

CEMEX

Recycled surfacing marks UK sustainability progress

CEMEX has achieved a 25% RAP content in the UK's first major contract to recycle surface course.

Recycling is now becoming standard practice for road reconstruction, but so far the technique has mainly been restricted to base and binder courses. Material recycled from surface

courses still tends to be incorporated into lower pavement layers.

That could be set to change in the future, as CEMEX has demonstrated through the UK's first major contract to recycle existing

wearing course into a new running surface.

The project involved planing off and replacing the wearing course over a 5km section of the M4 between Junctions 32 and 33, north of Cardiff between mid July and the end of August 2006. It was funded and promoted by the Welsh Assembly Government, which is very keen to promote recycling of road materials. CEMEX Construction Services won the £1.3M contract after a competitive tendering process.

This is Viapave with a 25% RAP content. CEMEX

The Welsh Assembly Government gave two options for the contract – traditional surfacing or recycling using 25% or more of the existing material. There was a slight cost premium for the recycling option, according to the company, but only very slight.

Although this stretch of the M4 carries a lot of heavy traffic, the underlying structure of the road is still sound. It was only the surfacing – a 50mm porous asphalt wearing course – that had come to the end of its life and needed replacing.

But it is the design of this surface course that makes it suitable for recycling, according to CEMEX. A lot of the company's work involves taking up hot rolled asphalt with chippings, which is not good for recycling back into modern surface courses. On the M4 there is a thin wearing course

CEMEX's surfacing material for the M4 was mixed at Wellvoe quarry – the company's South Wales drum mix plant





Working on an historic 'first' – CEMEX operatives replacing M4 surfacing with recycled material

with a single size, high PSV aggregate, which makes it ideal.

CEMEX carried out all of the work at night, working on one lane at a time between the hours of 9.30pm and 5.30am. Each night the contractor managed to plane off and replace between 400t and 600t of surfacing before repainting white lines and reopening the lane to full traffic when the closure ended.

The road was planed to a depth of 50mm and the planings hauled to CEMEX's Wenvoe quarry, approximately 11km away. Here the planings were screened, the moisture content checked, and the suitable aggregate that came out of the planings was moved to the company's nearby Forest Wood asphalt plant. The planed aggregate was then mixed with virgin aggregate and a polymer modified binder to form the new surfacing material.

The resulting material is a version of CEMEX's Viapave – a nominal 14mm aggregate, high PSV, thin wearing course system made with polymer modified binder. To be precise, it is Viapave with a 25% RAP (Recycled Asphalt Planings) content. CEMEX uses a polymer modified binder because it believes it is a reliable material and does not cause problems of binder migrating. It is also a closer match to the binder in the original porous asphalt.

One of the biggest challenges in road

recycling is to maximize the amount of RAP in the mix, and the Welsh Assembly Government's demand for 25% or higher is at the upper end of levels normally achieved in recycled mixes. Planings cannot be pre-heated, so they tend to bring the temperature of the mix down when they are added – one of the main reasons why RAP content is often only 10% to 15%.

CEMEX normally adds the recycled material into the mixer, where it cools the mix. With the M4 mix it is adding a percentage of RAP into the dryer and a percentage at the mixer.

According to the company, temperature is not the main inhibitor to incorporating a higher percentage of recycled material. Usually only 20% to 30% of what comes out of the planings can be used. A large percentage of single size stone is needed, and a lot of it gets broken up in the planing process and during crushing and screening.

However, all the surfacing material that CEMEX is planing out of the M4 is being recycled, with the material that is not suitable for the new wearing course going into binder and base course material. That is one reason why the company carried out the processing at Wenvoe. There, there is a drum mix plant that is used for most of the binder and base course that CEMEX lays in South Wales. During the contract, 1000t of

leftover planings went to the National Eisteddfod for footpath construction.

At the tender stage, the Welsh Assembly sent contractors a 10t sample of the planings so they could make trial mixes of their wearing course. CEMEX tried different mix temperatures and discovered that the material is at its easiest to handle when mixed approximately 20°C higher than traditional asphalts. However, it still cools in time to run traffic at full speed when the road reopens without any rutting.

Throughout the project the Welsh Assembly had a team of inspectors monitoring CEMEX's work. What they seemed to be really interested in was the company's audit trail that proved it had put 25% RAP in. The client has also insisted on a five year guarantee for the new surfacing.

CEMEX believes there is set to be a significant increase in resurfacing projects that incorporate recycled planings. At the moment contractors do not see an awful lot of pure thin wearing course renewals. They are normally planing deeper and taking out the lower layers as well. But over the next few years the industry will start to see the first generation of thin, single size, high PSV wearing courses coming out.