

Group cyclists urged to spread out as it can affect exposure to vehicle emissions

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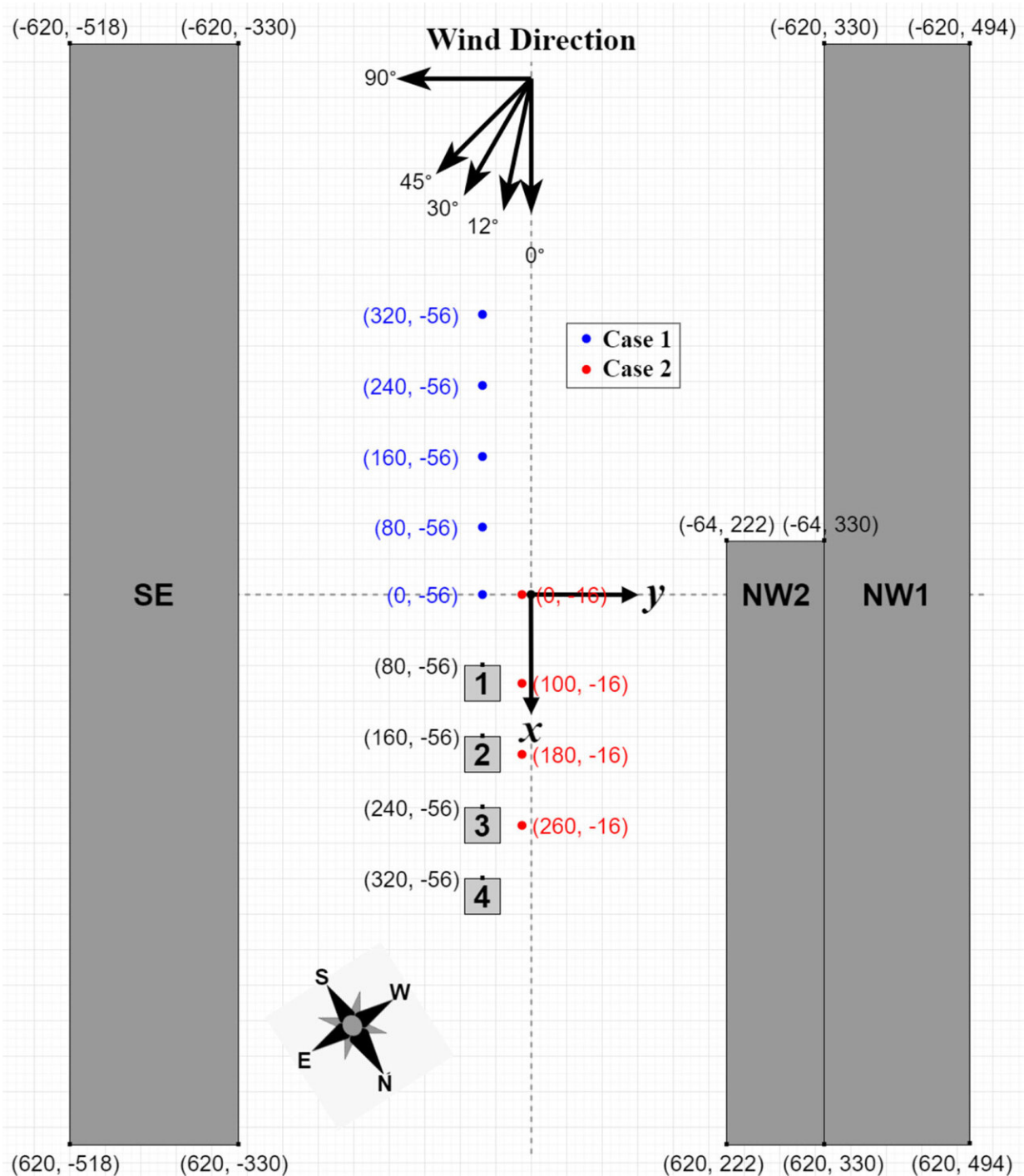


Diagram of the street canyon scale model used, all measurements of the coordinate system are in mm. Gray boxes represent the cyclists, while dots indicate the position of the source during the experiments. Case 1 refers to the car positioned upstream of the cyclists in blue and Case 2 is when the car is adjacent to the cyclists in red. The wind direction indicates the wind incidence in

the free stream. Credit: *Journal of Wind Engineering and Industrial Aerodynamics* (2023). DOI: 10.1016/j.jweia.2023.105333

The notion that in a group of cyclists, the person in front of the group is always the most exposed to harmful vehicle pollutants has been debunked by the University of Surrey.

A series of unique experiments were carried out in Surrey's Environmental Flow (EnFlo) [wind tunnel](#), capturing results from a vehicle driving in front and adjacent to the riders.

With a vehicle in front of a cycling group and little wind movement, the findings confirm that pollutant exposure decreases the further the [cyclist](#) is from the vehicle. However, with more wind, riding towards the back of the group can be a good strategy to minimize exposure.

When the vehicle is adjacent to the cycling group, results show how [exhaust fumes](#) can be trapped by a complex aerodynamic field, making the front riding position the place with the least exposure despite its proximity with the vehicle.

Joy Schmeer, Postgraduate Researcher at the University of Surrey and lead author said, "Cycling is encouraged to reduce congestion on the roads, as well as [traffic emissions](#), yet despite many encouraging health aspects of cycling, the exposure to and inhalation of vehicle pollutants is something not to be forgotten, especially when used as a regular alternative transport method."

"The findings of these experiments highlight group cyclists needs to consider their routes and position within a group, especially when roads become busier and narrower."

Dr. Marco Placidi, Senior Lecturer in Experimental Fluid Mechanics at the University of Surrey commented that "The results of these experiments reveal important recommendations that cyclists and drivers should know to increase health and safety while cycling in groups."

"While drivers need to maximize their distance away from riders before overtaking them, cyclists should aim to distance themselves from the vehicle's exhaust, but also potentially from other riders if a [vehicle](#) is driving adjacent to them. As for further recommendations, experiments like these show the need to consider repercussion of peak utilization of urban cycle lanes during their design stages."

The paper was published in the *Journal of Wind Engineering and Industrial Aerodynamics*.

More information: Joy Schmeer et al, Group riding: Cyclists exposure to road vehicle emissions in urban environments, *Journal of Wind Engineering and Industrial Aerodynamics* (2023). [DOI: 10.1016/j.jweia.2023.105333](#)

Provided by University of Surrey

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