

# In situ recycling: neutralising tar safely and at low cost

Three recent projects carried out by Colas have shown in situ recycling to be a very cost effective option for reconstruction of roads containing tar bound material.

Circumstances have brought back demand for Colas's in situ cold mix recycling operations for the structural repair of roads. Reconstruction of carriageway below surface course level has become a necessity due to severe deterioration of road condition in some locations. If the existing layers to be rebuilt are found to contain hazardous tar bound macadam, treating the material without moving it is proving to be an effective and relatively low cost solution.

The in situ process involves planing off the surface of the carriageway then scarifying down to depths of 200mm to 300mm, mixing in an appropriate type and quantity of binder and compacting the resulting treated material. According to Colas, demand for this method of road recycling fell away in recent years.

"This was mostly due to local authorities not reconstructing their roads," says the company's Recycling Manager Jochen Troeger. For three highway authorities and their contractors in Dorset, Bedfordshire and Cumbria at least, structural highway repairs have become essential. In each case, this has meant considering what to do about the tarmacadam frequently found in road construction over 40 years old.

Regulatory requirements and costs associated with the different options available were the critical determinants of what was done. While all excavated material is classified as waste, the Environment Agency (EA) defines materials containing greater than 0.1% tar as hazardous. Highway authorities, obliged to investigate whether any project is likely to encounter such a hazard, can test arisings after they are produced. But if tar is then detected, options for dealing with the contaminated



In situ recycling represents a cost effective means of renewing worn carriageway

material are effectively restricted to disposal or treatment at a suitably licensed site. The number of these is limited and the costs usually prohibitive if the arisings have to be transported over a significant distance.

Clients of Colas over the past year have adopted the opposite approach, which is regarded as good practice by ADEPT's guidance on dealing with tar bound material, by exploring the chemical make up of existing road layers from the start. Contractors Hanson in Dorset and Amey in Bedfordshire and the highway authority Cumbria County Council were then able to design or specify appropriate solutions that avoided disposal at landfill and ultimately saved a lot of money.

Cumbria County Council Technical Director David O'Farrell helped produce industry's guidance as Cumbria's representative on ADEPT's Soils & Materials Group. He says: "Contractors, on discovering tar in arisings, can mix these

with other material until the level of contamination is within the acceptable threshold, but only if they have the necessary permit and permission from the EA and follow regulations for handling hazardous material. There has been a recent test case whereby a contractor in the Midlands was prosecuted for mishandling tar contaminated planings.

"Proper testing should not be viewed as onerous. The EA has stated that if highway authorities have issues of tar, no action will be taken against them as long as they are sticking to existing guidance. The best advice to authorities suspecting the presence of tar is to seek advice from their local EA office."

According to Mr O'Farrell, ADEPT's guidance was produced to encourage a "uniform and consistent approach" avoiding disposal at landfill for reasons of environmental sustainability regardless of cost. Practically this leaves highway



Tarmacadam that has been down for many decades is more likely to contain hazardous materials

authorities or their maintenance contractors with two options: in situ or ex situ recycling. The latter has been adopted by a number of councils in the past for processing large quantities of material. Substantial programmes of road reconstruction justify the scale of ex situ operations, which involve location of a processing site with materials processing, grading and mixing plant.

For authorities without such resources, but discrete reconstruction projects to tackle, the in situ recycling option makes more economic sense. Dorset tasked its contractor Hanson with rebuilding a section of the A350 on the outskirts of Poole in the autumn of 2010. In situ recycling, selected to prevent disposal of tar contaminated material at landfill, gave a monetary saving greater than the cost of Colas's contract, according to Jochen Troeger. It also presented the best means of solving a traffic management problem.

"Closing the road for reconstruction was impossible because the A350 is the main north-south route in the area, but we were able to operate traffic control with work under way on one side of the road at a time," Mr Troeger says. "This could not have been done with ex situ recycling because of the 320mm deep excavation it would have produced."

Similarly, for Bedfordshire's term maintenance contractor Amey this year, access was maintained along a residential road in Bedford while the carriageway was reconstructed. As in Dorset, a deep excavation (260mm in depth in Bedford) would have prevented safe running of traffic alongside.

In both cases a 40mm surface layer was

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removed before a Wirtgen recycling machine treated the road to the required depth. Different mix designs were developed for each scheme – a fuel ash bound material in Dorset and a stronger cement based base course in Bedford due to the thinner depth of construction. But both projects featured the same detailed preliminary work.

Trial holes, coring and extracting of samples for developing trial mixes prior to

work starting on site, were followed by in situ and laboratory testing of the recycled material during and after the reconstruction proper.

"Both clients have since said they will look to use in situ recycling again," says Mr Troeger.

Cumbria's project, carried out in August this year, differed in the fact that an ex situ solution was initially devised for reconstructing two sites – one of 10,000m<sup>2</sup> in size and another of 2000m<sup>2</sup> – 48km apart.

However, when costs were considered during tendering of the contract, Colas's bid with an alternative in situ design offered a £300,000 saving, mostly due to the distances of transport and site set up costs involved with ex situ recycling.

"We have chosen to carry out in situ recycling on part of Cumbria's non principal road network because the technique offers equivalent levels of durability compared to traditional reconstruction methods, while bringing cost savings and environmental sustainability benefits," says Cumbria County Council's Area Highways & Transport Manager Johnathan Smith.

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