

**Exhaust Pipe Modifications to Reduce Soot Staining on Vehicle Bodies
Based on Roof-level Exhaust Flow Simulations of Diesel Railcars**

Natsuki HARADA Yuhei NOGUCHI Yuto ARAKI Tokuzo MIYACHI

Exhaust gas emitted from diesel railcars can sometimes cause soot staining on surface of car body. Computational fluid dynamics (CFD) simulations were conducted in this study to investigate the exhaust flow around a car body and to analyze both the causes of soot staining and its countermeasures. Based on the findings from CFD simulations, the exhaust pipes of the actual car were modified. The degree of staining with and without the countermeasure was evaluated based on the image brightness of the car body. As a result, the modified exhaust pipe reduced soot staining on the car body surface.