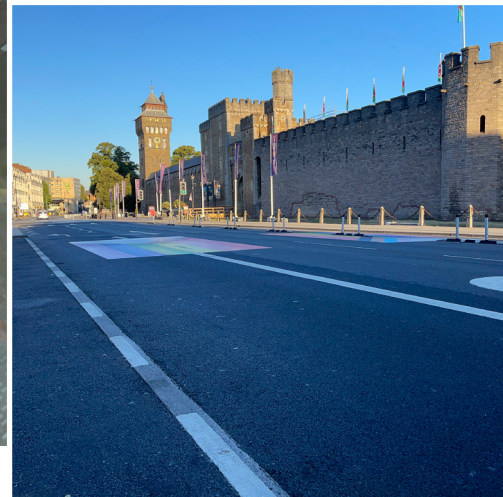




CASE STUDY

A4161 Castle Street

Cardiff, Wales



Application Opportunity

The A4161 Castle Street encircles the iconic Cardiff Castle in the heart of the Welsh capital — a high-volume, fast-flowing single carriageway, originally constructed on a concrete base. Over time, the surface course had begun to show clear signs of fatigue and required replacement.

Because the underlying concrete base remained in sound structural condition, the asset owner had the opportunity to specify a high-performance overlay: a surface strong and durable enough to bond over concrete, resist the stresses of heavy, fast-moving traffic, and extend the life of the existing asset without the cost and disruption of full reconstruction.

Recommended Product

10mm SteelFlex was specified as the ideal solution. Engineered with 95% recycled steel slag aggregate and a high-performance polymer-modified binder (PMB), SteelFlex offers exceptional resistance to reflective cracking — the principal failure mode when surfacing over concrete — making it the natural choice for overlay applications of this kind.

More Info



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The recycled steel slag aggregate at the core of SteelFlex delivers strength and interlock beyond what natural aggregates can offer, while the high-performance PMB ensures the surface remains durable under extreme stress and helps to reduce traffic noise. By returning steel slag — a by-product of steel manufacturing — back into the road network, SteelFlex reinforces SteelPhalt’s commitment to circular-economy principles without compromising performance.

Results and Benefits

Installed in 2022, 1,000 tonnes of SteelFlex were laid across the scheme, incorporating approximately 950 tonnes of recycled steel slag aggregate. Years on, the surface continues to perform to the high standards expected, confirming SteelFlex’s resilience under sustained, high-volume traffic loading and reducing whole-life maintenance costs for the asset owner. Beyond performance, the use of recycled steel slag significantly lowered the embodied carbon of the scheme compared to conventional surface course alternatives, delivering a total saving of approximately 20,000 kg CO₂e.

Carbon Data

SteelPhalt Products	Carbon footprint Kg CO ₂ e/tonne	Average Surface course Kg CO ₂ e/ tonne	Carbon Benefit Kg CO ₂ e/tonne
SteelFlex	37.7	52	14.3

* Value based on SteelPhalt verified EPD tool

Producing one tonne of SteelFlex generates 37.7 kg of CO₂e — the carbon embodied in the materials and processes that go into making the product. A conventional natural-aggregate surface course produces 52 kg CO₂e per tonne to achieve the same result. That difference — 14.3 kg CO₂e saved for every tonne laid — is carbon that is never

released into the atmosphere, simply by choosing the right product specification. Across this scheme, with 1,000 tonnes installed, that represents a total saving of approximately 20,000 kg CO₂e — a meaningful reduction in embodied carbon with no compromise on performance.

What does this mean?
Carbon data measures the greenhouse gas emissions, expressed in kg CO₂e per tonne, embodied in the production of one tonne of asphalt mix. The lower the number, the less carbon is released to produce the same amount of material. The Carbon Benefit shows how much less carbon SteelFlex generates compared to a conventional surface course doing the same job.

Conclusion

This scheme demonstrates that high performance and lower carbon are no longer trade-offs but can be delivered in a single, optimised solution.

With the concrete base of the A4161 still structurally sound, the challenge was to find a surface course capable of bonding over concrete, resisting reflective cracking, and withstanding high volumes of fast-moving traffic. 10mm SteelFlex was selected precisely for this reason.

Its 95% recycled steel slag aggregate provides exceptional strength and interlock beyond what natural aggregates can offer, while the high-performance PMB ensures durability under extreme stress and helps reduce traffic noise. The outcome is a longer-lasting, more resilient surface that reduces maintenance needs and extends the life of the existing asset — while lowering the embodied carbon of the scheme compared to a conventional surface course.