

**Lafarge**

# Sheffield's show of strength

Fuel resistance, high strength and colour have been combined by Lafarge to form an innovative grouted asphalt which made its debut at Sheffield Transport Interchange earlier this year.

Applications such as bus interchanges, airport taxiways and petrol stations call for surfacings which are not only high in strength but are also resistant to hydrocarbons. Until recently concrete and block paving dominated this market but grouted asphalts can now offer the same high strength and resistance to fuels spills as concrete but with the laying flexibility of asphalt.

Sheffield Transport Interchange is the first site to benefit from transformation using a newly developed grouted asphalt from Lafarge which adds aesthetic appeal to the material's offer. Around 5000m<sup>2</sup> of the bus stops and lanes at the interchange have been resurfaced with a red pigmented Axocrete as part of an overall refurbishment project.

"Axocrete's strength comes from the specially designed grout which is applied to the surface of an open textured asphalt,"

says Lafarge Aggregates National Asphalt Development Manager Jim Wilson. "The grout fills the voids in the asphalt to create a dense material which can withstand both heavy static and dynamic loading as well as high turning forces.

"Another added benefit of grouted asphalts is that they can be laid continuously, whereas a concrete pavement has to be cast in several sections. Joints between these sections create weaker points in the surface."

**"Axocrete's grout fills the asphalt's voids to create a dense material which can withstand heavy loading and high turning forces"** Jim Wilson

Nonetheless, asphalt is not commonly used on sites where there is a potential for spillage of fuel, or other chemicals, because it can break down the bitumen binder's bonds and result in spalling. Fuel resisting binders have been introduced to the market

to improve the performance of asphalt in vulnerable areas but grouted asphalts offer the same level of resistance as concrete. The grout used in Axocrete prevents any spilt fuel from coming into contact with the bitumen binder. This combination of characteristics appealed to the South Yorkshire Passenger Transport Executive, which operates the Sheffield Transport Interchange, and led to specification of the material for the refurbishment. Sheffield's

interchange handles hundreds of buses per day and complete closure of the facility to carry out the surfacing work was not an option, so the work had to be phased.

"We carried out the work in five stages but that did not mean that we could ease ourselves into the contract – there was a very tight deadline to complete the first part," says Wilson. Lafarge working in partnership with Smiths Construction had just five days to remove the existing surface, lay the asphalt, apply the grout and jet blast the surface to expose the aggregate to improve skid resistance. Five days may not sound like much of a challenge but the first phase of the work also had to include training of Lafarge's site operatives on how to carry out the grouting process. "The resurfacing at Sheffield was the first time we had used Axocrete on a commercial contract so it was a steep learning curve for everyone involved," explains Wilson.

Lafarge used a proprietary 40mm thick asphalt support coat to form the asphalt framework for the grout at Sheffield but the



The final Axocrete surface was shot blasted to increase skid resistance.



Axocrete's strength comes from the specially designed grout which is applied using squeegees.

mix was specially designed to give a high void content. A carefully graded 10mm pink granite aggregate – sourced from Lafarge's Mountsorrel Quarry – and a fibre modified straight run bitumen binder were used to form the bespoke asphalt mix. The low viscosity grout was mixed and pigmented on site and applied to the asphalt using a squeegee to ensure all the voids were filled. The surface was then brushed to give an even appearance to the surface and allowed to cure for 12 hours before being shot blasted. "The Axocrete surface does not need to be blasted but at Sheffield we felt there was a need to have a higher skid resistance so we added it to the specification," says Wilson.

The grout used at Sheffield was coloured using a red pigment and the asphalt was made with an aggregate in a similar hue but Lafarge can also produce Axocrete in grey, green or black. The company is also working on development of a more decorative white 'terrazzo' version of Axocrete which is achieved by substituting the shot blasting with polishing.

Work at the Sheffield Transport Interchange was completed at the end of April but Lafarge is already in negotiation with several other clients to use Axocrete at several other UK bus stations.

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## AXOCRETE'S DECADE OF DEVELOPMENT

Lafarge first started developing a grouted asphalt 10 years ago under the name Bitmacrete, although the company never marketed the material. But over the last decade, grout technology has undergone considerable advancement. Lafarge recognised that the new hi-tech grouts had the potential to boost Bitmacrete's benefits and began developing a new grouted asphalt, which was later christened Axocrete, in 2000.

"The grout we use in Axocrete is much more engineered than anything we have used before," says Wilson. "The main advantage of the new hi-tech grout over the older version is its high early strength which means the surface can be trafficked almost as soon as the grout has cured."

Laboratory analysis shows that Axocrete's grout can reach compressive strengths of more than 40N/mm<sup>2</sup> after 24 hours and over 100N/mm<sup>2</sup> after 28 days. Field trials at Lafarge's Mountsorrel ready mixed concrete plant and at Nether Langwith Quarry were carried out three years ago and the material has performed well under regular heavy loading.



Lafarge used a high void content asphalt to form the framework for the Axocrete surfacing at Sheffield.