

ROADS

Concrete Roads Save Fuel

A growing amount of research is finding that, when compared to asphalt roads, driving on concrete roads delivers dramatic fuel savings particularly for heavy goods vehicles. With petrol prices continuing to the rise, the research makes interesting reading for anyone concerned about the cost of filling up their vehicles.

Research carried out by the Canadian National Research Council's Centre for Surface Transportation Technology (1) found that at 100km/h a heavy goods lorry used up to 1.8% less fuel when travelling on a concrete road compared to an asphalt pavement and up to 3.1% less fuel compared to a composite (asphalt topcoat over concrete). When travelling at 60km/h, the fuel saving was up to 3% compared to the asphalt road and up to 6% compared to the composite road.

For a passenger car, the concrete road fuel saving was 2.9% compared with the asphalt road pavement and a reduction of 2.3% fuel consumption compared to the composite pavement.

The Canadian research has been backed up by new research carried out in Sweden by the Road and Transport Research Institute (2). The Swedish research examined the fuel consumption of a Volvo car and a 60 tonne lorry on the E4 motorway north of Uppsala, Sweden, which has both concrete and asphalt sections. Driving on the concrete section the lorry used 6.7% less fuel than when driving on the asphalt section. The car used 1.1% less fuel on the concrete section compared to the asphalt.

Similarly, research carried out in Japan by the Nippon Expressway Research Institute, together with Narita International Airport and the Japan Cement Association (3) found that the fuel consumption of a heavy good vehicle is up to 3.4% less on a concrete road compared to asphalt.

What the research has found is that the smoother ride offered by concrete pavements compared to the ride resistance of asphalt roads contributes to significant fuel savings. This is a direct cost and sustainability benefit that drivers can understand. The findings provide further evidence of the benefits of having concrete inside lanes for dual carriageways and motorways. These 'truck lanes', in addition to enabling fuel savings, would also provide longer performance and need less remedial maintenance.

1. Effects of pavement structure on vehicle fuel consumption. G.Taylor and J.Patten, Centre for Surface Transport Technology, National Research Council of Canada. 2002
2. Measurements of fuel consumption on an asphalt pavement and a concrete pavement in Sweden. B-A.Hultqvist, Department of Road Engineering, Road and Transport Research Institute, Sweden. 2010.
3. Effect of pavement type on rolling resistance and fuel consumption of heavy-duty vehicles. T.Yoshimoto, Japan Cement Association; T.Kazato, Nippon Expressway Research Co. Ltd; I.Hayakawa, Narita International Airport Co. Ltd. 2010.



Ring Road around Antwerp

Whisper Concrete – Historic first section to be replaced

After Seventeen years in service, a short stretch of the first ever whisper concrete to be laid in the UK is due to be removed and replaced with an asphalt thin surface. The section, on the northbound carriageway of the M18, between Junction 5 – 6, was constructed by Mowlem Civil Engineering in two layers paved monolithically.

A rail mounted SGME paving train laid the concrete 240mm thick. The base layer was 190mm thick, and the top 'whisper concrete' layer was 50mm thick and used high skid resistant gritstone 8mm chippings from Cumbria in the running surface.

After a Gomaco longitudinal 'super smoother' had passed over the concrete, a surface retarder was applied and covered with polythene sheets for protection. After some 24 hours the polythene was removed and the surface laitance brushed off to expose the aggregate surface which has lasted so long.

Concern was expressed at the time about loss of the small surface chippings but those doubts have proved groundless. This first section of whisper concrete gave noise readings less than adjacent hot rolled asphalt, and the 'trial' contract was deemed a success.

Now the reasons for the replacement of this historic section are given as de-bonding of the upper surface from the lower one, and also there has been some pot holing.

Still, not bad for 17 years! Will the new asphalt surface last as long?