A new road surface cuts tyre noise to one-tenth of that produced on today’s asphalt. EU-funded researchers have now moved tests from the lab to Europe’s roads, with the aim of providing a quieter, less stressful life for those living next to lots of traffic.

The constant hum and roar of traffic is mostly tolerated as a stressful annoyance by people living and working in cities or along motorways. But this noise reduces overall quality of life and can even damage health over time, according to a 2011 World Health Organization (WHO) report.

Among the findings: about 2 out of every 100 ischaemic heart diseases in Western Europe are attributable to stress and elevated blood pressure caused by traffic noise. And one in five reported their sleep was disturbed because of traffic noise.

For cars moving at speeds over about 30-40 km/h, most of this noise comes from tyres as they roll along an asphalt or concrete pavement. The EU-funded PERSUADE project is working on a way to reduce this noise tenfold – or by 10 decibels – through a yet experimental surface made of recycled tyres, stone aggregate bound together with an elastic polymer such as polyurethane.

“A drastic reduction of traffic noise for people living in agglomerations and along roads is within reach,” declares project coordinator Luc Goubert of the Belgian Road Research Centre (BRRC).

The breakthrough makes it possible to reduce traffic noise in areas where noise barriers cannot be erected, such as along city streets, he says. It could also provide a cheaper, more effective alternative to noise barriers – for example concrete walls – used to shield residents along motorways. Noise barriers typically achieve a reduction of 7 to 12 decibels.
The project, which ends in August 2015, is now refining the new surface and its application by testing it on road sections in Denmark, Sweden, Belgium, Poland and Slovenia.

**Optimal mix**

Poroelastic surfaces mainly work by reducing tyre vibrations – a major source of noise. Vibrations are reduced due to the extended contact of the tyre with the elastic surface. This, together with the material’s sound-absorbing air voids and the fine texture of the road cuts the noise drastically.

PERSUADE built on earlier tests of poroelastic surfaces, done mainly in Sweden and Japan. Those surfaces had foundered on durability – the material tended to disintegrate after a relatively short period. Following extensive testing of a variety of mixtures, PERSUADE’s researchers hope they have identified and solved the problem.

The new mixtures reduce tyre noise, are as skid resistant as asphalt, can be applied using existing road-laying equipment, and are cost-effective compared to existing noise barriers. Laboratory testing indicates that the durability is about the same as thin asphalt layers on roads. The PERSUADE surfaces also reduce the fire hazard compared with conventional dense asphalt or concrete.

**From the lab to the road**

The project team has now started assessing noise reduction, durability, skid resistance and other factors under actual road conditions. Half of a 75-metre section of road near Kalvehave, Denmark, was resurfaced with a PERSUADE mixture in August 2013.

However after a few months the material started to loosen from the pavement, mainly because it did not cure properly, says Goubert. During the construction, the team observed that the binder was too liquid and dripped off. The result was the rubber and stone material at the top did not bind properly.

The section was removed and replaced in June 2014 after the problem with the binder was solved.

“This is part of the learning process,” he adds. “Success depends on curing time – and that depends on the weather. The humidity and temperature must be not too high and not too low. We have to fine-tune the mix to the ambient temperature and conditions when the surface is laid.”

At Linköping, Sweden, the team tested prefabricated panels of the material along a 25-metre section of road. The panels were laid in November 2013 after the top layer of asphalt was removed.

At Herzele, Belgium, 40 km west of Brussels, a 50-metre section of road will be surfaced in August 2014 with a test mixture. Additional tests will be carried out in Poland, Sweden and Slovenia in 2014.

An initial analysis indicates that even with a three year lifespan, the PERSUADE surface would be a cost effective alternative to noise barriers. Three years is however too short in practice. The project is aiming at a lifespan of seven to nine years.

The project partners plan to continue tests and further research after the project ends, either individually or together. For example, project partner Duravermeer, a road construction company, has responded to a call by the Dutch government to develop and demonstrate innovative poroelastic surfaces.

See also: [CORDIS](http://cordis.europa.eu)
PoroElastic Road SURface: an innovation to Avoid Damages to the Environment

**Project Acronym:**
PERSUADE


**Links**