Case Study: High Speed 1

Project
Roofing for St. Pancras Station extension, Ebbsfleet International Terminal and Stratford International Terminal - the three stations forming the High Speed 1 network

Project Manager
London & Continental Railways

Roofing Contractor
Prater Limited

Roofing System
Various

Project Size
Various

Sarnafil's HS1 'hat-trick'

Single-ply roofing and waterproofing solutions specialist, Sarnafil, has completed its contribution to the groundbreaking High Speed 1 rail project.

Costing almost £6billion and taking 10 years to complete, HS1 – an evolution of the Channel Tunnel Rail Link – is the UK's single biggest construction project in history and links London to Europe's high-speed rail network.

London & Continental Railways, the company responsible for managing delivery of the project, specified Sarnafil's acclaimed waterproof membrane for roofs at all three stations forming the HS1 network – St Pancras, Ebbsfleet International and Stratford International – allowing Sarnafil to complete this historic hat-trick.

Justifiably, the £800million restoration of St Pancras to its Victorian splendour has been called the 'jewel in the crown' of the HS1 project. Officially opened in late 2007 by the Queen, the Grade I listed building has already won a raft of awards as an architectural and engineering triumph.

Envisaged as the new gateway to Europe, St Pancras' famous Barlow Shed required a 230-metre extension to accommodate the Eurostar trains the station now plays host to, which are a staggering 400 metres in length. Located behind Sir William Barlow's 1868 single-span ironwork arch, this new-build trainshed features Sarnafil's striking roof.

With the Barlow Shed extension as well as the work at Ebbsfleet and Stratford all featuring flat-roof designs, Sarnafil's roofing was the clear choice for London & Continental Railways from the start of the HS1 project. "Put plainly, our single-ply is great for flat roofs," says Sarnafil's national sales manager, Tim Halls. "It was absolutely the right solution for this design."

Above: Ebbsfleet International Terminal, Kent
500 tonnes of structural steel and 2,200 square metres of glass were used in this project, to create a station as long as a football pitch, 45 metres high and with six platforms – two for Eurostar services and four for high-speed domestic services.

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An additional benefit of Sarnafil's solution, however, is that its S327-12EL light grey membrane with zinc capping achieves the all-over zinc-roofing look that London & Continental initially considered for a fraction of the cost.

St Pancras contractor consortium, CORBER (Costain-O'Rourke, Bachy Soletanche and Emcor Rail), commissioned Sarnafil's long-term installation partner, Prater, to install the roof. A stunning saw-tooth structure of repetitive northlights that, from afar, appear as waves of blue-grey glass, the roof was installed in two phases and took a total of five years to complete with an 18-month break between phases.

The 13,000 square-metre roof installed in the first phase of the extension comprises eight 1,620 square-metre sections supported by a 1,200 tonne steel frame. This Sarnafil S327-12EL high-tensile 1.2mm membrane was mechanically fastened using the SarnaBar system to secure the roof against wind uplift. Phase one finished in 2004.

Using the same Sarnafil materials and techniques, phase two saw the 2006 completion of the slightly narrower roof covering new platforms to the west of the station. Sean Neary, operations manager at Prater, says of the project: "It was logistically challenging because of access restrictions and the sheer numbers of people on site, but it went very well due to excellent organisation."

Sean also praised Sarnafil's on-site presence: "Quality assurance is vital in a project of this scope – the client [CORBER] required constant proof the appropriate checks had been carried out and the correct standards reached. Sarnafil's regular site visits, together with its own quality assurance methods, were of great benefit in this process. It's good to have that level of input from your supplier."

Though the transformation to the Barlow Shed has become emblematic of both the St Pancras and wider HS1 projects, the extension has been applauded for complementing the Barlow building. But as a company used to receiving plaudits for its role in innovative architecture, how does Sarnafil feel about its roof playing 'second fiddle' to Barlow's?

"I don't think we've been eclipsed by the Barlow Shed," says Tim. "The Barlow Shed is a product of its time and the technology of its time. But the extension is a modern design using modern technology. I hope in years to come it will be as synonymous with St Pancras as the Barlow Shed."

New international terminals, Ebbsfleet and Stratford, complete the HS1 network.

Opened in early 2008, Ebbsfleet in Kent used 500 tonnes of structural steel and 2,200 square metres of glass to create a station as long as a football pitch, 45 metres high and with six platforms – two for Eurostar services and four for high-speed domestic services.

Stratford, meanwhile, forms part of London's winning 2012 Olympic bid and will be the main rail station serving the east London Olympic site. High-speed Japanese-style 'bullet' trains are expected to transport 25,000 spectators an hour from central London to the games in just seven minutes. Though completed in 2006, it will not open until 2009.

This page: St Pancras Station
Sarnafil roofing protects the 230-metre extension built to accommodate the Eurostar trains the station now plays host to, which are a staggering 400 metres in length.

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Above: Stratford International Terminal
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Both roofs feature Sarnafil's S327-12EL light grey membrane, which was mechanically fastened using a small amount of adhered membrane to provide a clean, uninterrupted roof surface. Thermally broken fasteners were also used to achieve Part L requirements and reduce cold bridging. A SarnaVap 500E vapour control layer and SarnaTred walkway tiles perfect the Sarnafil roof.

All HS1 Sarnafil roofs are expected to last in excess of 40 years. "It's a quality product that will provide waterproofing for many years," Tim explains. "The quality of workmanship that's gone into their construction is exceptional."

In all, over 50 million man-hours have gone into the HS1 project. And yet, remarkably for a project of this magnitude, it was delivered on time and on budget. Tim believes that Sarnafil's contribution to the smooth running of the St Pancras phase in particular is thanks to its long-standing and successful working relationship with Prater:

"Sarnafil has been working with Prater for over 20 years on some outstanding projects, including Arsenal's Emirates Stadium, the Bluewater Shopping Centre and Stansted Airport. It's this combined experience and expertise that enabled us to fulfil the HS1 St Pancras brief. Sarnafil is privileged to be part of such a prestigious project."

For further information please visit www.sarnafil.co.uk.

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