Development of an Exposure Model for Diesel Locomotive PM Near the Alameda Corridor Railroad

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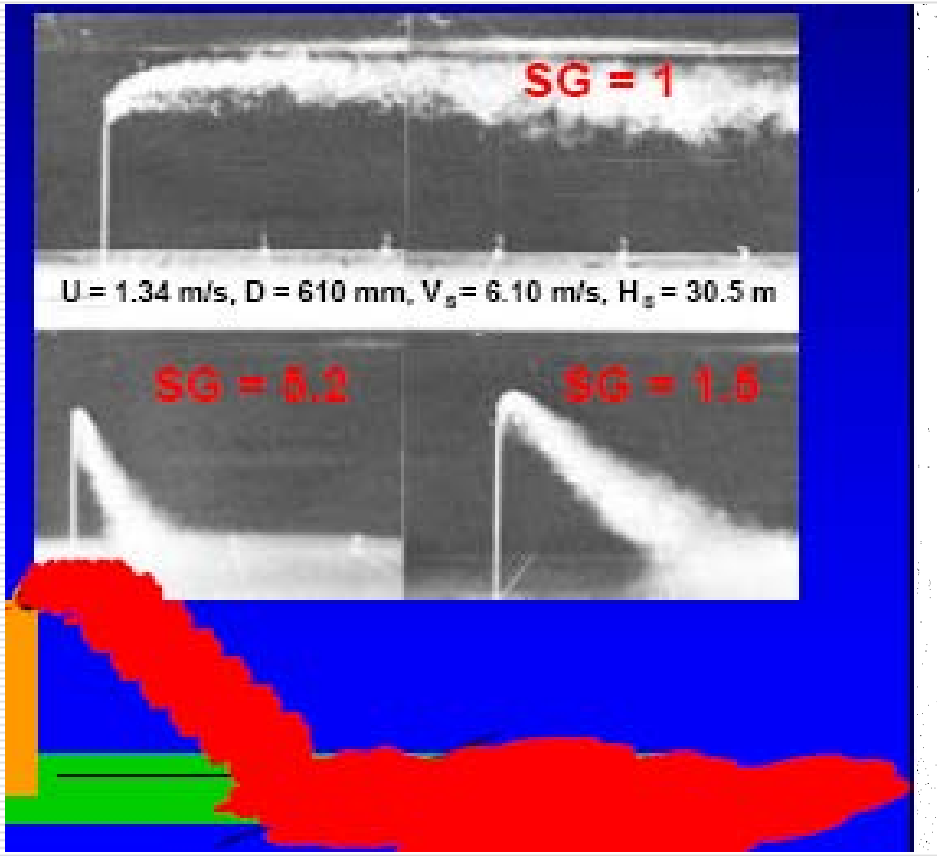
Objectives and Significance

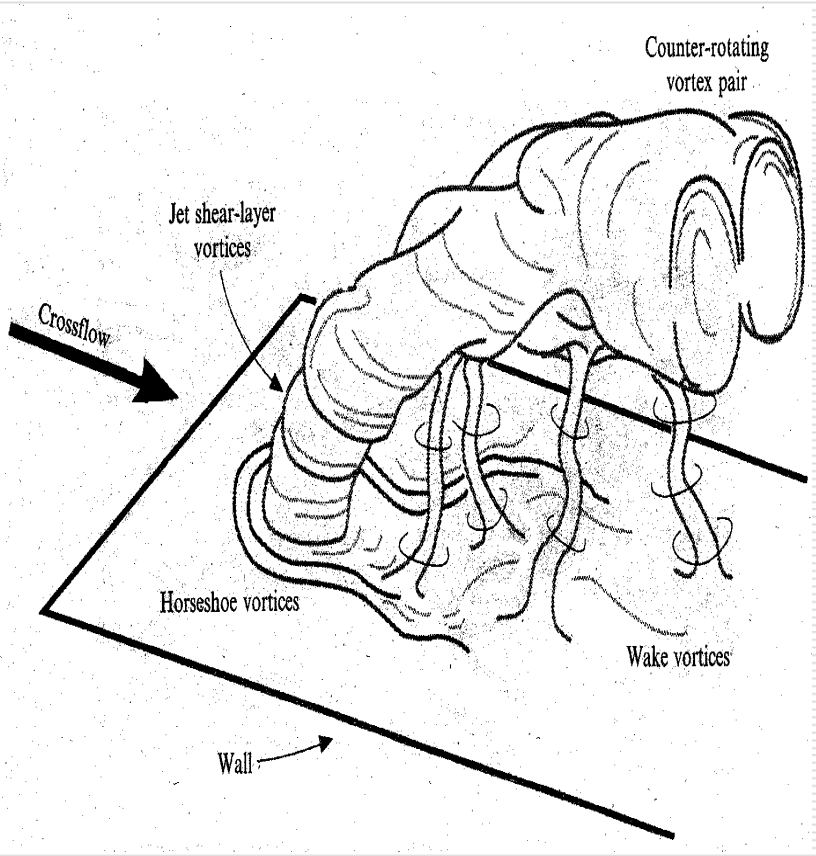
- The objective of the investigation is to measure particulate matter (PM) from passage of diesel trains at different distances from the Alameda Corridor railroad.
- The study will provide the exposure concentrations of these pollutants at different distances from the alameda corridor railroad and can be used for exposure control options such as installation of appropriate filtration systems, avoidance of construction of buildings within a specified distance from the corridor, emission control strategy and dislocating schools to further distances away from the corridor.

Background

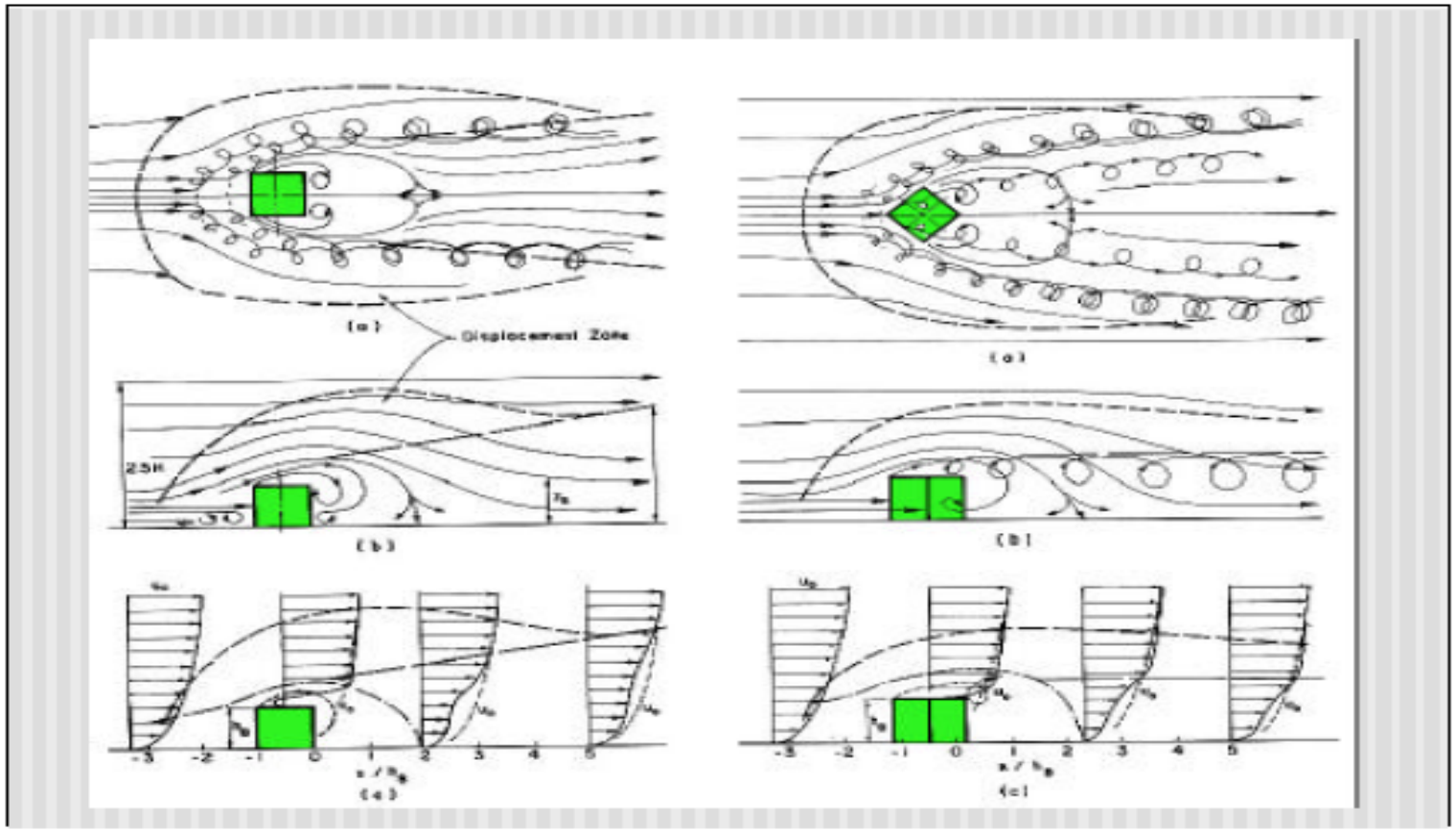
- There are increasing recognitions that particulate air pollution can have an acute effect on human health
- Previous studies on vehicle emissions near major roads indicate that dispersion and concentration of these pollutants are strongly dependant on local wind speed and direction
- Weak degrees of correlation between particle numbers and the gaseous concentrations
- the concentrations of these pollutants are reduced at distances from the major roads
- All these studies were performed in open areas

Characteristics of a Jet in Cross Flow and The Effect of Specific Gravity of Pollutants on Jet's Trajectory





In Urban Areas, Characteristics of Wind Around Buildings Affect the Trajectory of Pollutants.



Equipment

Young model 05106 wind monitor-MA

TSI DustTrak model 8520

Measurement Location

East Track

West Track

The Camador Heim Bridge

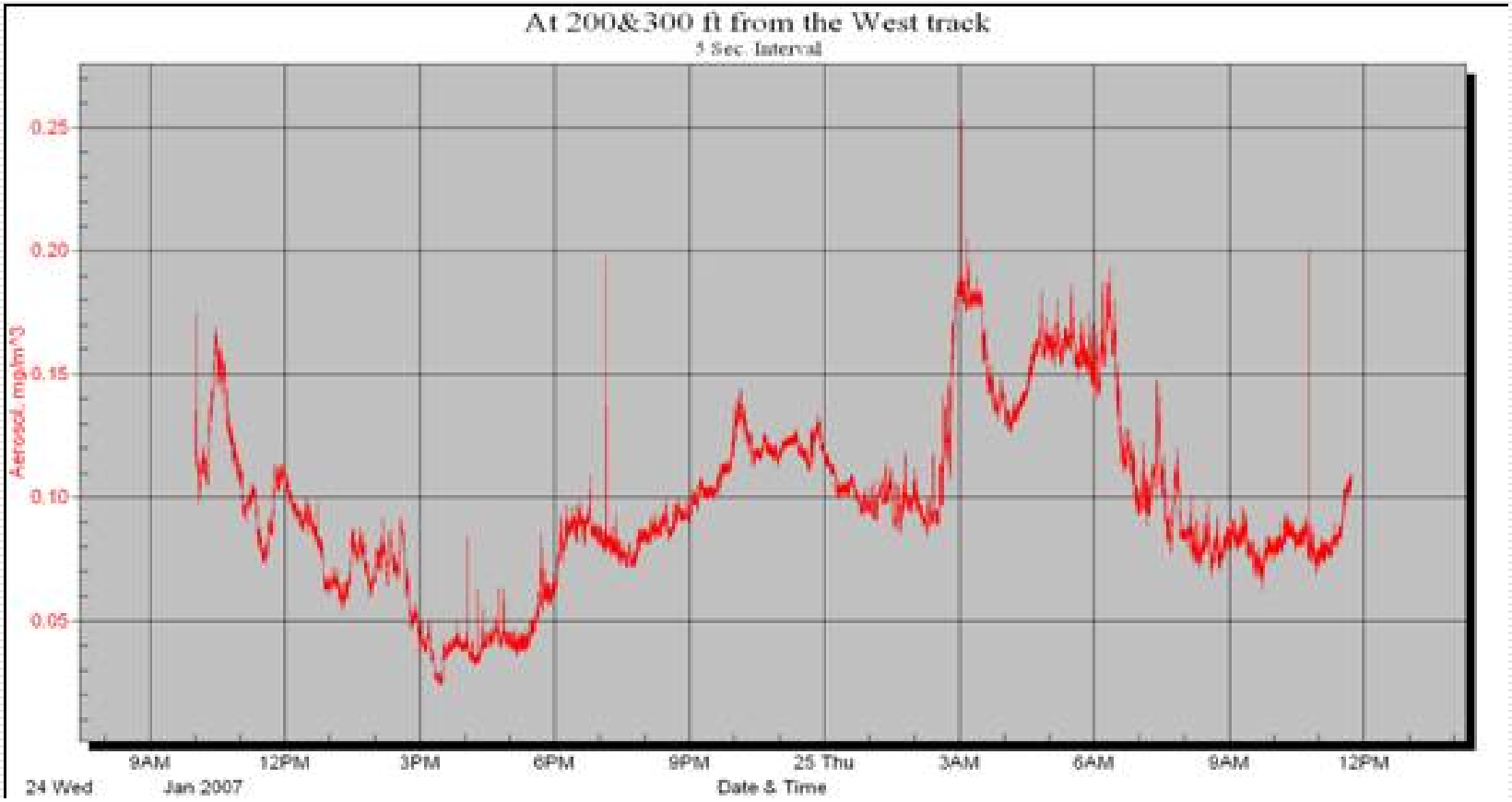
Truck Idling

MEASUREMENTS

- Measurements were performed at 4.6 m (15 ft) from the east track between the railroad and the Comador Heim Bridge and at 9.75 m (32 ft), 23 m (75 ft), 44.2 m (145 ft), 61 m (200 ft), and 91 m (300 ft) from the west track along the Anchorage road perpendicular to the railroad.
- At each location, between 8 hours to 24 hours of data was collected. Measurements were repeated on several occasions to ensure the accuracy of the data. A minimum passage of 10 locomotives was observed for each location and the type and the numbers of locomotives for each passage were recorded.
- Background concentration was taken as the maximum value within 2 minutes before the locomotives arrive at the measured locations.
- Locomotives were from BNSF, PHL, and UP.

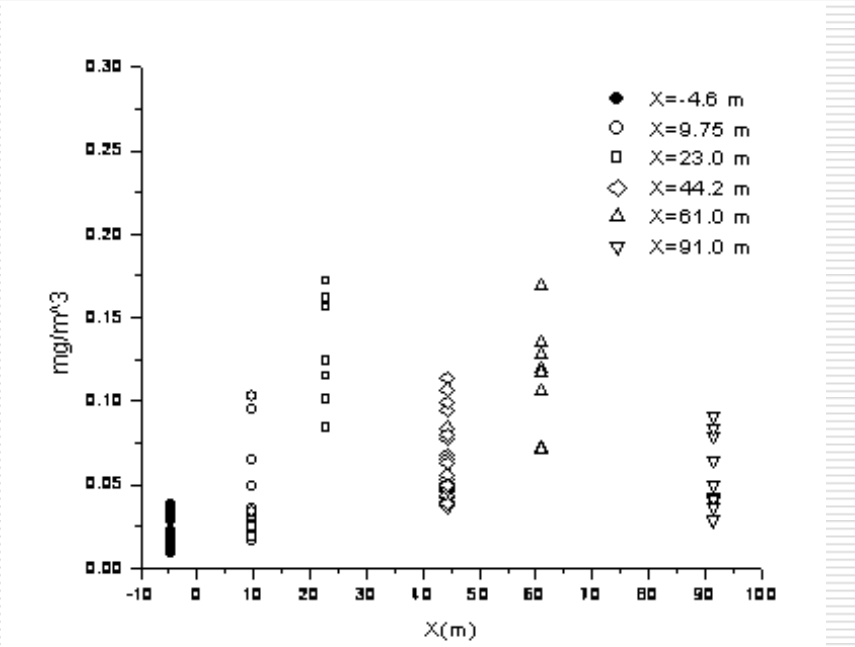
Typical Locomotives

Typical Output

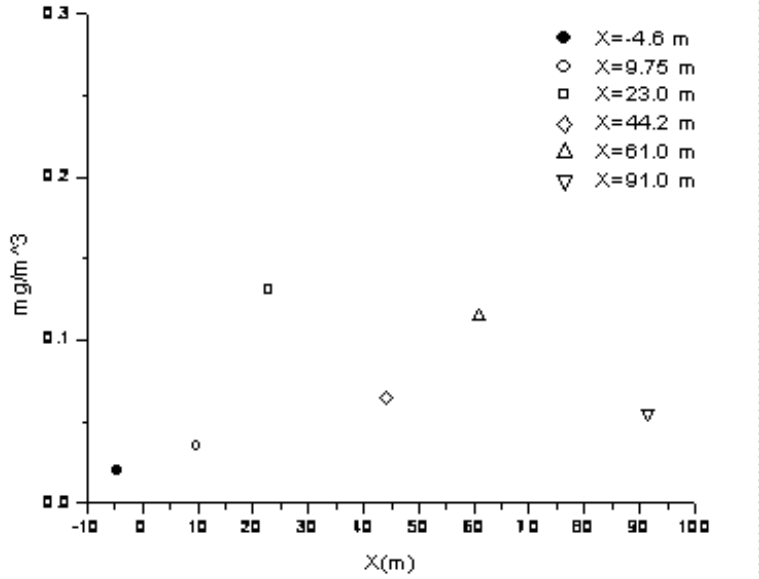


Aerosol Concentration From Passage of Locomotives

Axial Variation

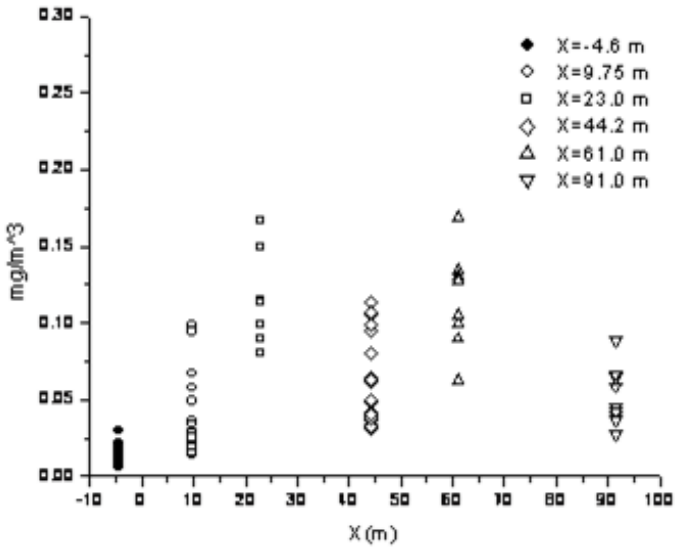


Averaged Axial variation

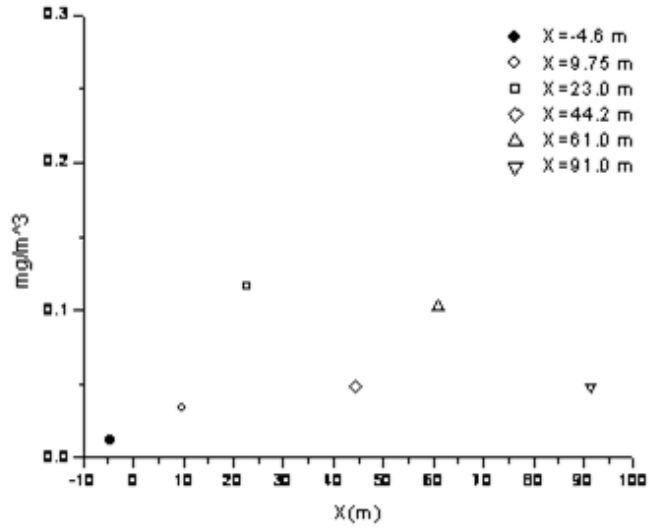


Background Aerosol Concentration

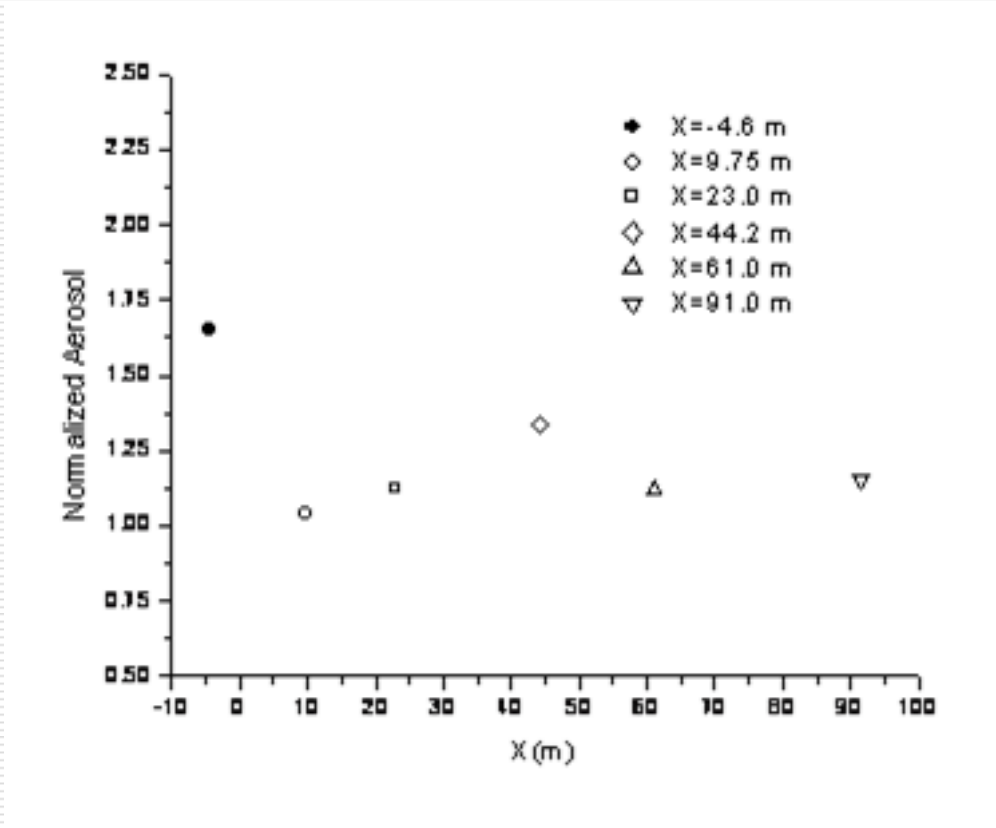
Axial Variation



Averaged Axial Variation



Axial Variation of Normalized Aerosol Concentration



Conclusions

- Particulate concentration increases by more than 50% from the passage of the locomotives near the railroad
- Between 30 m to 60 m the increase is approximately 25% and beyond that the increase is between 10-15%.