



PLASTIC ASPHALT

Recycled plastics can make asphalt sturdier and cheaper.

Recycled plastics have multiple uses, including road construction. At the moment, pavements based on recycled plastics offer a great value.

ROAD PAVEMENTS BASED ON RECYCLED PLASTICS BOAST ENHANCED DURABILITY AND HIGHER WATER RESISTANCE.

Benefits offered by this approach include lower costs in terms of road maintenance, asphalt production, and waste disposal, to name just a few. Moreover, road pavements suffused with recycled plastics boast enhanced durability (including tensile strength) and tyre grip, and demonstrate higher resistance to water, lubes, and fuels. Thanks to its plasticity, the additive helps prevent pavement deformation in the long run and minimise crack growth while in service.

In 2002, the Indian KK Plastic Waste Management Ltd. was the first company to patent the technology for using recycled plastics in road construction. Its engineers had developed KK PolyBlend, a polymer blend made out of recycled polyethylene bags, plastic cups and PET bottles.



KK PolyBlend road pavements. Photo: [facebook.com/plasticroads](https://www.facebook.com/plasticroads).

EACH KM OF ROAD LAID USING THE MR GRANULES CONSUMES THE EQUIVALENT OF 684,000 PET BOTTLES OR 1.8 MILLION PLASTIC BAGS.

The blend is mixed in the ratio of 8:100 to the total weight of bitumen in the asphalt concrete mixture, thus improving road pavements. Bangalore, where the company's waste recycling plant is based, has seen ca. 2,000 km of roads laid using KK PolyBlend, with some 8,000 tonnes of plastic waste used for this purpose. The new pavement has stood the test of time. In 2009, the Central Pollution Control Board of India published a study which stated that the roads leveraging the innovative technology performed well and developed no cracks or potholes. The plastic component makes bitumen more rigid and water resistant. According to the manufacturers of plastic bitumen, the technology requires ca. 1.5 tonnes of recycled waste per 1 km of road laid, which is equal to 3 to 4 tonnes of non-recycled plastics.

Scotland's MacRebur hit on the idea. Its founder and inspiration, Toby McCartney, came up with a technology to granulate recycled plastics, called MR. The company offers a total of three granule modifications. MR6 is designed to increase stiffness and deformation resistance on slow moving roads or bus stops, and is mostly efficient in a hot climate. MR10 makes road pavement more flexible and durable in a cold climate. MR8 is conceived to completely replace bitumen.



Paving the MR-based asphalt mixture. Photo: macrebur.com.

USING 20% OF RECYCLED PLASTICS PROCESSED INTO EASILY MELTING GRANULES CAN HELP REDUCE THE ASPHALT LAYING TEMPERATURE BY 40%.

According to Mr McCartney, their mission is to help solve two world problems: enhance the road quality and curb the pandemic of waste plastic. That said, he refuses to fully disclose the composition of their innovative mix, a secret shared only by the other two co-founders of MacRebur. They point out that their products are made using materials derived from non-recyclable waste plastic that was destined for landfill or incineration. Each km of road laid using the MR granules consumes the equivalent of 684,000 PET bottles or 1.8 million plastic bags. According to the company, their road surface is 60% stronger and 10 times more durable.

In 2017, the company built the first MR-based road in the north-western English county of Cumbria. 2019 saw the technology make it into the British capital, with plastic asphalt used to lay a bike lane running through London's Queen Elizabeth Olympic Park.



First-ever plastic road in Cumbria. Photo: facebook.com/pg-macrebur.

Founded in 2011 and ranking among Canada's fastest-growing companies since last year, GreenMantra develops polymer additives based on recycled plastics which can be used in road construction, asphalt roofing, and composite manufacturing. The company is also building an innovative production line to process polystyrene waste into modified polymers for inks. However, its key innovation makes a real difference in road construction as it helps use up to 20% of recycled plastics by processing them into easily melting granules designed to reduce the asphalt laying temperature by 40%. Today, the modified asphalt solution is widely used in Vancouver, including on busy highways.

How GreenMantra makes polymer additives for road construction

Gathering
polyethylene
bags



Transporting granules to the
plant which manufactures
polymer additives



Shredding, washing and
melting plastic waste
into primary feedstock
(polyethylene granules)



Processing granules into wax,
with a special unit melting and
mixing plastics and a chemical
catalyst splitting molecular
chains to produce liquid wax



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This year, South Africa built its first-ever road with plastic asphalt. The pilot project focused on a 1 km road section in a coastal municipality of Eastern Cape. Scotland's MacRebur was engaged in the project alongside the locally based SP Excel and Scribante Construction. In July, the companies started laying plastic asphalt on a highway section between Durban and Johannesburg. The engineers conceived this project to find out if the new asphalt can withstand the South African climate and regular sun exposure.