

Aggregate Industries

The engineer's flexible friend

Striking the right balance between binder course strength and flexibility has always been a challenge in urban areas, but Aggregate Industries believes it has found the answer.

Many metropolitan roads are traditionally surfaced using 'soft' binder courses to resist reflective cracking, but these mixtures can be susceptible to deformation which may result in rutting. This can also present difficulties during the laying process. At the other end of the scale, dense asphalt mixtures offer greater resistance to deformation, particularly under slow moving heavy traffic in urban areas. But they do not have similar levels of performance in terms of resisting cracking from fatigue failure.

Resistance to both fatigue and deformation failure is key to reducing urban road maintenance and, according to Aggregate Industries, its latest product

Bardon Superflex provides the solution. It also offers productivity benefits to the surfacing contractor and client. Test data for the new material proved compelling to the London Borough of Croydon and led to a contract to lay around 3000t of the binder course on the A236 earlier this year.

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"Analysis suggests the fatigue life of Bardon Superflex is twice that of 50/20 hot rolled asphalt, with wheel tracking a fifth of the HRA rate." Bob Allen

London borough councils, and as a result of the extremely close working relationship that our contracting division has with these clients, we were aware of the growing need

for a more flexible but stronger binder course for extensively cracked surfacing and damaged roadways," says Aggregate Industries Asphalt Research Manager Bob Allen. "In partnership with BP Bitumen we started working to develop a product to fill this gap in the road maintenance market last summer, through a laboratory investigation

which focused heavily on mixture volumetrics as well as binder characteristics."

Aggregate Industries and BP Bitumen put several different asphalt mixtures through a rigorous round of laboratory testing, including indirect tensile stiffness modulus, wheel tracking and fatigue testing, before finalizing the optimum design. This intensive testing allowed the new product to be benchmarked against existing products to give potential customers a realistic idea of the material's capabilities. Laboratory testing was followed by a series of laying trials at Aggregate Industries' Express Asphalt plant in Croydon to put Bardon Superflex through its paces.

"Bardon Superflex is a designed asphalt bound by a polymer modified bitumen binder and uses a 20mm nominal aggregate," says Allen. "The material performed very well under test and analysis suggests that the fatigue life of Bardon Superflex is twice that of 50/20 hot rolled asphalt (HRA) with a reduction in wheel tracking to a fifth of the HRA rate."

Delays to traffic were minimised by use of high performance materials including Bardon Superflex





Aggregate Industries has developed Bardon Superflex to provide the optimum balance between flexibility and strength

Laboratory and laying trial results gave the London Borough of Croydon the confidence to specify the new product for resurfacing of the busy A236 in August this year.

"The A236 – known locally as Mitcham Road – is lined with a mix of commercial and residential properties, and suffers from constant heavy traffic because it is an alternative route in and out of London to the A23," says Bardon Aggregates' Regional Technical Manager Chris Marchesi. "The road has suffered over the years due to the many utility openings and limited opportunities to carry out the required extensive repairs in the past."

Bardon Aggregates planed out a 110mm thickness of the existing surface course and parts of the binder course in stages before applying the new material. Around 10,000m² of Bardon Superflex was laid at the site as a regulating binder course varying in thickness from 80mm to 120mm, overlain by a 30mm layer of Aggregate Industries' proprietary thin surfacing Bardon Smatex.

Laying of both Bardon Superflex and

Bardon Smatex over the 1.6 km length on Mitcham Road went very smoothly. Use of the high performance materials enabled Aggregate Industries to finish the contract ahead of schedule.

"The work was originally scheduled to take two and a half weeks and was planned using traffic management and lane closure," says Marchesi. "But because we were able to traffic the Bardon Superflex earlier than a more conventional HRA binder course, we were able to fast track the work and completed it in just under two weeks.

"HRA binder courses have a lower early life strength than Bardon Superflex and need time to cool and 'cure' before reintroduction of traffic or overlaying, otherwise the tendency for HRA to rut is increased.

"The resurfacing at Croydon was carried out in the middle of the heat wave in August, and this would have had a significant impact on the contract programme if we had been using HRA because its cooling time and early trafficking is more weather dependent.

"Bardon Superflex, on the other hand, can be trafficked early, with no adverse effects even in hot weather thanks to its

early strength characteristics."

Marchesi adds that use of HRA materials would have extended the contract period to around four weeks and there would have been little opportunity to fast track the project.

No additional testing of the new carriageway is planned but visual inspections indicate that Bardon Superflex's early life strength and flexibility is standing up to the rigours of Croydon's traffic.

"Some phases of the surfacing had to be completed during off peaks hours, but use of Bardon Superflex speeded up the works and avoided the need to work all the way through the night," says London Borough of Croydon Divisional Engineer Barry Castrique. "We were pleased with the speed of the surfacing and many local residents are also pleased with the quieter and smoother surface course."

Aggregate Industries is currently in discussions with a number of other London boroughs and metropolitan councils regarding further Bardon Superflex contracts and has high hopes for the product's future.

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