

Decarbonisation through product innovation

Nigel Bullock (right), head of solutions at Hardstaff Barriers, part of Hill and Smith Infrastructure, spotlights how sustainability and decarbonisation has been a key driver behind its recent product innovation



National Highways' Net Zero Plan is based on three headline commitments: net zero for National Highways operations by 2030, net zero for maintenance and construction by 2040 and net zero carbon travel on its roads by 2050.

Hill and Smith is firmly committed to supporting the plan. Our own net zero target is aligned with National Highways' pledge to achieve net zero carbon emissions for maintenance and construction operations on the strategic road network by 2040.

To help realise this, the company has been working to deliver product innovations as well as ensuring its manufacturing and installation systems are as efficient as possible.

This was demonstrated recently with the launch of the REBLOC H1 Barrier. Transforming our precast H2 containment Rigid Concrete Barrier (RCB), RB 80XA, through value engineering we have successfully delivered a new H1 RCB product, which removes material cost and mitigates carbon impact.

The new barrier has been successfully crash tested to the required performance level of H1 containment and requires 50% less steel

and 20% less concrete per unit compared to the original H2 REBLOC RB 80XA. An installation of 1,000 metres of the new H1 barrier realises a 5,250kg reduction in steel and requires 40m³ less concrete.

Working with our long-term strategic partners Hanson HeidelbergCement Group and SWP Concrete Solutions in the production of our REBLOC Barrier range, we have also produced a low carbon concrete, decreasing the CO₂ emissions associated with standard CEM1 concrete by 33%.

Developed using Ground Granulated Blast Furnace Slag (GGBS) as a replacement for cement content in the concrete – and combined with an admixture to help with product setting – the result is a concrete barrier with a reduction in embodied CO₂ of approximately 780kg for every tonne of CEM1 Portland cement it replaces.

While GGBS is not new to the industry, what is unique in this strategic collaboration is its use where early strength is required as well as the use of admixture technology that has not compromised performance.

Hill and Smith also has full external verification of this carbon data so the sector is supported with a robust kg/CO₂/m² indication.

This can also be underpinned with an indicative environmental product declaration (EPD), generated using lifecycle tools and aligned to the product category rules for Type III construction products in EN 15804. Detailing the CO₂ emissions for the concrete mix and providing further detail of where emissions occur along the value chain, this EPD provides transparency across the supply chain.

It's worth noting that our partner, Hanson UK, has reduced its CO₂ emissions in the UK by more than 50% since 1990 – with a roadmap to achieve net zero by 2050. Hanson is the largest producer of low carbon concrete in the UK – demonstrating how the construction sector is making strong progress on the UK's net zero goals.

Further developments from Hill and Smith are also underway, including a self-compacting mix to improve the production process and the use of wireless concrete sensors to monitor temperature and strength gain every fifteen minutes.

Our commitment to reducing carbon impact has also been considered in the manufacturing process. Both the H1 and H2 barriers have the same external profile, facilitating a seamless production switch through the use of existing production moulds, lowering carbon as well as costs.

Taking a fresh approach to RCB design, and using a surface mounted precast barrier, the REBLOC range is designed to be implemented with minimal civils work and managed construction risks. This was demonstrated recently with the placement of 700 metres of H2 barriers in only four working hours, reducing the construction programme, minimising impact on the customer, reducing overall scheme cost and delivering minimal carbon impact.

The combination of a precast solution, collaborative project planning and delivery, as well as the H1 RCB product innovations deliver a positive contribution to the sector's overall carbon impact. Benefits are realised through a range of factors including decreased site traffic and time on site and reduced project delivery time frames, resulting in less pollution and minimal customer impact and a significant reduction in the use of materials such as steel and concrete. 🌱

