

Case story | Frijns Steel Construction × Hempel

Overcoming specification challenges

Specified to Last



Corrosion protection for the **Orbital Highway project** in Qatar

Renowned for their successful completion of industrial and commercial projects, Frijns Steel Construction took on the prestigious Orbital Highway project in Qatar. Tasked with producing gantries covering the expansive 57-kilometer highway on a tight delivery schedule, Frijns sought a reliable partner to provide the best corrosion protection for these steel structures, all while adhering to budget constraints, specifications, and tight timelines.

This story not only highlights the importance of meticulous corrosion protection specifications but also demonstrates how expert guidance on coatings can ultimately lead to better solutions for all partners involved.

AT A GLANCE

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| Customer | Ashghal |
| About | Responsible for all aspects of infrastructure projects and public buildings in Qatar |
| Contractor | Leighton Contracting & Al Jaber Engineering JV |
| Subcontractor | Frijns Steel Construction Middle East WLL |
| Coating system | Hempadur Avantguard® 750 Hempaprime Multi 500 Hempathane 55210 |
| Application | Airless spray |
| Total litres | 5,700 L |

The challenge:

The specification overlooked practical considerations

The Orbital Highway holds the distinction of being Qatar's longest highway, spanning a length of 195 kilometres from south to north. It begins in Mesaieed within the Al Wakrah Municipality, then extends northward to Ras Laffan on the coast within the Al Khor Municipality. Frijns was one of the contractors commissioned to produce the gantries that cover the 57 km highway. Their task was to ensure that the structural steel gantries were long-term protected against corrosion in the harsh climate of Qatar.

Initially, the specification called for hot-dip galvanisation followed by a multi-coat paint system. However, Frijns sought a second opinion from Hempel, relying on their long-standing trust in Hempel's expertise in corrosion protection. It soon became evident that this initial approach presented several practical challenges.

Firstly, the size of some steel sections, which could reach up to 15 meters in length, made hot dip galvanisation impractical due to the limitations of available zinc bath sizes in Qatar. This would necessitate double handling of the steel sections, significantly increasing costs and risking project delays.

Secondly, the risk of stress corrosion cracking and hydrogen embrittlement made galvanisation a less suitable option, as the structural load of the Orbital Highway was immense. In other words, dipping in hot acid allows hydrogen ions to infiltrate the steel, where they can accumulate in high-stress pockets, thereby weakening the structure and potentially compromising its integrity when subjected to loads in these areas.

And lastly, the adherence of coatings to galvanised surfaces also posed a challenge. Basically, the zinc within the galvanised steel continuously reacts with the environment, leading to the immediate formation of zinc oxides and hydroxides. This build-up can hinder the adhesion of paints to the substrate, and consequently affect the protection and lifespan we aimed for.

Thus, the oversight in the specification process revealed significant practical challenges in protecting the structural steel gantries for the Orbital Highway project in Qatar. Addressing these complexities demanded careful consideration and expert guidance.




The solution

Frijns entrusted Hempel with the task of specifying and supplying an efficient coating system, opting for the incorporation of Hempadur Avantguard® 750, an activated zinc-rich epoxy primer, Hempaprime Multi 500, a high-build barrier mid coat, and a glossy polyurethane topcoat, Hempthane 55210. This choice facilitated the completion of the entire coating process within a single day.

This solution managed not only to meet but exceed the project's stringent specifications for corrosion resistance. Moreover, Hempel's local manufacturing and supply capabilities ensured the timely delivery of essential products throughout the project's duration. Frijns was very impressed with the result, noting the high expertise level, which contributed significantly to the increase in productivity.

The Orbital Highway's steel structures are now protected against corrosion for years to come, demonstrating the value of expertise, innovative technologies, and partnership in overcoming complex engineering challenges.



The coating system

The primer, **Hempadur Avantguard® 750** with activated zinc technology, significantly enhances the coating's anti-corrosive performance and mechanical strength, increasing durability, productivity and corrosion protection.

Hempaprime Multi 500, a versatile high-build epoxy intermediate coating, reduces application time through fast drying and shorter minimum overcoating intervals. It enables a three-coat system to be applied in a single shift without compromising on quality, strength, or finish. Further, it is tested in accordance with ISO 12944 C5 high requirements.

Hempthane 55210 completes the system. Designed for advanced protection in severely corrosive environments, while also offering a highly aesthetic finish, where colour and gloss retention are key.

Do you need help for a specification?

Reach out and get free guidance and inspiration to protective coatings specifications. We will reply within 24 hours.

Also, visit our Specified to Last Hub where you'll find all the resources and support needed to specify the optimal protection for your structural projects:

www.hempel.com/specifiedtolast

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