

# Exploring the legacy of porous asphalt

June 2003 is the tenth anniversary of a key event in the advance of asphalt technology – the surfacing of a stretch of M4 in south Wales with porous asphalt.

Today's highly engineered thin surfacings such as Tuffgrip are durable, quiet running, promote road safety and are much the preferred surface course for Britain's roads. The technology behind them did not just happen, however: its development was an evolutionary process marked by a number of key events.

One such was production of the porous

asphalt laid between junctions 33 and 34 of the M4 in south Wales exactly 10 years ago. Porous asphalt for roads was then a relatively new material but the contract proved outstandingly successful. It can be seen in retrospect as a significant step in the development of surfacing technology.

"Porous asphalt with its high void content had been extensively trialled by the early

1990s and there was considerable enthusiasm for the spray and noise reductions that could be achieved," remembers Hanson's head of product technology Chris Curtis. It was a division of Hanson's predecessor ARC that was to win the M4 contract.

"There were some real concerns, however. A section laid on the M25 had lost its texture very early on, focussing attention on the need to achieve and retain void content. The proposed specification was onerous and there was unease about such matters as measurement of hydraulic conductivity."

Nevertheless, the Welsh Office and its agent South Glamorgan County Council were keen to use porous asphalt on a major contract, a 3.4km length of the M4 from Capel Llanilltern to Miskin. ARC was equally keen to get the work which, verging on the experimental, would provide an edge – all being well – over its competitors.

"Also it was our patch," says the former ARC Surfacing's south Wales general manager Denis Curran. "We had the required PSV aggregate at Craig-yr-hesg quarry at Pontypridd and a production facility nearby."

Production looked problematical at first. Bitumen binder for the porous asphalt required modification which ARC first thought could be provided by natural rubber used in powder form. But the specification called for an extra 30 seconds of mixing time with the number of batches each day –

Ten years on the surface still provides an excellent running surface





BP's Olexobit binder was used on the M4 contract

leading to lower output, tonnage to the laying machines and profitability.

"Which is where we came in," says the technical manager for BP Bitumen UK Ron Taylor. BP, long time a supplier to ARC, had taken part in the 1980s' porous asphalt trials where its modified bitumen had proved the best performing preblended binder.

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Based on a synthetic rubber, the modified bitumen was a derivative of a product developed by BP and already marketed with success in Germany under the brand name 'Olexobit'. "It's a very cohesive product, it sticks aggregate together very well and producing a thick binder film is very durable," Taylor says.

Taylor points out there was another major advantage to ARC in opting for Olexobit: the preblended bitumen could be stored in conventional tanks that were already in situ. "Hanson did not have to invest in its mixing plant," he says.

The Welsh Office proved an enlightened client, seemingly aware of the benefits of

partnering before that concept had been articulated by Latham, et al. There was close communication and cooperation between the client, its contractor, BP, TRL and the rest of the supply chain.

"Porous asphalt was new to us, the material presented fresh challenges. At every stage we all sat down, talked it through, trialled possible solutions, overcame the problems and came up with the right answers," Curran says.

The approach worked well. Twenty millimetre nominal single size stone was specified with a PSV of 68 – a Rolls Royce asphalt, as Curran describes it. The mix achieved went down beautifully, at up to 1000 tonnes a day, the contract being finished in half its allotted time. "The surfacing proved very successful (at reducing surface water and spray) and – unusually for a Government department! – generated a fair amount of praise for us," says Welsh Assembly Network Management Division project engineer Tony Carroll, formerly of the Welsh Office.

It still provides an excellent running surface 10 years on, a performance which

## Porous asphalt: a brief history

Porous asphalt dates from the end of the Second World War and development of the jet aeroengine. An open textured, pervious macadam was needed to clear water from runways to prevent fast incoming aircraft from aquaplaning in wet conditions. The material functioned well and, as traffic levels rose on Britain's roads in the 1960s, porous asphalt's suitability for highway surfacing was explored.

has been closely monitored – in particular for texture, skid resistance and noise – by TRL. Two further contracts were let in south Wales for porous asphalt on the M4 and ARC won them both. "We learned a heck of a lot which subsequently served us in good stead," Chris Curtis says.

Porous asphalt was not to prove popular, despite its many advantages. "Laid 50mm thick, it was just too expensive. What we had to do was develop a product that conferred the same benefits of texture, spray reduction, skid resistance and so on but was a lot less dear."

That product was Tuffgrip, a thin surfacing with BP's Olexobit 100 polymer modified binder. Tuffgrip is laid 25mm thick and is proving a commercial success for Hanson. "It really is a surface course for the twenty-first century", says Curtis.

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