

Stabilising the road



Stabilisers bring recycling improvements to roads in the UK and Armenia

The local road authorities near the UK city of Bath have saved nearly €250,500 on the cost of repairing a 400m long section of the B3110 Midford Road. This saving has been achieved by opting to recycle and strengthen in-situ the existing surface, instead of using conventional full depth pavement reconstruction. The road surface upgrade was required as the existing road was disintegrating though all its layers and needed repair.

In addition to the construction cost savings, in-situ recycling also provided substantial environmental benefits including a reduction in carbon dioxide emissions as well as reduced materials transportation and less use of newly extracted materials. At the same time, the work reduced disruption to the road network.

The bulk of the cost saving came from not having to extract and dispose of waste material in a special, licensed landfill. Instead, the existing road materials were re-used as the primary source of aggregates and these were recycled and strengthened in-situ cutting waste. In addition, an estimated 12tonnes less of CO₂ emissions were achieved using in-situ recycling.

Site investigations and subsequent materials testing showed that the road pavement contained a high proportion of tar material. The various road repair options available were examined and it was clear that in-situ recycling offered a cost effective and environmentally beneficial solution. With some 1,800tonnes of bituminous materials in the road pavement, it made sense to re-use the existing surface rather than extracting this and disposing it off-site at a licensed waste site around 80km away. Tar

material disposal costs alone would have been approximately €205,000 and some of this material was classed as special hazardous waste, which meant that it probably needed incineration, costing around €1,139/tonne.

Contractor Atkins had previous experience of in-situ recycling and the process proved to be the best option to reconstruct this particular section of road. In-situ recycling also proved less disruptive to local traffic than conventional reconstruction as it saved about 180-200 movements of 20tonne trucks, as well as improving the carbon footprint of the work.

By using in-situ recycling for the road, the authorities also made cost savings on the bituminous base and binder courses that would have been used in conventional pavement reconstruction. The construction work would have cost around €626,450 using conventional pavement reconstruction methods and would have taken longer and been more disruptive to road users. The in-situ repair proved to be quick to carry out on-site and was also able to cope with light traffic almost straight away. The numerous benefits and success of this in-situ repair technique mean that the authorities will be using it on similar road strengthening schemes in future.

The in-situ recycling process was carried out by a specialist contractor, Stabilised Pavements, using a stabiliser to rework the damaged road pavement to depths of up to 320mm. The

A blend of cement and pulverised fuel ash was spread as a blanket across the remixed material to strengthen in-situ the tar bound road

ROAD RECYCLING/STABILISATION

- ▶ stabiliser simultaneously mixed in specific quantities of 70% cement and 30% pulverised fuel ash (PFA). This was applied in a powder blanket across the surface of the remixed material at a ratio of 8% by volume of the in-situ material's dry density, as required by the specification. Depending on the in-situ recycling work being carried out and the application, lime, cement, pulverised fuel ash, bitumen emulsion, foamed bitumen and water can be mixed in by the stabiliser. The mixture can then be compacted, re-profiled, re-rolled and overlaid with a final surface for a fast return to traffic.

For this job, the quantity of the strengthening agent was determined from testing and mixed in a one-pass operation with the stabiliser at the designated depth of 180mm. Water was added into the mix at the same time to achieve the required optimum moisture content. The cement and PFA complement each other as the cement provides an initial gain in strength of the recycled materials, while the PFA slows hydration and helps increase strength over time. The process was performed in accordance with the relevant specification for structural maintenance of highway pavements.

Stabilised Pavements had to recycle and strengthen in-situ 3,868m² of road to a 180mm depth of tar-bound hazardous material and provide a 20-year design life for carrying 2.5 million standard axles. The 10m wide carriageway was treated in two separate halves. Whilst one half of the carriageway was being

recycled and strengthened, the other half remained open for one-way traffic. Once the required levels and compaction was achieved the surface of the in-situ repaired carriageway was sprayed with a sealing tack coat and gritted as a temporary running surface for traffic. The process was then repeated for the other side of the carriageway using the adjacent recycled carriageway for one-way traffic.

Although the in-situ recycled and stabilised base course bulked-up during processing, the centre-line crown levels were adjusted for the new road surface. The crown was raised by 80mm, and 10mm along the channels, increasing the cross falls to 6-7%. Atkins's surfacing contractor Bardon Contracting followed on and overlaid SPL's rejuvenated full width road base with a conventional 50mm thick hot rolled asphalt surface course for a fast return to full traffic.

Meanwhile in Armenia, a Caterpillar RM500 Rotary Mixer has been used for road reclamation, the first time this type of machine has been used in the country. The machine was demonstrated to Armenian Government officials by Caterpillar dealer Zeppelin Armenia and local contractor Chanaparh. The machine was first used to carry out a demonstration of asphalt and road base recycling and stabilisation to depths from 200-250mm on a 250m long by 7.5m wide road, in three passes. Water was mixed into the reclaimed asphalt and base material before compaction and the machine produced sub-base to grade, prior to the 60mm asphalt wearing

LOOKING FOR A SPRAYER?



MASSENZA

Via Bologna, 12
FIDENZA (PR) Italy
Ph.: +39 0524 202811
Fax: +39 0524 530205
E-mail: massenza@massenza.it
www.massenza.it

ROAD RECYCLING/STABILISATION



Armenian contractor Chanaparh is now using a Caterpillar RM500 to help recycle roads and provide rapid repairs in Armenia

▶ course being laid with a BB651C paver the next day. After the demonstration, Chanaparh put its new RM500 to work and took the machine to a small village near Yerevan where it reclaimed a 750m section in five hours.

And further substantial reductions in CO₂ emissions from highway repairs can be made if the material used to repave the surface is supplied from a warm mix type plant, according to French firm Fayat. Using warm mix production at around 120-130°C with bitumen with additives can allow emissions savings of 20% or higher. Some techniques are based on temperatures below 130°C, or even below 100°C, which further reduce emissions, as well as having the direct

cost saving from cutting fuel costs.

Many one- and two-drum asphalt plants can be adapted to these solutions without major modification. Using continuous recycling with a two drum plant and an external mixer, the RMS TSR ERMONT offers an effective solution. Using some 70% of recycled material in the plant requires the joint use of TSR and the main dryer mixer. The TSR reheats the recycled matter, but it is not recommended to exceed 110°C to prevent clogging and also to ensure that no polycyclic aromatic hydrocarbons are emitted as this can occur when the temperature tops 130-140°C. With this low energy process up to 60-70% of the materials in the plant can be recycled, further cutting the overall impact of the road repair. ■

searchable
List of companies
worldhighways.com

Caterpillar
www.cat.com

Fayat
www.fayat.com

Stabilised Pavements
www.stabilisedpavements.co.uk

Wirtgen
www.wirtgen.de



Safety Care Traffic **ALWAYS PROTECTING YOU, NATURALLY!**




www.sctitalia.com Sct s.r.l, via Agostino Novella n°13 - 25046 Cazzago San Martino (BS), ITALY
tel. +39 030 2092541 fax. +39 030 2010774 e-mail info@sctitalia.com