Long Life: Tarmac's Master plan

Innovation has been given a major boost by the advent of privately financed roads and private sector maintenance management of key elements of the trunk road and motorway network. The response of Tarmac proves the point.

There has been a fundamental change in the market for asphalt with new customers who have new problems, different perspectives and a new openness to ideas claims Tarmac Quarry Products Technical Director Colin Loveday.

"Standard products are no longer the universal answer and we have grasped this new opportunity with an approach focused on finding solutions to customers' needs, which is embodied in our new "Masters in Asphalt" branding."

Tarmac's approach reflects the company's recognition of the growing importance of maintenance, as opposed to new construction. Tarmac Quarry Products has secured a number of significant contracts. It is now responsible for the routine maintenance of the trunk roads and motorways of South and West Yorkshire; the Area 8 "Super Agency" in the northern Home Counties; and the entire length of the UK Highways M40 DBFO together with the local authorities contracts for Bradford, Epping Forest and Basildon, a total of nearly 3,500 kilometres of road.

TQP feels that its breadth of involvement from the design stage through construction, materials production, surfacing and now including long term maintenance leaves it uniquely placed to understand all phases of road operation.

"It is this kind of all embracing involvement which enables us to feedback from maintenance experience to improve our products and techniques," says Loveday. "Private funding in particular has freed us up to produce innovative solutions on major contracts and what we learn there increases the knowledge base which we can bring to all our customers."

An example of the new TQP approach was seen recently on the M40 where the Tarmac Laing Construction Joint Venture undertook an £11.5M contract for the UK Highways consortium which operates the motorway from London to Warwick on behalf of the Highways Agency under a DBFO concession.

The task was to reconstruct 7km of concrete carriageway between junctions six and eight, a decaying and notoriously noisy section which local residents frequently complained about. Motorists did not like the bumpy, noisy ride either.

The traditional approach to the problems on Junction 6-8 would have been to have repaired the old concrete pavement before overlay-

Tarmac laying Masterpave in echelon on the M40 near Oxford.

ing. Tarmac/Laing, however, opted to break new ground by the choice of a 'crack and seat' treatment - the first use of this technique on a UK motorway.

The treatment involves cracking the concrete into short slabs which slows down the onset of any cracking in the overlay due to expansion and contraction in the substrate.

"The task then was to devise an economic overlay solution and in this the design of the asphalt materials was crucial," says Loveday. "We worked closely with Tarmac/Laing and with Hyder, the JV's designer. It was necessary to come up with a base material which was stiff so that the overlay could be kept reasonably thin, but at the same time not too brittle in order to limit crack propagation."

The eventual solution was a special 50 pen DBM basecourse controlled to exacting in situ stiffness limits. "By managing the stiffness of the base we kept the overall asphalt thickness to only 150mm. This involved an extensive coring and testing exercise to certify mechanical properties and kept our laboratories working 24 hours a day at the peak of the work.

Some 1500 tests later and after a few sleepless nights we were able to present our customer with the job he wanted."

Full account was taken of customer needs in the choice of a wearing surface for the M40. The road user was looking for a smooth, safe, quiet surface. There was also a need to reduce traffic generated road noise in what is an environmentally sensitive area of the Chilterns.

The operator had a prime need to have a surface which would give the best maintenance profile over the whole life of the road, so durability and performance were paramount. TQP's solution to all of these problems was a 35mm layer of Masterpave with 14mm high PSV gritstone.

"We have worked very hard on Masterpave to get it as durable as possible," says Loveday. "Durability is a key issue when lane closure penalties come into play and we estimate that Masterpave should give a good five years life on top of the expectation for Hot Rolled Asphalt. It is quite possible for the road to complete the 30 year concession period with only a single surface treatment."

It is, however, the noise characteristics of the new surface which are the most impressive. "Both ourselves and our customers were delighted with the noise reduction as soon as the job opened," Loveday says. "So we commissioned the Transport Research Laboratory to find our just how quiet it really was."

TRL carried out a full noise survey over four days, comparing the Masterpave with porous asphalt and HRA on the adjacent section between Junctions 5 and 6. The survey showed that the noise reduction from HRA to Masterpave was 5.1 dB(A) for cars at 110km/h and 3.7 dB(A) for heavy vehicles at 90km/h.

Putting this in perspective, 3 dB(A) means a reduction of around 50% in noise level and 5dB(A) close to 70%. The survey also revealed that the Masterpave was almost as quiet as the adjacent porous asphalt, with a difference of only 0.6-0.7 dB(A).

"It's not just TRL who have noticed the difference," Loveday says. "So have the motorists and the locals. We feel that the Masterpave is giving the noise performance expected from porous asphalt but with much greater life expectancy and without the winter maintenance problems."

The use of Masterpave is not restricted to motorways. The material has been used in many applications from house drives to airfields, motorway service areas and race circuits like Brands Hatch and after extensive trials has now achieved Highways Agency approval.

"It is not just a single product which we try to lay everywhere," says Loveday, "but more of a bespoke surfacing system capable of adaptation to meet a wide range of needs.

"On the M40 its performance was right for the aspirations of the PFI concession holder in respect of its maintenance strategy. In other applications the needs are different and that is why we have developed a portfolio of solutions under our 'Masters in Asphalt' umbrella."

TQP's technical director Colin Loveday.

Masters in Asphalt: achieving solutions to customer needs

Tarmac has a 30 year maintenance contract.