Do strict speed limits really reduce traffic emissions?

Environmental policy makers increasingly rely on computer models to test traffic policies. Researchers have investigated the impact of reducing speed limits on traffic emissions using two different models, but the models produced some contradictory results. The researchers therefore warn policy makers to interpret model results very carefully and to avoid relying on simple ‘macroscopic’ models.

Driving at slower speeds is safer, but some contend that it is also more environmentally friendly, based on the assumption that driving more slowly uses less fuel and produces fewer emissions. This may be true of motorway traffic, but some traffic simulations have predicted that driving at slower speeds in urban areas actually increases emissions. Given that many European countries are lowering speed limits, the question of whether driving more slowly produces fewer emissions is becoming increasingly relevant. Modelling has been used previously to try to address this question, but the results have been ambiguous.

The researchers say policy makers should be careful about interpreting studies which assess the impact of speed reduction policies on emissions. In their current study, they combined results from two different models to try to understand more about the impact of driving speeds on the environment. However, they say neither method is perfect.

The first method used a sophisticated, ‘microscopic’ approach based on second-by-second analysis of driving speeds and gear changes (the VeTESS model – developed by the EU DECADE project). The second method used a more simplistic, ‘macroscopic’ approach based on average speeds (using a Copert/MEET model). This second approach is what is generally used to compile national emissions inventories.

As a basis for their models, the researchers used data recorded in three different cars, considered “average” in many European countries. Data were recorded while the cars were driving in the town of Mol, Belgium and in Barcelona, Spain. The researchers fed the data into their models and then made adjustments to see what would happen if the speed limit in these areas was reduced.

Using the more basic model, emissions of all pollutants increased very slightly – between 1-5 per cent for carbon and nitrogen oxides when a 50 kilometres per hour (kph) speed limit was lowered to 30 kph. With the more sophisticated model, emissions showed a slight decrease, but the difference was not significant. Only the changes in particulate matter (PM) were considered significant for policymaking purposes. However, the results were still contradictory depending on which model was used. Lowering the speed limit to 30 kph reduced PM emissions by between a quarter and a third under the sophisticated model, whereas they rose by nearly 10 per cent under the simple model.

Despite the variations in model results, the researchers conclude that, unlike the situation on inter-urban roads, strict speed limits are unlikely to reduce emissions significantly in urban areas. Moreover, it is crucial in urban situations that different modelling approaches are applied to test the impact of potential speed reduction policies. Current approaches may not be able to provide definitive answers as to the effects of speed reduction in urban areas, but using different methods will at least provide a more rounded understanding of the problem. The researchers also stress that speed limits in urban areas should be first and foremost a safety, not environmental, measure.

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