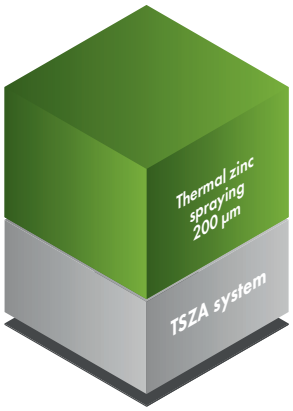
Thermal spraying

KIT study proves superiority of ZnAl15 corrosion protection

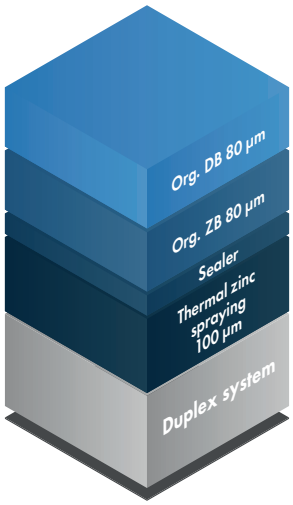
The lifespan and performance of steel structures significantly depend on the choice of corrosion protection system. In collaboration with the Karlsruhe Institute of Technology (KIT), GRILLO has investigated the effectiveness of thermally sprayed zinc-aluminium systems and compared them with currently used corrosion protection coatings. The study highlights the economic and ecological impacts of these systems over a service life of 100 years, demonstrating that thermal spraying is clearly superior in terms of these criteria.

The study design:
How was the study conducted?

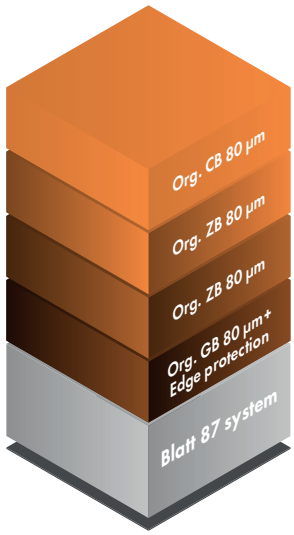
The investigation is based on a specific bridge model that represents the typical characteristics and loads of steel bridges. The reference bridge is a composite steel bridge that spans a six-lane motorway. It consists of four HL 1100 girders and has a coating area of 485 m². Based on this model, three corrosion protection systems were analysed to compare the effectiveness of each method. The study employs two main methods to evaluate these systems: Life Cycle Cost Analysis (LCCA) and Life Cycle Assessment (LCA). These methods enable a comprehensive analysis of the costs and environmental impacts over the entire lifespan of the bridge, including manufacturing, usage, maintenance, and deconstruction.



TSZA system
200 µm thermally sprayed zinc-aluminium



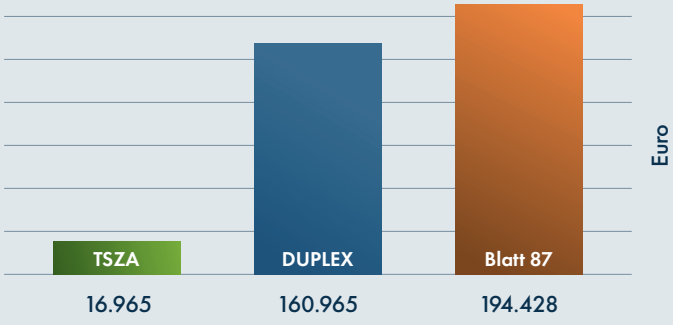
Duplex system
100 µm thermally sprayed zinc-aluminium with organic coating

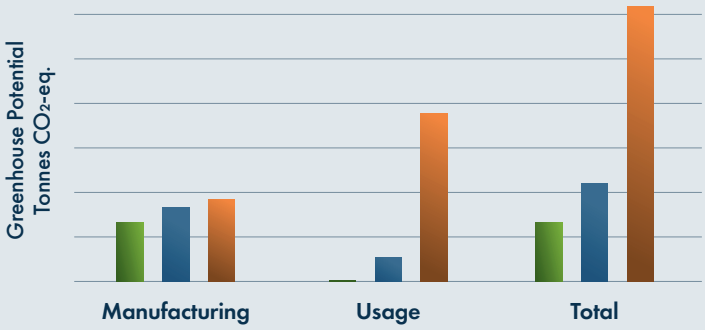


Blatt 87 system
Standard bridge coating according to ZTV-Ing.

The most important results
of the KIT study

Life cycle costs
TSZA and Duplex systems incur significantly lower life cycle costs compared to traditional methods such as the Blatt 87 system. Both thermally sprayed systems offer substantial cost savings due to their longevity and low maintenance requirements.





Environmental impact (life cycle assessment)
TSZA and Duplex systems show significant reductions in greenhouse gas emissions over the entire life cycle, with a remarkable decrease in CO_2 equivalents compared to the standard coating according to Blatt 87, which was also investigated.

Further benefits of
thermally sprayed ZnAL15 protective coating

Reliable protection
Thermally sprayed ZnAl15 offers reliable corrosion protection for over 100 years, in addition to high mechanical resistance.

Climate-friendly maintenance
The Duplex system also enables an environmentally friendly renewal of the topcoat at the end of its service life.

Aesthetics & function
Organic coatings in the Duplex system enhance the appearance while ensuring corrosion protection through the ZnAl15 spray layer.

Conclusion

Thermal spraying: The corrosion protection that prevails

The choice of corrosion protection system decisively influences the life cycle costs and environmental impacts of bridges. The KIT study demonstrates that thermally sprayed zinc-aluminium is both economically and ecologically superior to conventionally used corrosion protection systems. GRILLO's zinc-aluminium solutions offer a high-quality and sustainable way to protect steel bridges and large steel structures.

Are you looking for the right corrosion protection for your project?

Do you have specific requirements or questions about choosing the right material for corrosion protection? Our team of experts is here to provide you with individual advice and help you find the optimal solution for your project.

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