It is very important to create a 3D model which replicates the actual car park and specify the locations of fresh air supply and exhaust. Initially CFD simulation is carried out without any jet fans to check the concentration of CO. Based on the CO concentration, the number of jet fans and their locations are decided.

Further CFD simulations are carried out to optimize the system. Once the system is optimized the number of jet fans and locations of jet fans are frozen. Fire simulation is carried out to determine the transient behavior of smoke in the car park and once the emergency system is switched ON, then the direction and time taken to remove the smoke from basement is determined.

**INTRODUCTION**

Traditional car park has ducted system for ventilation, these systems are quite in-efficient as they cater to the complete car park area even though the ventilation requirement is only at small part of the basement. Modern car park has jet fans which helps in minimizing energy consumption due to the efficient design. CFD is widely used to determine the number of jet fans, location of jet fans in the Car park so that the system works efficiently in ventilation mode and fire mode.

In ventilation mode the jet fans helps in moving the high CO towards the exhaust, hence reducing the CO level in the basement. In case of fire, the jet fans move the smoke from the place of fire to the exhaust location, hence improving the visibility in the car park area.

**CHALLENGES**

- Determining the optimum number of jet fans and their location.
- Simulating the fire and determining the emergency philosophy for efficient smoke exhaust.
- Identifying the appropriate no of Zones within the Basement & defining an efficient control sequence for CO sensors & Jet Fans.

**THE SOLUTION**

It is very important to create a 3D model which replicates the actual car park and specify the locations of fresh air supply and exhaust. Initially CFD simulation is carried out without any jet fans to check the concentration of CO. Based on the CO concentration, the number of jet fans and their locations are decided.

**BENEFITS**

- Virtual testing of the car park for ventilation and fire scenarios.
- Cost estimation for the Car park ventilation system.
- Design optimization of system for efficient performance.
- Effective & energy efficient control sequence.