Lafarge Aggregates

Momentum builds in high strength asphalts

Lafarge is pushing ahead with the next generation of durable asphalts, in pilot schemes for the Highways Agency.

Some very strong and durable asphalt was laid in February this year on the south bound slow lane of the M1. The material was an EME-2 mix developed by Lafarge Aggregates together with Shell Bitumen, and laid by Lafarge Contracting to further test and refine the company's techniques for mixing and laying EME-2.

Lafarge has now mixed and laid several thousand tonnes of this high strength base and binder course asphalt during a development programme stretching back several years.

Before the M1 job, which was the largest so far at 1500t, there was a 330t pilot contract on the M60 and going back further, 450t in Hertfordshire and 300t on the A14.

The A14 project was the first full pilot of EME-2 asphalt on the English trunk road network in November 2004, but for Lafarge, it was just a logical progression in the chronology of the firm's EME-2 work. Lafarge Aggregates has strong links with France where EME-2 originates and has been successfully used over many years. The company is now looking to lead further introduction of EME-2 to the UK.

Use of EME-2 is likely to increase significantly in the near future given its recent inclusion in the Specification for Highway Works Volume 7, Pavement Design & Maintenance. Long life asphalt pavements are the road sector's favoured option for future road construction and maintenance, and a lot of development work has gone into making French EME-2 technology applicable to the UK.

The initial work on EME – Enrobé à Module Elevé – for UK roads was effectively put on the shelves at Lafarge's Shawell development laboratory after initial trials, when the Highways Agency decided continued use of UK macadams with hard binders was its preferred option for High Modulus Bases (HMB).

But by 2002, the long term durability of HMB15 and 25 was being called into question and the HA put a stop to use of these materials.

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Robert Gossling

Lafarge's Business Technical Manager Robert Gossling says: "Based on our previous experience with EME, we decided to revisit the French methodology for design of EME-2 and stiff binders, having recognised it would out perform HMB35, which was also likely to be withdrawn by the HA. This included taking the HA's pavement engineer John Williams to France to better understand what the French engineers were doing."

According to Gossling, during this visit meetings were held with French contractors experienced in designing and laying EME-2, together with road managers and engineers who have been specifying and using the material over many years.

So began a development programme for UK EME-2 asphalt. Through a technology transfer arrangement with a French

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Lafarge and Shell have continued to progress development of EME-2 asphalt with 1500t laid on the M1 in February this year

Laboratory, Lafarge was able to use UK aggregate and binders in mix designs carried out strictly following French EME methodologies and standards. A broad range of aggregate and binders has now been tested in France including at Shell Bitumen's European Research Centre in Rouen.

Then, on completion of this initial laboratory design phase, a series of in house laying trials was started. These were at Lafarge's Dowlow quarry near Buxton in December 2003, a St Albans quarry in February 2004 and at a Cambridge site in June 2004 – with data from Lafarge's trials validated by the Transport Research Laboratory. The French specification was still being used at the time, although the HA, Quarry Products Association and Refined Bitumen Association have since developed a UK equivalent.

The result is a draft EME-2 specification in TRL Report 636 in 2005, including a very exacting new bitumen binder specification.

Several thousand tonnes of EME-2 asphalt has been mixed and laid by Lafarge

Following many years of experience, French engineers have determined that correct specification of the binder is a vital aspect of EME-2 development. The French approach requires greater control over the binder manufacturing process to ensure good resistance to oxidation, water attack, deformation and brittleness.

Following initial design work with BP and Shell Bitumen, Lafarge selected Shell as its binder supplier and partner in development of EME-2, and visited Shell's labs in France as part of its research efforts.

Shell Bitumen Technical Manager Andy Self says: "The new binder spec is very demanding but we have manufacturing methods to meet it. Our technical partnership with Lafarge on EME-2 involved extensive binder testing at our labs in Nottingham and Rouen. The Shell Bitumen technical team in France was able to impart a lot of useful information and experience on EME-2 binders and asphalt mixes."

"Experience to date from the pilot schemes carried out for the Highways Agency is very encouraging," Gossling adds. "Reports from the production and laying departments have confirmed that EME-2 can be produced and laid successfully with traditional UK equipment."