

Nynas Bitumen

Pilot success points to new high strength asphalt

Nynas Bitumen has taken a lead role in an extensive research and development project which has produced a new generation of high performance asphalt.

Very strong, long life asphalt pavements can now be supplied with confidence following successful completion of a pilot contract using a full specification for a new material – EME2. This has effectively concluded a three year Research & Development programme carried out by a team including Nynas Bitumen and Tarmac.

Emergence in Britain of EME2 – the French Enrobé à Module Elevé – is the result of considerable endeavour by the R&D project partners. Frequent visits to France have been required with extensive material testing for applying EME2 technology to the UK. This has culminated in the first full scale commercial use of the material by Tarmac and Nynas in Scotland this year.

Bonded layers of EME2 asphalt can form the base and binder courses of a pavement

and have a high content of hard bitumen binder combined with a carefully graded aggregate. The hard binder, which is typically 15/25 Pen grade bitumen, is mixed with the good aggregate grading to give a very strong asphalt with high stiffness and resistance to deformation. The high content of binder produces durability in terms of resistance to fatigue and cracking and it also means major benefits of workability and laying quality.

These facts have been proven during 10 years or so of EME2 use in France for the construction and maintenance of heavily trafficked roads. In 2002, the Highways Agency embarked on an R&D programme with the Quarry Products Association (QPA) and the Refined Bitumen Association to bring the same benefits to the UK.

Crucial to the development of EME2 mixes

is the fact that each combination of aggregate and binder has to be designed to meet exacting performance criteria. So there cannot be a single recipe for all types of stone, but instead a specific EME2 mix design worked out for each source of aggregate. Applying this to the UK has meant investigating and checking conversion of EME2 design to UK test methods.

“We can now confidently supply very strong, long life pavements which will provide excellent value for our customers.” Colin Loveday

With such a challenge ahead, close partnership was going to be essential for success. Tarmac volunteered to progress the initial development work on behalf of the QPA and Nynas came forward at the same time to partner Tarmac in a joint effort. Representatives from Nynas and Tarmac initially visited the French regional asphalt design laboratory in Nantes with samples of UK bitumen and aggregate for testing.

“The mixes were made and tested with French equipment and then similar tests were carried out on the same asphalt with the UK’s equivalent testing apparatus,” says Nynas’ UK & Ireland Product Applications Manager for Performance Asphalts Jukka Laitinen. “The results showed where the principles of French EME2 design can be applied using UK material testing methods and where it was necessary to retain the French techniques.”

Mixes were tested to show where EME2 design can be applied to UK test methods and where necessary to retain French techniques





(Above and below) The first surfacing contract to use the draft EME2 specification was carried out by Tarmac on the M876 near Stirling this year

The next step was to develop mixes in the UK, using local aggregates, binders and mix and testing equipment, to work towards producing a full UK EME2 design specification.

“Equal amounts of material testing and development were carried out at Nynas’ and Tarmac’s laboratories with many different types of aggregate and binder. The results were then fed back to the EME2 R&D project, contributing to a build up of a lot of useful data,” says Laitinen.

Development of EME2 design, mix and laying procedure continued to roll forward with a small trial in the pavement test facility at TRL. By 2004, further laying trials were under way. Nynas and Tarmac carried out several such pilot schemes at a number of sites using different aggregates and binders, while TRL was doing the same, all under the auspices of the overall R&D project.

“The asphalt producers, bitumen suppliers and the Highways Agency all worked

together to produce the first draft of a full EME2 specification for use on UK roads,” says Tarmac Director of Technology & Quality Standards Colin Loveday. “The draft spec was agreed towards the end of 2004 and is now being used for further EME2 pilot contracts.”

The draft specification for design, production and laying of EME2 has been published in TRL Report 636. The largest EME2 contract so far and the first to use the specification under fully commercial conditions was undertaken in Scotland in May this year, on the M876 near Stirling. Two EME2 layers were laid, one of 110mm over another of 150mm – effectively providing high strength base and binder courses – with a 40mm layer of Tarmac’s Masterflex thin surfacing over the top.

Around 6000t of EME2 asphalt was laid in total, with bitumen from Nynas’ refinery in Dundee and aggregate from Tarmac’s quarry at Stirling.

“This pilot contract has proven a great success and we are grateful to the Scottish Executive Trunk Road Division for its support in this work,” says Loveday. “We can now confidently supply very strong, long life pavements which will provide excellent value for our customers.”

