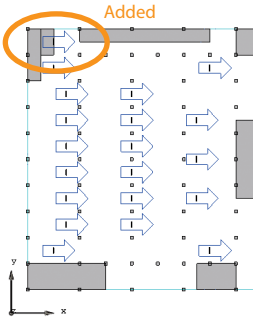


Circling airflow
= Not ventilated well

Modified simulation model and results

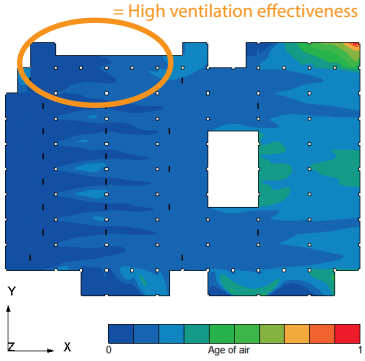
A blower is added near the opening. Air does not circulate, and ventilation efficiency is improved.

Blower layout



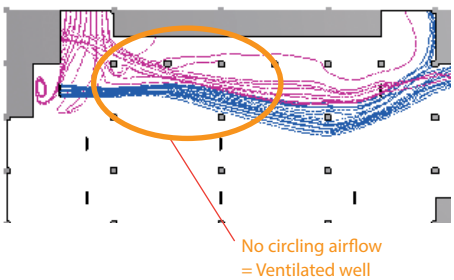
Contour plot of index for age of air

Low index for age of air
= High ventilation effectiveness



Streamlines

From nearby opening (magenta)
From the closest blower (blue)



No circling airflow
= Ventilated well

Notes

scSTREAM is used to calculate the index for age of air in a ventilated parking structure to locate areas of low ventilation effectiveness. Flow visualization helps explain why the effectiveness is low and provides useful information for possible countermeasures.