

Roadstone Recycling

Strengthening the benefits of recycling

Reconstruction of a key road in Northumberland has further lengthened the list of projects carried out in quick time and with reduced costs through use of ex situ recycling.

Costs have been reduced and carriageway strengthened ahead of programme by a recent road recycling project, with savings in use of energy and primary aggregates. Specialist contractor Roadstone Recycling is most keen to emphasise the scheme's semblance of routine however, pointing to the apparent normality of the benefits of ex situ recycling.

Northumberland County Council's (NCC) A189 Spine Road near Blyth, north of Newcastle, is the latest stretch of carriageway to be recycled by Roadstone Recycling. The project team has reconstructed 15,000m² of carriageway in three weeks using the technique and in the

process, given the road another 25 years of design life, at a saving of around £30,000.

"These figures are typical of what can be achieved now with ex situ recycling," says Roadstone Recycling Managing Director Gary Cook. "We will probably finish 2004 with 12 projects completed during the year. Every single one has saved money in comparison to conventional hot mix reconstruction and produced the right result in terms of a durable carriageway."

Roadstone Recycling was subcontracted to Tarmac, which in turn was working for NCC's framework contractor Mowlem, on the A189 job. The project is just the latest to be completed by Roadstone Recycling.

Others this year have been larger and saved more money due to economies of size.

However, the A189 project stands as a good example of how quickly a road can be reconstructed using the ex situ recycling technique. Mowlem's £850,000 contract also involved construction of safety fencing and other ancillary work and took 23 days to complete. Of that total, only seven days were spent planing and nine laying the recycled asphalt.

As is usual with Roadstone Recycling's ex situ cold mix recycling, the asphalt planings were processed at a temporary site established nearby, in this case at the disused Blyth power station 5km away.

The planings were graded before being mixed with bitumen which was 'foamed' with injection of air and water immediately before being added to the mix. The result was a relatively cold recycled asphalt mix – in comparison to the conventional hot alternative – which could be laid immediately or stockpiled for later use.

"Aggregate grading and production of the recycled asphalt is closely controlled at the mixing site, which is a distinct advantage over in situ recycling. Material produced ex situ is very consistent and can be laid with confidence using conventional paving equipment. This has given ex situ recycling the edge in terms of performance and means it can be specified for heavier traffic loadings," says Cook.

Durability of the recycled pavement was

Tarmac and Roadstone Recycling needed only sixteen days in total to plane off, recycle and relay 15,000m² of asphalt





Grading of planings and mixing of recycled asphalt was closely controlled at a temporary site close to the A189 reconstruction project

important to NCC, but so were price and environmental concerns, as Project Manager Ray Thompson explains.

“Our main aim was to generate some cost saving, but the contract was two edged. Saving of primary aggregate and energy costs was also an attractive proposition in terms of meeting our environmental targets.”

“We originally asked our framework partner Mowlem to produce indicative prices for carrying out this project using conventional and recycled reconstruction. We were keen to go down the ex situ recycling route and so far it seems to have worked. It has definitely succeeded in terms of price and environmental benefit. We now just need to see if the recycled road stands up from a technical point of view.”

Tarmac and Roadstone Recycling have reconstructed three lanes of a 1.4km stretch of the A189 dual carriageway. Existing construction anticipated for the recycled asphalt mix design consisted of an 80mm thick surface course of Hot Rolled Asphalt, over a 65mm HRA base course and a further 85mm dense bitumen base course. Beneath this lay a further 220mm of wet mix macadam.

The mix design for the recycled asphalt was based on similar material used to reconstruct another section of the A189 in December 2000. Both projects have been designed using Roadstone Recycling’s

standard specification to produce a recycled asphalt equivalent in strength to a heavy duty road base. A 25 year design life was required with an anticipated loading of 35 million standard axles.

The mix was designed to consist of 91.5% of recycled aggregate with 4% pulverised fuel ash, 1.5% cement and 3% of 150 penetration grade bitumen – all mixed to an optimum moisture content of 5.5%.

Planing was carried out to a depth of

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350mm to ensure a sufficiently deep strengthened carriageway. Thickness of the new recycled asphalt is 310mm, laid and compacted with standard paving and rolling equipment in two layers. This was then overlaid with a 40mm layer of HRA to match previous schemes.

According to Thompson, the current work is part of an ongoing programme of major strengthening of the A189 in Northumberland. The performance of the recycled road base will be closely monitored during its early life before the technique is adopted for further sections of the A189.

Based on results obtained so far however, he is optimistic that the recycled carriageway will meet expectations. Cook, with eight

years as an exponent of ex situ recycling, is even more confident of the new carriageway’s performance.

“Every single carriageway reconstructed by us with ex situ recycling has performed as expected, where the contractors have stuck fully to the specification. We have laid about 400,000t of recycled asphalt now and the road strengthened through our first major project in Walsall is still going strong after seven years.

“Another prime example of good performance is the A52 in Staffordshire, which in 1996 was another early ex situ reconstruction scheme. That carriageway was 98% recycled to a depth of only 200mm on a steep slope still used by a lot of heavy vehicles.

“In terms of recycled carriageway strength, we were getting 2,500MPa in tests then and we are now designing for around 4,400MPa,” Cook says. “There is no reason why all roads should not be reconstructed this way and achieve the same savings in cost and consumption of primary aggregate and energy.”

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