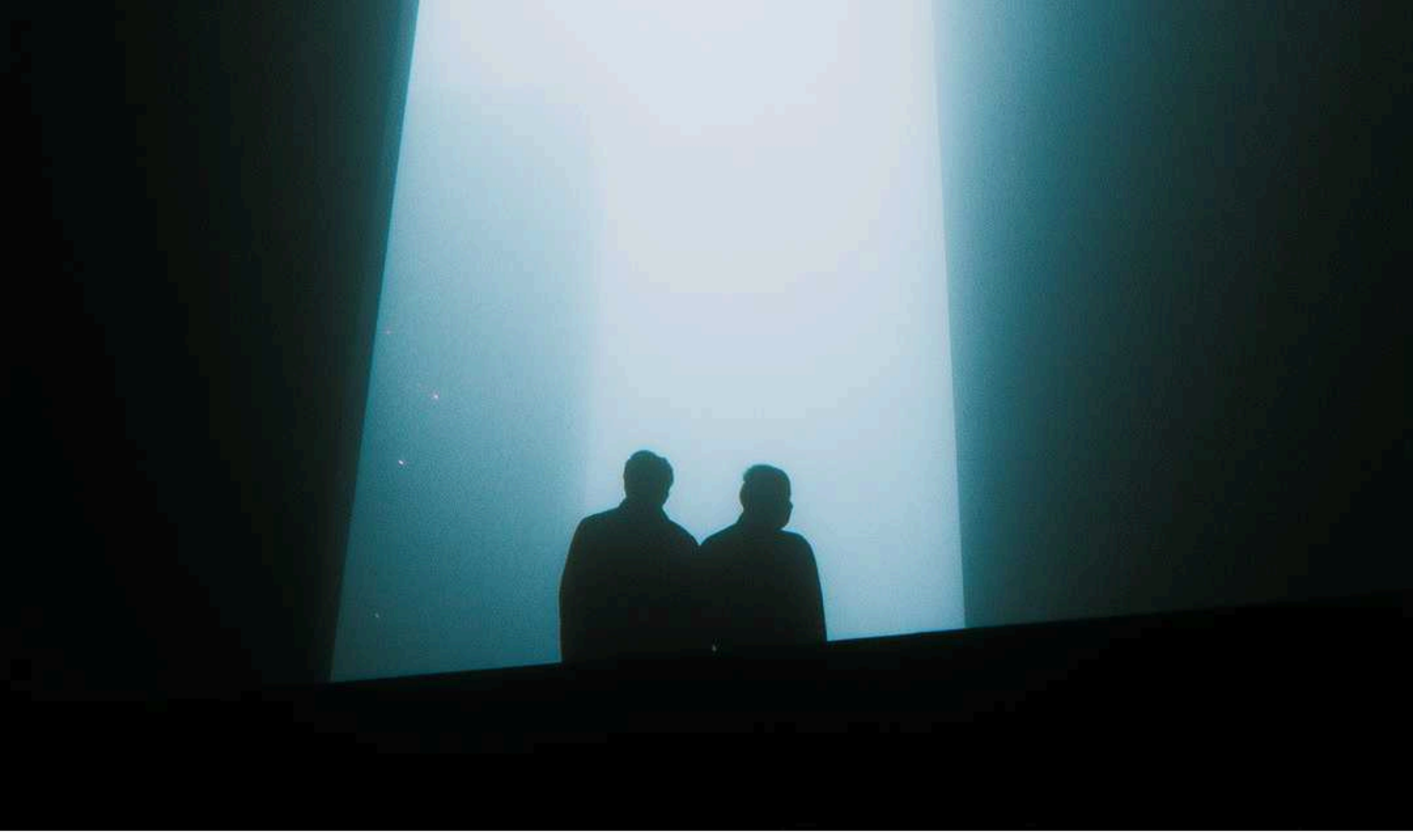
HEMPEL
Trust is earned

Common pitfalls

in coating specifications

Specified to **Last**



Introduction

Specifying protective coatings may seem straightforward. One might think:
“I know the region’s corrosivity category, I understand the fire protection requirements, and I have past specifications to reference — what could go wrong?”

In reality, the process involves several critical variables, and small misjudgements can lead to major failures.

A coating system that looks appropriate on paper can underperform — or fail entirely — if critical variables are not fully accounted for. These include, among others: incompatible coating layer selection, insufficient curing times, and exposure to unexpected environmental aggressors. Any of these missteps can reduce service life, drive up maintenance costs, compromise asset safety, and cause costly downtime.

At Hempel, we've spent over a century supporting coating performance across sectors and geographies. In this guide, we share five common pitfalls in coating specifications that we’ve seen repeatedly in real-world projects — why they occur, how to spot them, and most importantly, how to avoid them.

Let’s get straight to them.

Common pitfalls **in coating specifications**

Overlooking project-specific factors

A common misconception is that assigning a corrosivity category is a quick checkbox exercise.

In fact, this is one of the most nuanced parts of the specification process. While a region may fall under a general C2 category, factors like poor indoor ventilation or localised humidity can shift an asset's true corrosivity exposure into a higher category, despite being indoors — requiring a more durable, higher-performance coating system.

Getting the category wrong can lead to pre-mature corrosion, safety risks and unnecessary expenses. The corrosivity categories are classified from C1 (Very low) to CX (Extreme) as per the ISO 12944 standard.

This underlines why coating specifications should never be generic — thoroughly understanding the actual conditions of the specific project is key to long-term protection.

You can find more details about the categories in our guide "**A guide to specifying corrosion protection**".

Overprotection or underprotection

It’s all about hitting the right balance in your specifications. Overprotection is a waste of time, paint and money. Underprotection risks early failure. Correct categorisation saves costs and extends lifespan, but precise categorisation can be easier said than done.

Some situations require careful analysis and expert guidance before deciding on the level of coating protection. For example, an indoor parking lot may seem to be a low-corrosion environment, but steel beams can easily be exposed to rain and humidity coming from the entrance to the parking lot.

In such cases, it’s important to assess not only the corrosivity level but also the suitability of the selected coating system.

For instance, water-borne intumescent coating systems can be highly effective, but in more demanding or moisture-prone environments, they may require additional protective layers or specific conditions to perform as intended. If these factors are not properly accounted for, there is a risk of reduced adhesion, delayed curing, or compromised long-term durability of the coating system.

Underprotection of the structure can cause early coating failure and structural damage.

Therefore, conducting a thorough pre-analysis is essential — one that evaluates both compliance with protection standards and the coating’s actual performance in the specific environment to ensure optimal results.

Overreliance on outdated specs

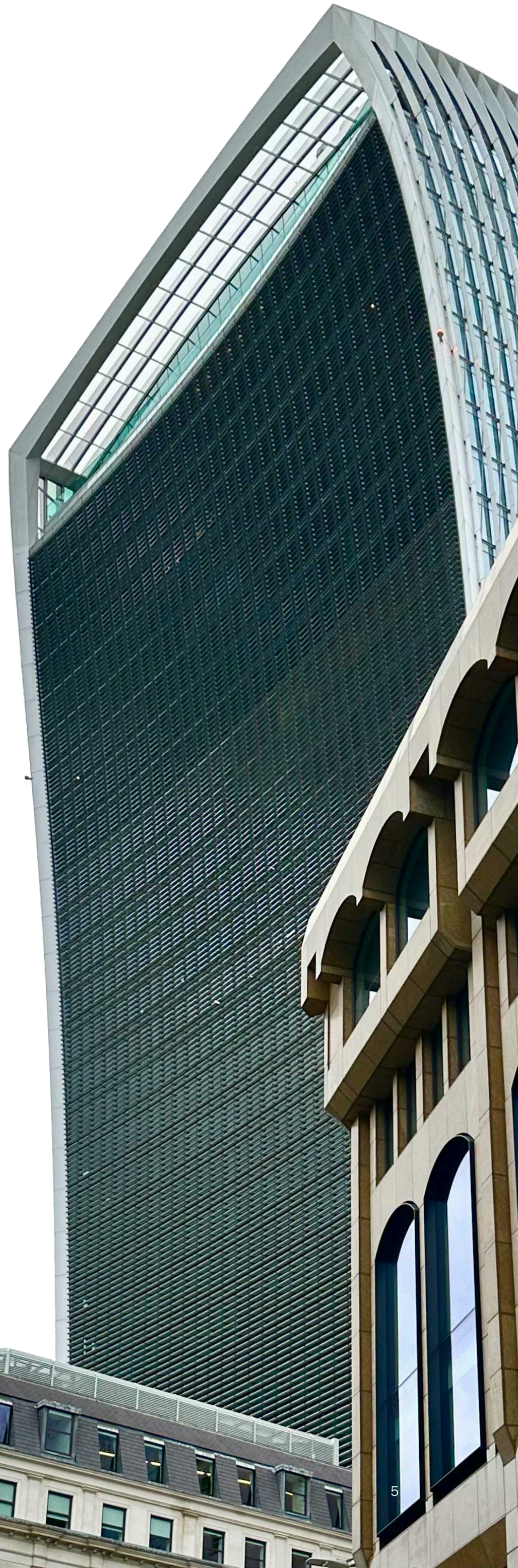
Coating specifications can sometimes become a routine task, with professionals defaulting to using an existing specification from a previous project that seems similar.

While using previous specifications can be relevant, it is not without risk. Standards, site conditions, and material requirements often change over time. Specifications that were suitable in the past may no longer align with the demands of the current project, potentially leading to gaps in protection or regulatory shortfalls.

This is particularly true for passive fire protection, where high-profile incidents like the Grenfell Tower and Lacrosse Building fires have triggered major regulatory changes. In response, many countries have shifted from prescriptive approaches to performance-based fire protection standards — placing greater responsibility on specifiers to validate the actual performance of selected solutions. This requires a deeper understanding of fire behaviour, structural impact, and compliance with evolving standards such as ISO 834 and EAD 350402-00-1106.

A similar development has taken place in corrosion protection — for instance, the ISO 12944 standard was updated in 2018, introducing the new category CX (extreme) for offshore and very aggressive industrial environments.

Specifications should never be treated as static documents — always review and update them to ensure they remain aligned with current standards, environmental conditions, and project-specific performance requirements.



Missing out on technological advancements

As a specifier, it is imperative to be on top of the latest advancements in coating technologies.

Given that existing standards may lag behind recent technological advancements or may not fully capture the performance of technologies in real-world conditions, it is advisable not to rely solely on standards when specifying protective coatings.

To go beyond standard benchmarks, speak with experienced industry professionals — like Hempel's specification and coating advisors — who can share practical insights on what works in the field and the latest protective technologies.

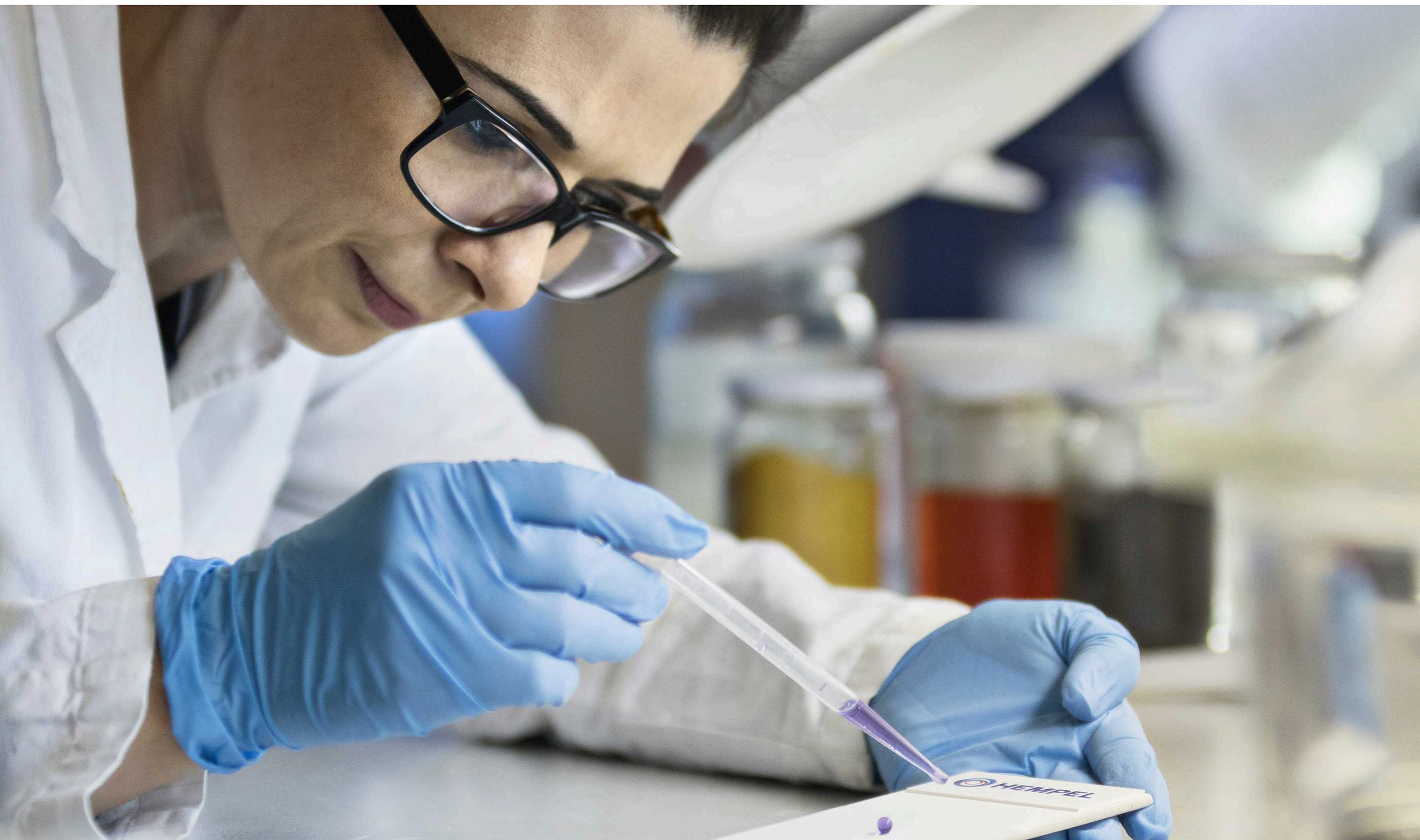
Durability beyond **35 years** with certified coating systems

For example, Hempel's latest innovation, **Avantguard 750 Pro**, is a patented high-performance activated zinc-rich primer that redefines corrosion protection. It provides more than 35 years of proven durability, setting a new benchmark for long-term performance. Fast-drying and optimised for 2-coat systems, **Avantguard 750 Pro** streamlines application and reduces material consumption — a single, versatile solution for new builds, maintenance, and repair.

Likewise, **Hempafire Extreme 550** sets a new standard in passive fire protection — delivering up to four hours of resistance even under C5-rated conditions. Its breakthrough formulation combines outstanding durability with reduced dry film thickness, minimising both material use and application time while raising the bar for fire performance.

These technological advances not only improve safety and durability — they also help achieve more sustainable solutions by reducing material waste, lowering application energy, and decreasing the embodied carbon footprint of the coating system.

Up to **4 hours** of fire resistance in extreme conditions



Underestimating long-term financial and environmental implications

Overlooking the long-term cost of corrosion can lead to unintended financial and environmental consequences. Continuous maintenance, premature failure, and the environmental burden of steel replacement carry considerable consequences — not just for specifiers, but for society at large.

The environmental impact of corrosion is substantial. Projections suggest CO_2 emissions associated with replacing corroded steel could account for 4.1% to 9.1% of global emissions by 2030.

From a financial perspective, choosing lower-grade coatings might reduce initial costs, but those savings are often outweighed by higher long-term expenses for inspections, unplanned maintenance, and operational downtime. Over the lifecycle of an asset, a more robust, upfront specification often proves more economical.

Therefore, long-term performance and sustainability should be considered core specification criteria — not secondary concerns. This means selecting systems that not only meet today's performance benchmarks but are also proven to perform over time in similar exposure conditions.

CASE 1

Diverse conditions in **Desert Water Theme Park**

Aquarabia water theme park in Saudi Arabia is an example of how a project can have unique and multifaceted specification challenges.

The 252,000 m² park, located 45 minutes southwest of the capital, Riyadh, gives rise to a diverse environment, with steel structures exposed directly to the arid weather conditions in the desert and a contrasting humid microclimate within the park, necessitating varied protection levels.

Hempel's client, a lead design consultant tasked with designing the park and supervising its construction, was met with the challenge of ensuring steel protection across the board.

Hempel drew on its experience from similar challenges faced in the region and beyond and contributed with advanced knowledge in corrosion and passive fire protection.

CASE 2

Shutdowns and traffic restrictions **on the Clifton Bridge**

The Clifton Bridge in Nottingham, UK, serves as an example of the consequences of insufficient corrosion protection.

In February 2020 it was discovered that water damage had corroded steelwork under the bridge. This resulted in the bridge enduring more than 18 months of traffic restrictions and partial shutdowns.

While the bridge may have been specified in accordance with the standards in place at the time, the case highlights how suboptimal specifications can have significant consequences — underscoring the vital role specifiers play in ensuring long-term performance and protection.

These real-world scenarios underscore the necessity for specifiers to diligently assess environmental conditions and regulatory requirements to avoid the pitfalls that have compromised the safety and functionality of such structures.

Conclusion

When specifying for structural projects, selecting the right protective coatings is critical to ensuring durability, safety, and compliance.

It requires a deep understanding of the structure, its function, and the environment it operates in. As standards evolve and technologies advance, continuous learning and informed decision-making are essential to avoid costly mistakes and deliver long-term value.

By fostering continuous learning and open collaboration, we can build safer, more resilient infrastructure that performs reliably for decades to come.

About Hempel

As a world-leading supplier of trusted coating solutions, Hempel is a global company with strong values, working with customers in the decorative, marine, infrastructure and energy industries. Hempel factories, R&D centres and stock points are established in every region.

Across the globe, Hempel's paints and coatings can be found in almost every country of the world. They protect and beautify buildings, infrastructure and other assets, and play an essential role in our customers' businesses. They help minimise maintenance costs, improve aesthetics and increase energy efficiency.

At Hempel, our purpose is to shape a brighter future with sustainable coating solutions. We firmly believe that we will succeed as a business only if we place sustainability at our heart. Not only is it the right thing to do, it will strengthen our competitive position, make ourselves more resilient and reduce our risk.

Hempel was founded in Copenhagen, Denmark in 1915. It is majority owned by the Hempel Foundation, which ensures a solid economic base for the Hempel Group and supports cultural, social, humanitarian and scientific purposes around the world.

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