

Nynas

Growing need to design asphalt materials to ensure performance requirements are met is behind increasing demand for Nynas' bitumen technology and asphalt engineering services.

Bitumen technology targets performance

Work being carried out at Nynas' laboratories in Eastham is marching in step with the adoption of performance-related specifications and performance-approved products. Analytical evaluation of bitumen binders, asphalt mixes and pavement design using properties determined under laboratory conditions is a vital aspect of developing bespoke materials to meet required levels of performance.

Judging from a rise in interest for these services provided by Nynas and the continuing introduction of performance-related specifications, it is clear that this method of designing, specifying and approving bituminous materials and asphalt pavements is the way forward.

Nynas established its asphalt engineering support service in 1997 to apply its bitumen technology expertise to bituminous pavement design evaluation and support for its customers. This was a strategic development by Nynas geared to coincide with the implementation of analytical asphalt design

methods and the emergence of performance specifications.

Clause 929 for the 'design, compaction, assessment and compliance of roadbase and basecourse macadams' was one of the first to be introduced to the Specification for Highway Works. This has been followed by performance based specifications for HRA wearing courses, surface dressing and slurry and micro surfacing systems.

A full system of performance based specifications derived from insitu experience of several pavement life cycles is some way off. But the asphalt industry's clients and road users are already benefiting from added value and better roads as a result of materials being developed to produce specific performance requirements.

"Clients of the asphalt producing industry are adopting the new specifications because they enable the optimum solution to be produced in terms of value and performance through materials design," says Nynas UK Sales & Marketing Director Willie Hunter.

"Asphalt producers can provide this if they work closely with the binder supplier and we want to be seen as the ideal partner for achieving optimum performance.

"Demand for our bitumen technology and asphalt design and evaluation services has grown incredibly in just two years," says Hunter. "Which shows how important our customers value the need

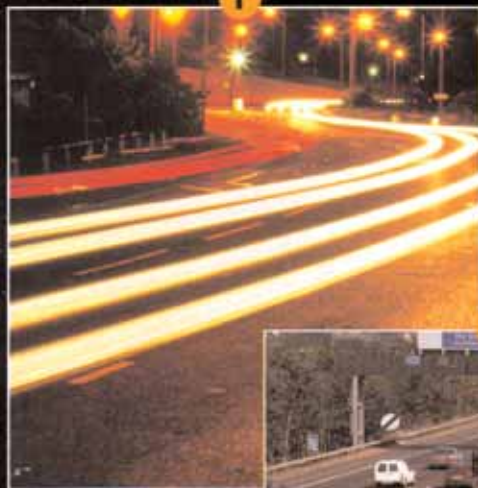
"There is now no limit to what can be achieved using asphalt technology."

Steve Harris

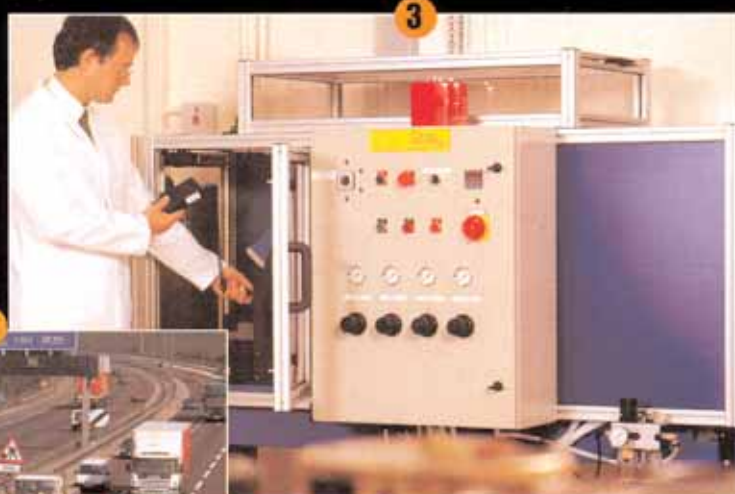
to design for performance, often on a bespoke basis."

Nynas is heavily involved in performance testing on two fronts. As well as providing asphalt performance evaluation, the company has initiated a development programme for looking at the performance of bitumen binders in isolation. This work is being led by Nynas' Group Competence Centre in Sweden and is part of a pan-European initiative to develop performance based binder specifications.

Nynas Quality & Development Manager Chris Southwell says close links between binder supplier and customer are vital for testing and evaluation of material performance.



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1. **Optimum asphalt solutions are being developed using performance specifications and analytical design methods**
2. **Innovation in bitumen and asphalt technology has brought cost effective, high performance materials**
3. **Better test methods result in greater confidence over performance predictions**

THE COMBINED EFFECTS OF A NUMBER of key changes in the asphalt industry have brought about the development of better and more cost-effective pavement systems, says Nynas Materials Engineer Steve Harris.

"The UK's principal roads network is a major asset valued at around £55,000M. But the budget for maintaining and improving this asset has been severely reduced over the past 10 years. In 1997, the deficit for local road maintenance was estimated at £4,000M. Funding for development of new roads has decreased by 30% over the last five years."

But we are demanding more performance from our roads, Harris says. "The load transfer from heavy goods vehicles is increasing. Heavier axle weights, super-single tyres and slower traffic due to congestion induce higher stresses and strains within pavement structures.

"The need for greater performance has highlighted the limitations in the traditional empirical methods of specifying and designing bituminous pavements and materials. In addition to this, the asphalt industry has undergone a cultural and technological transformation during the last few years. Culturally there has been a shift in risk emphasis from client to contractor. We are now well into an era of design & build philosophy and environmentally responsible added value solutions.

"This has resulted in greater focus on innovation and end-performance specifications. This is promoting partnerships and alliances between client, contractor and supplier that maximise efficiency and reduce exposure to risk."

Experience of road performance over the last 30 to 40 years coupled with transfer of knowledge between academia and industry – and advances in computer technology and modelling techniques – have allowed the development of an analytical method of designing pavements, adds Harris.

"This approach is enabling us to provide more cost-effective materials that provide greater road safety and ride comfort and are more environmentally friendly. In other words, best value solutions."

"It has always been understood that bitumen products have to be fit for purpose, but we are now devising tests to enable us to evaluate binder performance and to develop or select the exact binder for the particular needs of the application."

There is a range of laboratory tests for measuring binder performance at the manufacturing stage, immediately after laying and to assess long term ageing, deformation and thermal cracking characteristics over the whole service temperature range, says Southwell.

"We can carry out these tests ourselves, but we liaise closely with the customer on developing suitable testing regimes – and laying trials if necessary – for producing a material that performs as required. Detailed knowledge of the loading characteristics, environmental conditions and specific requirements of the final solution is essential for successful binder design."

Nynas' ability to provide bespoke solutions to suit its customers' individual needs, has been taken a significant step further with the advance of its asphalt engineering facility. The performance of

Nynas binders in its customers' asphalt mixes is now being evaluated under controlled laboratory conditions and mixture designs are being produced to meet performance requirements.

Recipe-based methods of specifying bituminous road building materials are not being discarded altogether. These methods have been around for considerable

time and durable roads have been produced successfully from them, says Nynas Materials Engineer Steve Harris.

"The new breed of specifications fall between the traditional method and a true performance based

system. Aspects of the recipe-based methods remain, but the new specifications are far less prescriptive and suppliers can now produce more economic solutions and make better use of their resources.