

CEMEX

Ingenuity solves surfacing problem

Use of a special additive has allowed CEMEX to reconstruct a full depth of asphalt pavement during night time possessions of a busy motorway.

The northbound section of the M6 approaching Junction 7 in the West Midlands is one of the busiest stretches of road in the UK. It is used by more than 150,000 vehicles a day, but only comparatively few night time motorists will have noticed a recent major reconstruction of the road.

Surfacing contractor CEMEX UK Construction Services came up with an ingenious way of surfacing full depth sections of the carriageway in nightly possessions during this project. Greater value was provided for the client in terms of costs as well as the vast reduction in disruption to end-users, many of whom drive HGVs up and down this stretch of road.

Considerable strain is put on this road every day. Heavy traffic loads – 30% of the vehicles are HGVs, which is twice the national average – are compounded by the topography. The road is on a steep uphill slope, so the large vehicles often move very slowly and congregate as they move towards Junction 7, where the M6 meets the M5. The M6 surface has frequently been characterised by deep rutting and signs of disintegration.

Heavy use of the road has also made it difficult to carry out any major carriageway improvements without causing severe congestion. So repairs up until now have mainly consisted of planing off and replacing only the surface course during overnight possessions.

The last time this was done, in December 2004, the repair lasted only six months before rutting appeared and it was clear that the only satisfactory answer would be to take out the entire bituminous construction as far as the underlying concrete sub base and reconstruct it fully. But this raised the question of how such a major repair could be carried out without significant disruption to the road.

“The material is workable at a lower temperature than usual, takes less time to cool and is stronger when cooled.” Martin Stevens.

Repairs can only be carried out between 10pm and 7am. This is long enough for replacing a thin layer, but not for the full depth, 210mm reconstruction this project required. Using traditional bituminous materials, the overnight possession would not give enough time for three separate layers to be laid and, importantly, cooled sufficiently for heavy traffic.

Operation and maintenance of the M6 at Junction 7 is the responsibility of AmeyMouchel, the Highways Agency’s Managing Agent Contractor (MAC) for Area 9 of the motorway and trunk road network. CEMEX is AmeyMouchel’s preferred surfacing contractor for Area 9.

Martin Stevens, CEMEX UK Construction Services Director, says: “There were two main issues: the road

Heavy traffic loads compounded by the topography of the location put great strain on the M6 near Junction 7





The M6 was reconstructed during night time possessions without any surface course material having to be sacrificed due to CEMEX's ingenuity

surface and the underlying layers were starting to lose their integrity; and any work that involved us being there at peak times was unthinkable."

The MAC's initial plan was to carry out the reconstruction within possessions, but to treat the surface course as a sacrificial layer. After each overnight possession, traffic would be allowed back onto the road in full knowledge that the surface would rut. The next night, the top layer would be stripped out and replaced.

Although the Highways Agency was willing to accept this proposal,



Sasobit was used in a conventional mix to allow the asphalt to be laid at a cooler temperature

AmeyMouchel and CEMEX were determined to find a more cost effective and less disruptive solution, and the R&D team at CEMEX set about looking for alternatives.

What it came up with was Sasobit, an additive traditionally used to improve the workability of hand lay materials. The material also makes the resulting asphalt stiffer and less resistant to deformation once it has cooled.

CEMEX believed that with Sasobit in a conventional mix, the normal workability necessary for adequate compaction could be achieved at lower temperatures. And, if the asphalt could be laid at a cooler temperature than normal, the reconstructed road would not have to cool so much to carry traffic.

Added to this, the stiffness benefits of the additive would make the resulting pavement construction significantly stronger than a standard repair, giving the Highways Agency a solution that should last much longer than traditional alternatives.

Extensive trials were needed to obtain approval for a departure from the Highways Agency's standard, before the reconstruction project took place in December 2005. Over the course of eight nights, CEMEX planed out and replaced a

210mm depth of pavement construction on both lanes 1 and 2 of the M6 for a total length of around 1km. Each night between 200m and 300m of carriageway was replaced, with 3,200t of the modified asphalt used in total.

It was laid in three layers; the lowest being 120mm thick and consisting of a 0/32 heavy duty macadam with Sasobit. In the middle was a 60mm layer of 0/20 heavy duty macadam with both Sasobit and a polymer modified binder to give even more deflection resistance. The upper, 30mm thick layer was CEMEX's Viapave surface course material modified by adding Sasobit.

All three layers were laid between 20°C and 30°C lower than conventional asphalt and, as a result, more quickly reached temperatures at which traffic could run on the surface without deformation. "The material is workable at a lower temperature than usual, takes less time to cool and is stronger when it has cooled," summarises Stevens.

Now that the project has been completed successfully, CEMEX is looking at other potential uses for the Sasobit-modified asphalt, including heavily trafficked, traditionally failing roundabouts.