

Nynas Bitumen

Binder rising to the challenge

Construction of elevated roadway at the Port of Dover has added to a portfolio of demanding projects that have benefited from use of Nynas Bitumen's Nypol HR binder.

Extrême asphalt specifications tend not to be the norm, but when they do come along high performance products are needed to answer the demands however exacting or rare. The Port of Dover, which is expanding to accommodate growing volumes of heavy goods traffic, provides a case in point, having called for an exceptional asphalt pavement.

This has recently been laid on a new 300m long and 14m wide section of elevated roadway built for the grade separation of traffic from two new roll on-roll off berths. The nature of the structure and its use led to a very demanding surfacing specification, ultimately met with

an asphalt mix design reliant on Nynas Bitumen's Nypol HR binder.

The Port of Dover has reinforced a noticeable trend. The scheme is the latest addition to a list of extremely demanding surfacing projects that have been delivered using Nypol HR.

One of the first was at Brands Hatch in Kent, or more specifically, the motor racing circuit's Graham Hill Bend where surfacing had become problematic. The asphalt laid at this tight radius corner was breaking up under extreme turning forces applied by sports cars and bikes cornering at high speed.

Contractor Tarmac together with Nynas developed an asphalt that combined a high

quality aggregate with Nypol HR to prevent the surfacing breaking up under extreme stresses. This was in 1998 and the Graham Hill Bend surfacing is still performing well, as is a similarly treated test track at Land Rover's Gaydon site in Warwickshire.

In this case, early in 2002, a new circular vehicle test track was built for use by chassis and suspension engineers of Ford's Premier Automotive Group (PAG). Again Nypol HR was used to produce a high strength asphalt that could resist very high turning forces. The 80m diameter test track has a minimum radius of 20m and is used to put marques including Aston Martin, Volvo, Jaguar and Ford as well as Land Rover, through tight turning tests.

"Nypol HR is a very tenacious and durable binder," says Nynas Bitumen Special Products Sales Manager Roger Dennison. "It is remarkably strong and retains its strength and elastic properties as it ages, so asphalt mixes incorporating Nypol HR are themselves very durable and perform well under difficult conditions for a long time."

Nynas' Nypol HR binder gains its superlative properties from a particular strain of polymer modification. This ensures a thick 'film' of bitumen is maintained on the aggregate and enables the binder to combine with the asphalt's stone content to create a high strength mix.

At Brands Hatch and Gaydon, the binder's tenacity for holding on to its aggregate has been used to prevent 'scuffing' – stone being pulled from the asphalt surface – under high lateral forces. At Dover, the demands are different, but no less extreme.

The surfacing supplier was Tarmac again, although this time working for main

The high speed Graham Hill Bend at Brands Hatch was the site of one of the first uses of Nypol HR





A thin asphalt pavement was laid directly onto the waterproofing membrane of the port's elevated roadway

contractor McAlpine Capital Projects (MCP) of the Alfred McAlpine Group. MCP's client was the Port of Dover, which retained Babtie as design and supervision consultant for the roadway construction and for the setting of a suitable asphalt specification.

"Heavy goods vehicles will account for a high proportion of traffic using the roadway, which has a steel beam and concrete deck slab construction, so effects of high loading and vibration were critical," says Babtie Technical Director and Project Manager Chris Couldrey.

"This was compounded by the need for a relatively thin and lightweight asphalt pavement that could be laid directly onto the concrete deck's waterproofing membrane."

Total thickness of asphalt laid on the elevated roadway is merely the sum of a 58mm layer of binder course – incorporating Nypol HR – and a standard 22mm surface

course. Such a thin pavement, without the 'sand carpet' asphalt layer conventionally laid over the concrete deck to absorb stresses, has enabled a light roadway design.

It has also demanded the binder course

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Roger Dennison

be capable of withstanding all of the forces. These are unusually high due to the effects of vibration and loading from heavy vehicles moving slowly and in the same wheel tracks.

"We needed a very strong asphalt mix that could withstand high forces from heavy lorries and resist rutting plus it had to be flexible to withstand the lively nature of the roadway structure," says Tarmac

Technical Manager Jan Hemsley.

"With Nynas' help, we developed an asphalt mix that ultimately gained the necessary strength and flexibility from the Nypol HR binder. This design worked as we hoped and is still performing well."

Tarmac appears to have got it right at Dover and according to Hemsley, has no qualms about admitting this has come after the asphalt design was refined from one or two mixes that failed to meet the exacting criteria. Such development work is, after all, fairly common where the demands are unusually extreme.

Nynas seems to like working this way. Its testing laboratories at Ellesmere Port have been set up to develop asphalt mixes from various combinations of its binders and customers' aggregate. Equipment in use includes an Immersed Wheel Tracker for testing rutting resistance in the presence of water, a High Friction Scuffing Tester and a NAT stiffness apparatus.

"Nypol HR is one of a number of proven Nynas products, but confidence in an asphalt mix comes from testing and tangible results that show the design will produce what's wanted," adds Dennison.

"We like to be as thorough as possible before work reaches the laying stage, evaluating several different options and pushing the mix to its limits to find the optimum results."



The 'lively nature' of the steel and concrete roadway demanded a strong and flexible asphalt

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