

Documents

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Carbon monoxide emission and eco-driving for freight sustainability

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Abstract

Carbon monoxide (CO) indirectly causes climate change because it affects the abundance of greenhouse gases such as carbon dioxide and methane. Carbon monoxide is formed because of incomplete combustion in diesel engines. The fate of CO towards achieving freight transportation sustainability is presented. Firstly, the pollutant (CO) emitted by diesel engines from freight vehicles was determined from field studies using the tailpipe emission technique. The effect of the behavioural approach, eco-driving, was also observed for the 304 km trip demonstrated by the drivers of the 40-footer truck. Eco-driving has many advantages, including emitting less CO, saving in fuels, and reducing accidents and traffic summons. Secondly, for freight sustainability, CO should be further reduced by adhering to Euro standards of the European Union for heavy-duty vehicles, which states that the emission should be 1.5 g/kWh. Thirdly, a diesel oxidation catalyst (DOC), which converts CO to CO₂, is an option that can be used. Then fourthly, the decarbonisation of transport using heavy electric trucks also shows some promise, although they are best for moving goods for a short distance. Finally, an efficient logistics system with optimal solutions adopting several measures is suggested for sustainability. These include 'Hub-Spokes' distribution, a polarised fleet, expanded delivery windows and last-mile delivery. Thus, these five steps help decarbonise the transport sector and consequently accelerate the zero carbon emission transition. © 2024 Published under licence by IOP Publishing Ltd.

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