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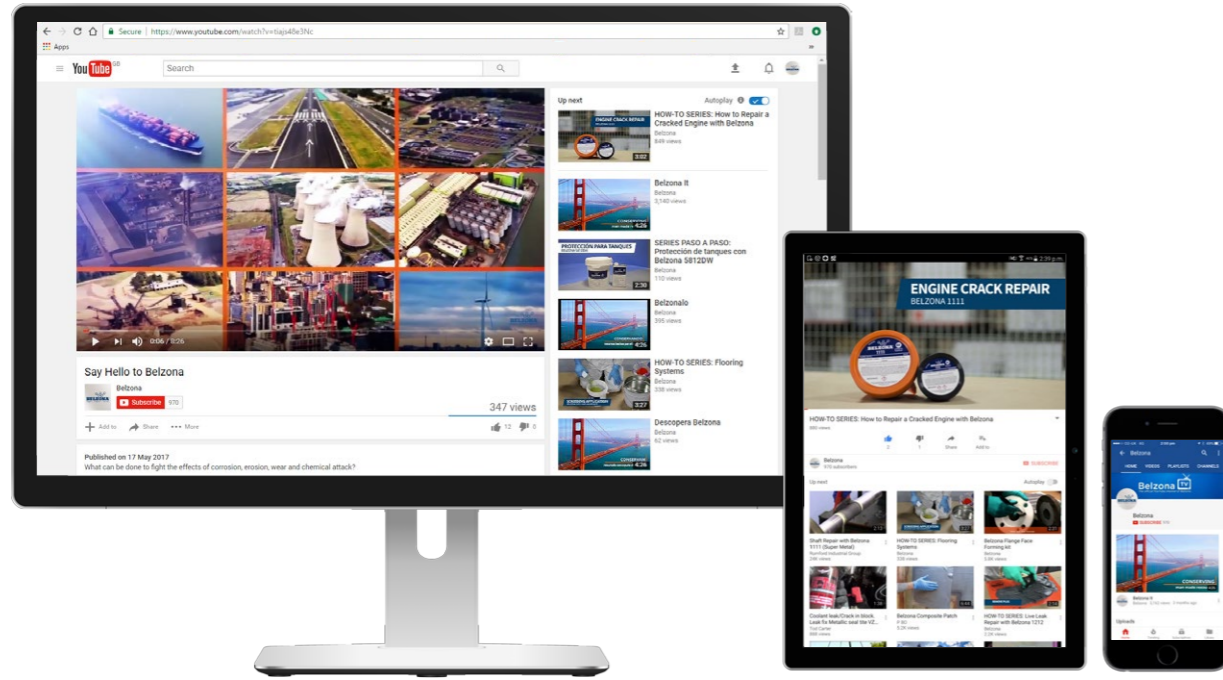
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10 YEARS
5 BELZONA APPLICATIONS

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From the Editor's Desk


Hello to our returning readership and welcome to those of you who have just been introduced to Belzonia and its range of solutions for buildings and structures. It is that time of year again, where the Belzonia Publications Team has been hard at work gathering and presenting the best of Belzonia's Facilities Maintenance applications. With this being our 8th annual edition of Facilitate magazine and the second global edition, it is fantastic to see the impact that Belzonia's polymeric materials are having in restoring and preserving the facilities we use daily.


Certainly, this is one of the most interesting issues of the magazine to-date, where we have worked closely with our worldwide Distributorship Network to source impressive and relatable applications in the Facilities Maintenance sector. Now, more than ever, our climates are subject to changes that are out of the ordinary from what we are typically used to. In particular, the effects of global warming and climate transitions are having a notable impact on buildings and structures. Whether it is increased rainfall, soaring temperatures or the heightened effects of UV exposure, these uncharacteristic conditions are making the task of Facilities Maintenance progressively harder.


Now in its 65th year of business, Belzonia can proudly attest to being the market leader in the manufacture of repair composites and industrial protective coatings. Part of this, Belzonia provides an essential service to those responsible for the maintenance of industrial facilities. This can range from the roofs, floors and walls of structures themselves, to the equipment within (pipes, pumps, shafts and heat exchangers), ensuring maintenance personnel have the tools to solve any potential issues.


By delving further into this edition of Facilitate, you will be confronted with some familiar troubles and damages which plague facilities around the world, perhaps ones you are tasked with keeping operational. On each occasion Belzonia has worked with the client to provide the most appropriate solution, ensuring that durability, longevity and quality have come as standard. We hope you enjoy the 2017 edition of Facilitate and find inspiration in our stories and projects.

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Over 3000m² of roofs were covered across the refinery site

Familiar solution confronts a new challenge

Having been a customer of Belzona's Thailand Distributor, Pan Mechanic Engineering Co. Ltd., they had a great deal of experience using Belzona materials for over 20 years. During this time, a wide range of applications had been completed; however, it was their involvement with tank base sealing that suggested Belzona might hold the right solution for the oil refinery's roofs. Initially used for minor maintenance jobs, successful applications using Belzona 3111 (Flexible Membrane) evolved into Thai Oil sealing more than 100 tanks with the liquid-applied membrane in the last ten years.

Frequent use of the system garnered a great deal of confidence from the refinery and when Belzona highlighted the material's versatility through further roofing case studies, Thai Oil realised its suitability for their own predicament. Familiar with the ease of application and waterproof quality, the refinery commissioned the coverage of more than 3,000m² (32,292ft²) of roofs. This included the three new concrete substation roofs, as well as the older control room and admin building roofs.



A combination of new and old concrete roofs required waterproof protection

Application method

To remove the source of the issue, the rooftop surfaces were abraded, ridding the concrete of any existing layers of laitance. Subsequently, the substrates were thoroughly cleaned of all dust and contaminants via waterjet cleaning, before final checks of the moisture and pH values. Once the concrete had been sufficiently prepared, the roofs were brushed with conditioner and the liquid-applied membrane, including reinforcement sheet, were administered. Overall, this system was implemented by 10-15 trained applicators, taking place across 60 working days.



Application of reinforcement sheet



Top layer brush-applied to complete seamless solution

TANK BASE SEALING TO ROOF LEAK HEALING

Thai Oil embraces Belzona waterproofing solution for over 3,000m² of roofs

Sometimes, the right solution isn't always a new one, yet may be one with which you are familiar. Notably, this was the case for a refinery in Chonburi, owned by Thai Oil; one of the largest oil refineries in Thailand. Involved in the production of various types of fuel oil, the refinery comprised of six refining units as well as a series of separate buildings across the site, including three newly built substations. Unfortunately, leaks had affected the older units, deriving from deteriorated concrete. With the water ingress threatening the operation of the refinery, Thai Oil required a waterproof solution that could be installed by their own personnel without the need for specialist tools or complicated installation.



60 days were required for completion due to the scale of this application

Assured for the future

Following the successful application of the material, Belzona 3111 was selected as the preferred waterproofing material for all future substation roofs. Sales and Project Manager for Belzona's Thailand Distributor, Panit Kittikunakorn, added

"Simply, the refinery regarded product quality, long-term repairs and professional service among the most important factors for this application. Therefore, the recognition of these elements in their previous dealings with Belzona, convinced them of our capabilities in other areas they had not considered."

Three years on, this application is still performing well in service, providing excellent waterproofing protection of all the refinery's key buildings and structures.



A tale of two buildings

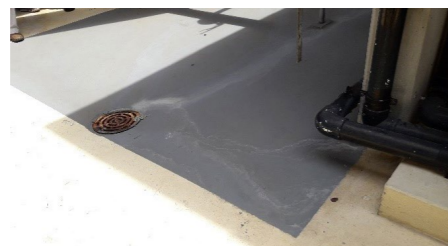
Keeping a property fully maintained can be an expensive task, both time- and money-wise. However, increasingly companies are turning to polymeric materials and repair composites to fully protect and quickly restore buildings. These purposefully-engineered materials provide better results than their traditional counterparts and can leave structures in perfect condition for 20+ years.

In Brisbane, Belzona's Australian Distributorship, Rezitech, has worked extensively with one facility management company to repair and protect its two adjoining buildings with Belzona materials, from the top (the roofs) to the bottom (a basement pub). In over 10 years of working together, 5 different areas have seen repair, protection and improvements from Belzona applications.



Roof

Material: Belzona 3111 (Flexible Membrane)
Benefits: Single-component, easy-to-apply, solvent-free, liquid system
Application: In April 2015, one of the building's consistently-leaking, air conditioning and chemical dosing units suddenly incurred a large spillage. It was decided to use a layer of Belzona 3111 for the area stretching from the dosing unit to the drain, to dramatically reduce the risk of the chemicals penetrating the roof. Because this system is solvent-free, work continued in the offices below without disruption from odours.



Loading dock and car park entrance

Key Material: Belzona 4411 (Granogrip)
Benefits: High mechanical strength, great adhesion
Other Material: Belzona 5231 (SG Laminate)
Application: The entrance to one of the building's loading docks and car parks had deteriorated significantly. This area was in constant use by tenants so the Facility Manager wanted to implement a quick repair that would reduce the risk of slipping for the long term. By investing the durability of Belzona solutions rather than traditional floor paints, the management assured its tenants' safety.



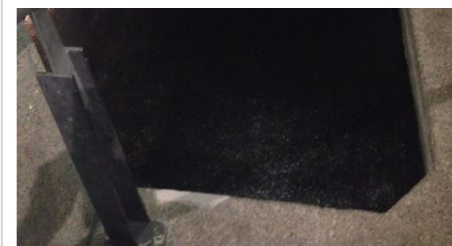
Concrete pillars

Material: Belzona 4141 (Magma-Build)
Benefits: High mechanical strength, non-absorbent, grout or screed consistency
Application: The buildings' damaged concrete pillars were of concern to the building management company. The concrete was significantly spalling and the customer wanted to use one of Belzona's concrete composites after witnessing their success in other areas of the buildings. Rezitech chose to use Belzona 4141, which is designed to effectively repair vertical and overhead surfaces, without the use of shuttering and with minimal support during application.



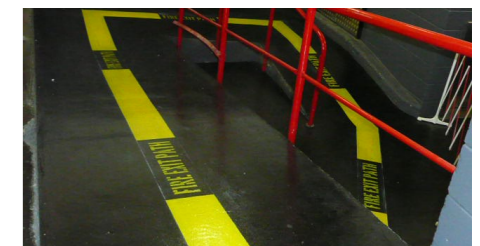
Pub entrance

Key Material: Belzona 5231 (SG Laminate)
Benefits: Fast-curing, non-slip, easily maintained
Other Material: Belzona 4111 (Magma-Quartz)
Application: The facility management company wanted to refurbish the below-surface entrance to one of its pubs. The flooring was seeing cracks form, so once again Belzona 4111 was chosen to fill them in. The area was then coated with Belzona 5231 to reduce the risk of slipping.



Fire escape ramp

Key Material: Belzona 4111 (Magma-Quartz)
Benefits: High mechanical strength, non-absorbent, grout or screed consistency
Other Material: Belzona 5231 (SG Laminate)
Application: The ramp leading to the fire exit needed an upgrade to improve its safety. The original design saw grooves gouged into the concrete ramp for anti-slip purposes but these were degrading and had broken away in parts. Therefore, Rezitech restored the ramp to a smooth surface before using a slip reduction system in Belzona 5231.



"The works carried out look incredible. Thank you from both myself and our client at the Mosque. Belzona and the Belzona Technosol team, should be very proud of the work that they have undertaken"

- Specialist Works Manager on behalf of the Shah Jahan Mosque.

DOME AND DUSTED

Mosque returned to original splendour: Dome roof receives waterproof repairs



View of the Shah Jahan Mosque and its spectacular dome



Extent of the perforations in the zinc dome



Seamless and waterproof protection of the zinc dome

The upkeep of buildings of significance and high regard is often a rewarding and interesting opportunity for Belzona. This was particularly true of the application presented by the Shah Jahan Mosque in Woking, UK. Built in 1889 by Dr Gottlieb Leitner, this mosque was the first to be established in Western Europe, outside of Muslim Spain and has stood for a staggering 127 years. Possessing such historical and religious associations, this building warranted special efforts to preserve its condition. Therefore, today the mosque has the honour of being listed as a building of special interest under the National Heritage, attaining historical Grade II status. Meanwhile, registering as an independent charity means that, since 1995, the local community has continually invested in renovation and restoration of the mosque's original elegance.

The problem

Most definitely, the jewel in the crown of this prestigious building is its green dome. Included as a homage to the green-coloured dome at the Prophet's Mosque in Medina, the striking design has become an integral part of Shah Jahan Mosque's heritage. However, over the course of its impressive lifetime, the zinc dome had become significantly damaged and was showing signs of ageing. It was suffering from a large number of perforations around its circumference, as well as several large holes, due to weathering and corrosion of the metal. In addition, the design comprised of a lateral band formed by 41 zinc stars, which had similarly succumbed to corrosion and loss of shape. All of this damage had led to

rainwater leaking into the mosque, causing unwanted disruption to the prayer times and community events taking place.

In search of a solution, the mosque made several enquiries with companies who utilised traditional hot work repair methods, all of whom rejected the application in fear of aggravating the problems even further. Due to the thin- and through-wall defects in the already fragile zinc dome, it was believed to be impossible to weld repairs without causing additional damage. As a result, a cold-applied alternative was recommended to both rebuild the existing metalwork, as well as provide a waterproof coating for future protection.

The application

Prior to application acceptance, Belzona carried out a series of pull-off tests on the dome's current coating to assess its adhesion strength. Once the adhesion levels were determined, it was understood that the existing coating could be sufficiently removed using hand tools, creating a clean and rough surface profile, rid of deteriorated coating and corrosion. The dome, measuring a total of 6.5m in diameter, was examined thoroughly to identify and repair any thin- and through-wall defects. Starting with the most severely damaged areas, Belzona Technosol began to rebuild and resurface the dome's profile using Belzona 1121 (Super XL-Metal). Incorporated with a fine steel mesh over the large perforations in the zinc structure, the metal repair composite was cold-applied without the need for specialist tools.

Introducing a flexible roofing membrane

Following some additional sanding, Belzona had restored a firm surface onto which the waterproof membrane could be laid. Once more, the substrate was cleaned and prepared in line with Belzona protocol, before the conditioner was applied across the entire dome and the seamless system of Belzona 3111 (Flexible Membrane) was installed. On such a complex surface, the liquid-applied, waterproof and weatherproof membrane demonstrated its ability to easily conform to the various contours of the dome, providing the mosque with long-term roof protection. In particular, this added flexibility and helped to reinforce the fragile zinc roof, offering respite from the 127 years of continuous exposure.

Altogether, two Belzona Technosol applicators took a total of six days to complete the repairs and protection of the mosque roof. In order to fully restore the dome to its original splendour, the Belzona membrane was painted green with a compatible coating system. Left uncoated, the stars and crescent moon were subsequently gilded by the client in line with the dome's original design.



Refurbished expansion joints can eliminate bumpy rides in hospital corridors



BELZONA'S SMOOTH HOSPITAL RIDE

“Smooth Ride” project successfully absorbs the stresses placed on hospital expansion joints.

Throughout Healthcare, floors are an essential part of Facilities Maintenance and any failure can be unsightly, noisy, harmful to mobile medical equipment and ultimately, dangerous. Amongst typical damages that can be found within Healthcare facilities is the deterioration of floor expansion joints, which can become damaged relatively quickly. Significantly, this damage results from poorly engineered expansion joints.

They are often unable to withstand the increased point load stresses which derive from equipment fitted with hard, small-diameter wheels. In addition, an ever-growing trend, which increases point loads at hospitals, is the need to accommodate high numbers of overweight and obese patients. Crucially, from a patient's perspective, this issue creates a

bumpy and uncomfortable ride for hospital guests whenever they were rolled in their beds or wheelchairs across the failed joint.

These failing expansion joints are a problem area which Facilities Maintenance Managers are focused on eliminating, in particular within the US. In fact, this application is one that has been maximised throughout the US under the name of the “Smooth Ride” project. Implemented by the Distributor from Belzona Carolina, the intention of the “Smooth Ride” project is to eliminate the bumpy ride suffered by patients and mobile equipment, stemming from damaged expansion joints. In addition, the repair eliminates the tripping hazard from failing joints, whilst simultaneously removing the issue of dirt and residue accumulation, found with traditional joint installations.

Step by step

Before refurbishment

Joint excavation

Concrete restored

Completed expansion joint



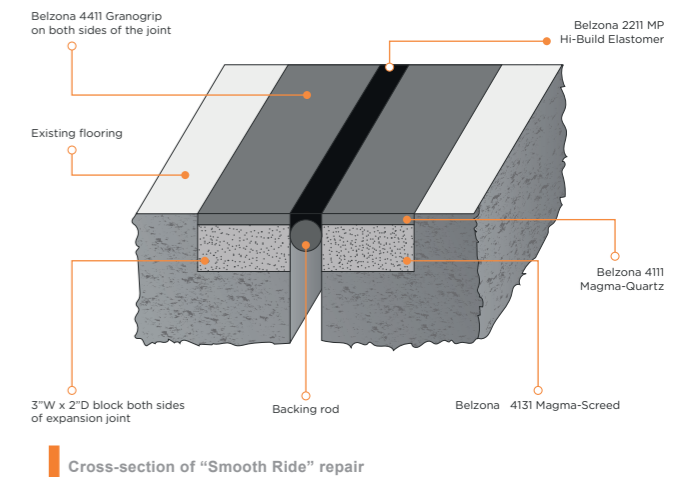
Belzona's joint effort

To effectively reinstall the expansion joint, the original is excavated, removing all the damaged concrete and failed components. Following correct surface preparation and conditioning, the repair then utilises Belzona's 4000 Series materials to rebuild the damaged concrete floor. Offering high mechanical and impact strength Belzona 4111 (Magma-Quartz) is ideally suited to replace the deteriorated concrete, which will combat the point load stresses common to that environment.

Next, a backer rod is inserted into the joint, before the application of highly flexible, Belzona 2211 (MP Hi-Build Elastomer), which accommodates for movement between materials at the joint itself. Finally, if required, Belzona 4411 (Granogrip) can be incorporated with aggregate to provide a slip reduction system either side of the expansion joint. This further eliminates the potential slip and trip hazards associated with the previous, failed system.

A long line of successes

The “Smooth Ride” project has been incredibly successful, with Belzona Carolina completing thousands of linear metres since the beginning of the millennium. These being shared predominantly between a core selection of 15 to 20 Healthcare trusts, some of whom regularly install over 10 joints per year. On average, an installation covers a 2.4m (8ft) expansion joint; however, previous “Smooth Ride” applications have managed to top several hundred feet. Located throughout the entire hospital, the areas where Belzona's expansion joint solutions can make a significant and long-lasting impact are vast.

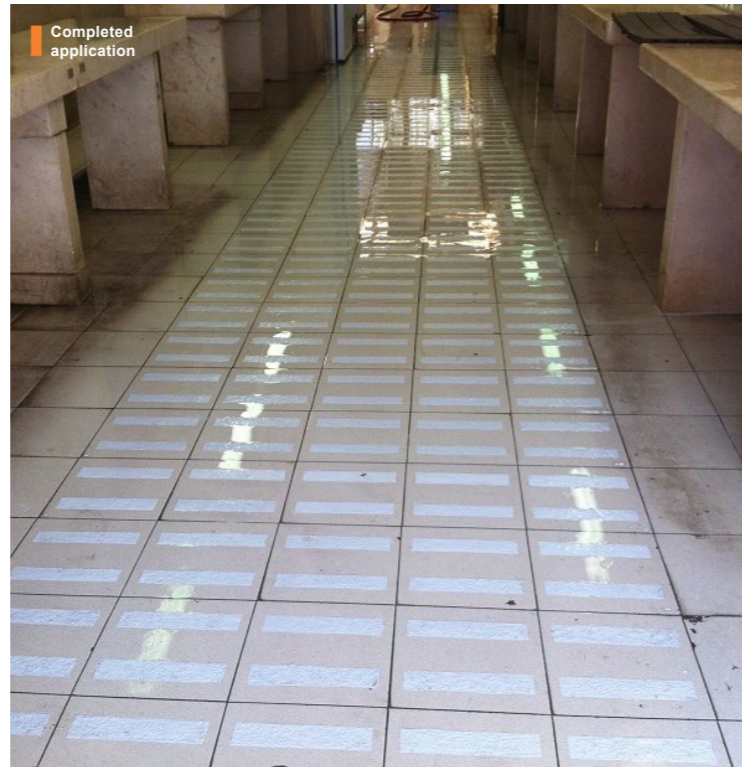




A taped off region prior to the Belzona application



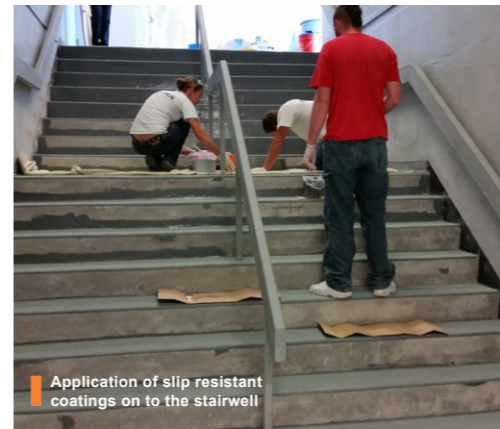
Belzona 5231 being applied to quarry tiles



Completed application



Concrete steps were each returned to a level substrate



Application of slip resistant coatings on to the stairwell



Belzona's solution has significantly outlasted the previous system

After 18 months in service, the application was inspected by the local Belzona Distributor, who stated:

"The stairs look like they are brand new as there are no scratches and no wear on the treads or edges. The school's green initiative only lets them quickly clean with water most of the time, but following a periodic deep clean, the school's Associate Principal said that the stair look really good."



Belzona grip system administered after vinyl tread failure

MARKET LEADERS IN PROTECTION PROTECT LEADING MARKET

When a popular Croatian fish market needed a safety grip system installed with minimal disruption, Belzona solutions were the ideal choice.

To certain businesses, a specific feature of a repair or protection product can be more important than the overall system. This feature could be a low price, an aesthetic preference, or as in this case, allowing the business to continue to operate throughout the application.

In a Croatian fish market, the quarry tile flooring was often wet and, especially during the summer season when there were plenty of tourists visiting the market, the risk of slipping and injury was high. However, it was of the highest priority to the business not to sacrifice any trading hours for the application of a safety grip system to counter this issue.

Therefore, the first solution they had tried were adhesive strips which could be quickly placed, but just as quickly were likely to wear out. It was then that a Belzona system was suggested: Belzona 5231 (SG Laminate) as a slip resistant coating mixed with Belzona 9211 (Supergrip

Aggregate), which provides additional grip. In testing, Belzona 5231's adhesion to damp quarry tiles (using ASTM D1002) produced impressive results of 1710 psi (11.79MPa). It is also classified as having Low Slip Potential in wet conditions when tested in accordance with BS 7976 utilising RAPRA Slider 96 (and this is even without the additional grip the Belzona 9211 would create). But beyond its performance as a safety grip system, Belzona 5231 also has a quick curing period - one of the most important factors to ensure minimal downtime. After only 8 hours at 20°C, the material will be cured enough to accommodate light pedestrian traffic and after 24 hours - full traffic and loading.

In the fish market, a region of 70m² (753ft²) was classed as potentially risky and in need of the Belzona system. However, for the client this area was too large to close off for coating at once, so instead, the solution was applied section by section over the course of six afternoons. This

method of application may have proven problematic for an alternative grip system, yet the characteristics of Belzona 5231 and Belzona 9211 meant this was perfectly possible. For example, the materials could be safely applied indoors without any health risks to the nearby customers because neither contains solvents. Also, the mixed solution can be easily applied by brush, meaning specialist or bulky equipment was not needed to be kept in the fish market for the six days of application. Finally, the quick cure time meant that 24 hours after each application the section of the fish market could be reopened to the public.

All-in-all, the Belzona system both managed to accommodate the client's need for minimal disruption and should also provide a durable and long-lasting solution. Although some businesses have to choose between certain characteristics and quality with alternative solutions, Belzona materials can often provide the best of both.

A GRIPPING SOLUTION FOR STUDENT SAFETY

Granogrip proves its durability and effectively maintains student safety on busy stairwell

Student safety is paramount when considering the maintenance of any educational facility. Areas which can be quite troublesome are undoubtedly stairwells and corridors, where high levels of foot traffic, paired with slip and trip hazards, can endanger students and staff alike. A school in Missouri, US, had to deal with this very issue after the failure of the vinyl treads on a busy staircase had increased the risk of trips and falls. As one of the key access points and a major thoroughfare in and out of the school, the vinyl grip system was subjected to high levels of wear and was unable to last longer than just one year in service.

The most prominent areas of deterioration were the steps' edges, where the concrete nosings had worn considerably. In addition, the stair treads were delaminating, causing a trip hazard as well as proving difficult to clean due to entrapped dirt and grime. To reinstate the same material would have proved costly and the customer lacked

confidence in the vinyl treads because it had not delivered a long-lasting solution. Therefore, the school sought a replacement system which was durable but also cost-effective.

After consultations with alternative grip system providers, Belzona's polymeric solutions were chosen to restore the concrete stairs and provide a new slip resistant coating. Initially, the glued down treads were removed and the concrete steps were prepared to ensure a clean, dry and debris-free substrate. The nosings and any additional deteriorated patches were resurfaced using Belzona 4111 (Magma-Quartz), a fast-curing concrete repair composite, providing a solid base onto which a grip system could be applied.

Using the Belzona 5231 (SG Laminate) system, the steps were covered with an abrasion resistant coating which could both protect the concrete and implement greater levels of grip. With the addition of a slip

resistant top coat, the aggregate was sealed in to ensure long-lasting durability, as well as ease the cleaning of the treads. As a final safety precaution, a layer of Belzona 4411 (Granogrip) was applied to highlight step changes with its safety yellow colour.

The school was pleased with the speed at which the project was accomplished, taking two days from start to finish and then ready for pedestrian traffic the next day. Notably, the cold-curing, solvent-free materials, helped to provide an odourless environment, suitable for application in the confined, indoor space. This assisted with the installation of the grip system, ensuring that the applicators were not subjected to potentially hazardous fumes. Moreover, versus reinstating the vinyl treads, the Belzona solution was extremely cost-effective at only a quarter of the price.

A COMPLETE COMPOSITE SOLUTION FOR BUND REPAIR AND PROTECTION

Bund coating combines chemical resistance and crack-bridging

In February 2016, a worldwide chemical company was looking for a solution to protect a bund at a chemical plant in Scotland. The client had a 450 tonne, steel, methanol tank currently housed within an open-air, concrete bund. The bund was porous and unlike adjacent bunds onsite, it did not hold rain water. To ensure that the bund was compliant with the Scottish Environment Protection Agency (SEPA), the client wanted to put in place a protective chemical containment coating that was liquid tight to protect against the environmental release of methanol if the tank failed.

The total bund surface area to be coated was around 460m², which included a 0.5m vertical band around the concrete plinth B, walls A, B, C, D and E, and a 1m band up onto the concrete plinth A (Figure 1). Previous attempts to repair cracks and fillets around the base of the plinth and surrounding walls had resulted in failures, leaving several areas of the bund vulnerable. As well as needing to restore these, a 25m, linear, mastic, expansion joint also needed to be replaced. To cope with the level of concrete movement, the asset owner required a protective coating which could move in sympathy with the large concrete pad and cope with stresses if any

further cracks developed. A 0.4m drainage channel, previously coated with Belzona 3121 (MR7), needed to be removed during preparation.

Every day, the plant receives three truck-loads of methanol, which takes up to one hour to completely unload. During this time, onsite work must stand down, therefore any solution had to be applied within this timeframe.

The client was offered a combination of Belzona solutions to address each problem within the bund, providing a complete repair and protection solution.

Before the application, the area was cleaned using a combination of detergent and antifungal washing, alongside high-pressure water to remove any contamination. Blasting wasn't permitted due to the tank containing methanol, so any loose concrete was removed to ensure a firm platform. The surface was then abraded to expose the aggregate by mechanical scarification.

Firstly, Belzona 4911 (Magma TX Conditioner) was used on all the surfaces where Belzona 4131 (Magma-Screed) and Belzona 4361 was to be applied. Once



the surfaces had dried, any cracks in the substrate were filled with Belzona 4131 (Magma screed). This was also used to create fillets to reinforce the joints between the walls, floors and tank base where required. Belzona 4361 was then chosen to coat the entire bund area, including walls, concrete plinths and drainage channel due to its excellent chemical resistance against methanol, flexibility and good adhesion, facilitating long-term sealing between the wall and the floor.

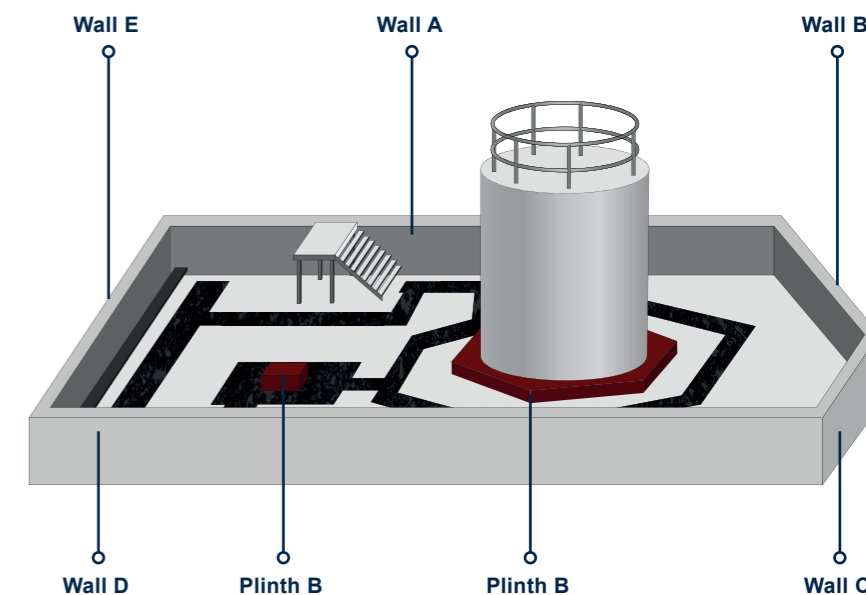
The second coat of which was directly applied within 24 hours of the first. Belzona 9211 (Supergrip Aggregate) was sprinkled on top of the curing Belzona 4361 to create 1m wide non-slip walkway (80m linear) to key areas within the bund where regular access is required.

In addition, the 25m expansion joint was removed, cleaned, masked off and

conditioned with Belzona 4911. A foam backing rod was subsequently inserted, before Belzona 4521 (Magma-Flex Fluid) was then mixed and poured into the void. Appropriate secondary containment has long been a legal requirement in many countries, particularly around tanks, storage vessels and other plant equipment containing hazardous liquids. Regulations (such as the Control of Pollution Regulations 2001 in England) are enacted to establish preventative measures. By not complying with these regulations, companies run the risk of being heavily fined, sometimes to the extent of incurring criminal proceedings.

Belzona 4361 helped to comply with the legislations relating to bund protection and its successful installation has helped the chemical plant to ensure a long-lasting barrier to unwanted chemicals leaching into the environment.

Figure 1: Containment area design

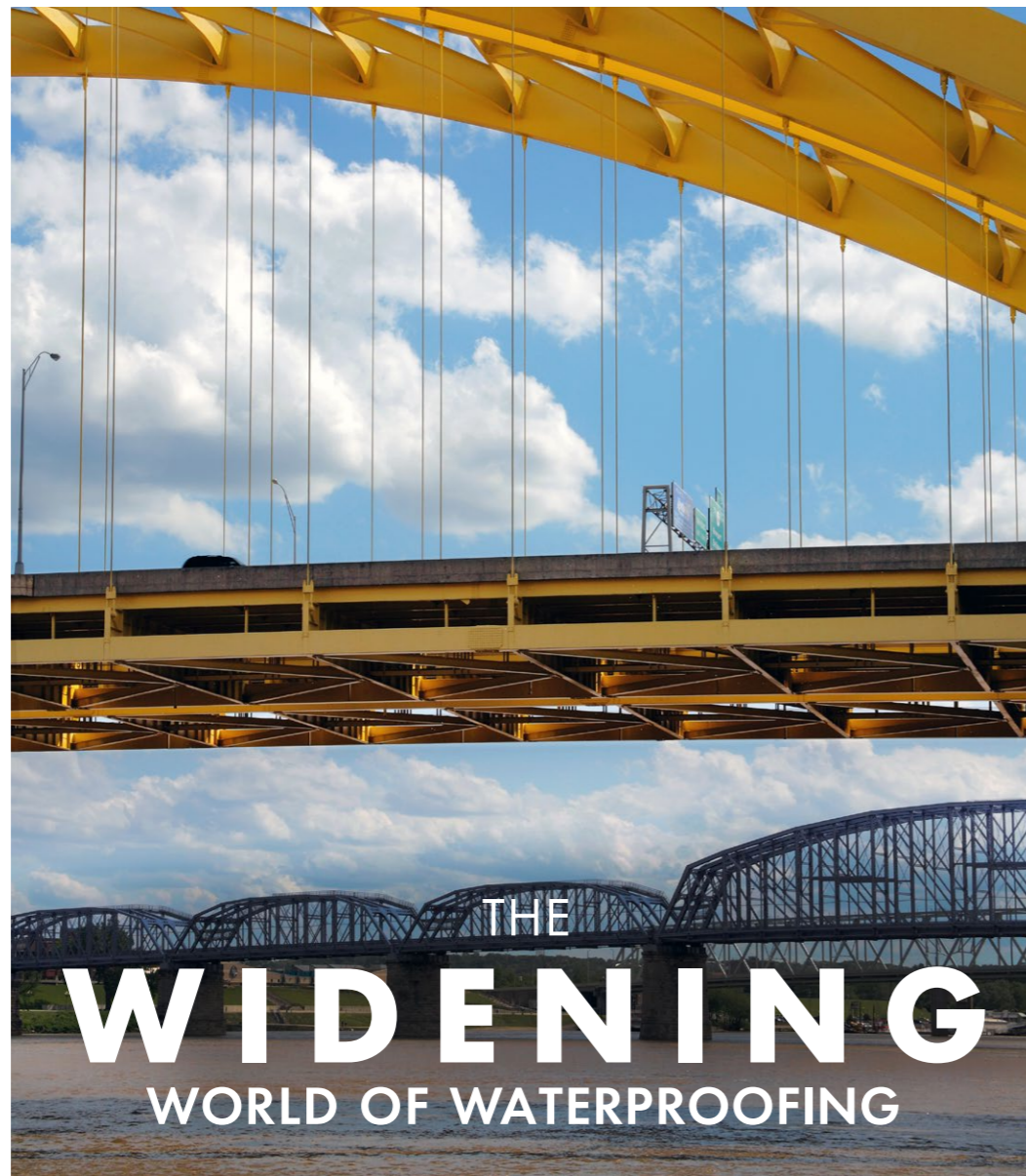
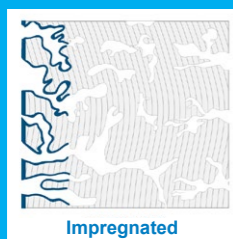
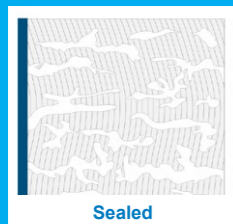


Case study

In Kentucky, USA, a waterproofing solution was needed for the new concrete parapet walls on bridges around the State. Several options were considered before eventually Belzona 5122 was chosen. This was due to the material's numerous benefits, as well as the excellent technical data and support provided by the local Belzona Distributor – Rumford Industrial Group.

Since the first application in 2008, the Department of Transport has been highly satisfied with results of Belzona 5122. The solution has now provided thorough protection for almost 50 bridges throughout the State, and counting. This continuous selection of Belzona over the years proves how useful waterproofing concrete structures is and the importance of a reliable and effective system. Traditionally, waterproofing materials may have been associated with residential and commercial properties, but now their potential for many alternative concrete structures is beginning to be realised.

Sealing vs Impregnation



Bridges are among the latest structures to benefit from waterproofing treatment

To extend the longevity of buildings and structures, the preferred choice is fast becoming water repellent solutions. This is a popular method for waterproofing exposed residential properties, and can also be used to protect civil engineering projects, such as bridges, roads and dams. These projects may not be the first things that come to mind for waterproofing needs, however it is a growing trend for Developers and Engineers to look to water repellent solutions. When applied to concrete structures early on, it can save downtime and cost of repairing them later.

One popular waterproofing material which has been used on a wide range of civil engineering projects and properties, is the aqueous penetrating liquid, Belzona 5122 (Clear Cladding).

Advantages of Belzona 5122 (Clear Cladding):

- Easily applied by either spray or brush
- Microporous
- Long-lasting water repellence
- Deep penetration

Unlike many other waterproofing treatments, Belzona 5122 provides completely invisible coverage, meaning the appearance of the surface is completely unchanged after application. It has also been dubbed "self-cleaning" as it continually sheds dirt and atmospheric pollutants throughout its lifecycle.



Belzona 4154 (Bulkfill Resin) was introduced to Europe in 2016 but already is proving itself to be a popular material. It fills a gap in the Belzona product range by offering a solution which repairs large areas of damaged concrete, brick and natural stone. Plus, it provides significantly superior characteristics to these traditional building materials, whilst also being cost-effective and easy-to-apply. With all of these benefits in mind, perhaps it is no surprise that despite its recent release Belzona 4154 has already been chosen for several important projects around Europe.

One of these projects was at a Plasterboard Manufacturer in Poland, where Belzona 4154 was used alongside Belzona 4111 (Magma Quartz) and Belzona 4411 (Granogrip) to repair a damaged loading bay and provide future slip resistance. Here, the asphalt covered concrete had experienced severe wear from regular heavy loading and urgently needed repairing. Because of the concrete substrate and the large area in need of repair, Belzona 4154 was an ideal solution.

To begin with, pneumatic tools were used to remove the large section of damaged asphalt and concrete. Then, before applying any repair composites to this area, a steel plate (which would later become the base of the loading area) was coated with Belzona 4411. This material was chosen for its hard-wearing properties, which would reduce the slip potential of the steel whilst not interfering with its strength.

Following this preparation, it was time to begin the concrete repair. Belzona 4154 was used to fill the majority of the void, leaving a gap of 6mm for the necessary top layer. Here, Belzona 4111 was chosen as it is designed to resurface and protect concrete and stonework. Finally, the steel plate was placed on top of this with the Belzona 4411 being used to secure this in place.

Belzona 4154 may be one of Belzona's more recent solutions but it is readily being adopted around the world. Going forward, the more prestigious applications it is used for, the more it will establish itself. 2017 may only mark the material's first birthday in Europe but judging by its current popularity it is likely to see a very successful future.

MAKING AN IMPACT

New concrete repair material fills gap for loading bay resurfacing

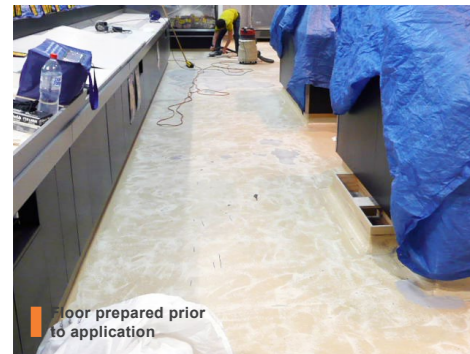


Robert Visser, Operations Manager for the shopping centre, commented:

"On behalf of a prominent shopping centre in the South East Queensland region, I would like to confirm that I am extremely pleased with the performance of Belzona's products. At first, we were sceptical of the products' performance, as many competitors had made similar claims. However, we soon revised our scepticism. The repairs performed by Rezitech have provided the centre with cost-effective, time-efficient and permanent solutions. I have no hesitation in recommending Belzona's products to any other organizations".



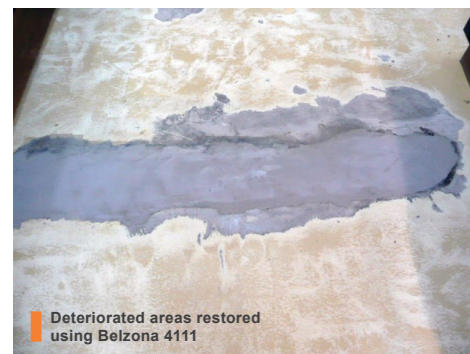
Completed restoration of floor coating



Floor prepared prior to application



Deteriorated floor coating



Deteriorated areas restored using Belzona 4111

SHOPPING CENTRE MAINTENANCE MADE SIMPLER

Belzona solutions enhance concrete relationship with shopping centre facilities

Welcoming thousands of visitors and hundreds of vehicles a day, shopping centres prove to be among the most complex and exhaustive examples of Facilities Maintenance. Because they cover such vast areas, site management requires constant attention, ensuring that the facilities not only remain intact aesthetically but comply with health and safety measures. One such shopping centre, situated in the Bayside Suburbs of Brisbane, Australia, was no different. Presented with many of the same issues that can affect the daily function of any facility, Belzona's Australian Distributor, Rezitech, contacted the shopping complex with a range of potential solutions. This was back in 2013 and over the space of four years, Rezitech has completed a variety of buildings and structures applications alongside the Facilities Maintenance company who oversees the site. These repairs have extended to the car park, access ramps, kerbs, shop floors and walls, as well as concrete surrounding steel gratings and expansion joints.

Revamping indoor floors

The 33,102 m² of retail floor space is home to 110 stores and businesses, all of which are subject to high levels of foot traffic as customers traverse the concrete, tiles, and linoleum every day. Significantly, these pedestrian areas are prone to continual wear and abrasion and are closely monitored for excessive deterioration. In partnership with the Facilities Maintenance company, Rezitech has helped to alleviate many of the issues brought about by these factors, on one such occasion in the Fruit and Butcher shop on site.

In this instance, there was a need to recoat the floor as several concrete areas were damaged and the old coating had delaminated in many places. Highlighted as an issue during a Health Inspection audit, Rezitech tackled the damaged concrete floor using Belzona 4111 (Magma-Quartz), a fast-curing concrete repair material. Accompanied by a two-part floor coating, to improve abrasion and slip resistance, the shop floor was reinstated quickly with minimal disruption.

Concrete damage curbed

Constant traffic from customers and deliveries is something that cannot be curbed, but the progressive wear and deterioration of car park areas certainly can be. After speaking to the site's Operations Manager, Rezitech were made aware of several areas that could easily be repaired using Belzona materials, including the concrete floor and expansion joints. However, kerbs navigating traffic around the car park were needing immediate attention due to spalling or detachment from the concrete substrate beneath.

Sometimes this required refitting or even the creation of a new kerb. In Winter 2013, this specific application was required after damage to the kerb warranted its removal and replacement. Using a wooden former, Belzona 4111 (Magma-Quartz) was applied into the design, re-creating the original kerb profile. Once the concrete repair material had sufficiently cured, the former was removed leaving the perfectly-formed kerb, ready to be painted.



Damaged and disbonded kerb



Formers in place to rebuild kerb



Kerb reinstated using fast-curing system

Future shopping successes

At the last inspection in late 2016, these repairs were still in excellent condition, some of which have been in place for over three years. Additional repairs have since been conducted at the shopping centre, all being repairs to broken sections of concrete or replacing sections of failed cement-based products. These successes highlight the Facilities Maintenance company's confidence in Rezitech and its provision of long-lasting Belzona solutions.

Following the recommendation of Robert, Rezitech has already begun associated applications with some of the other sites managed by this company, which includes the maintenance and upkeep of 20 centres across Queensland, Australia.



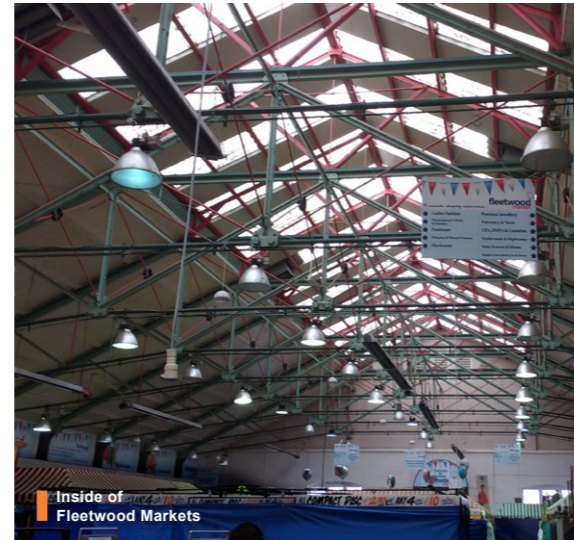
Roof found in terrible condition



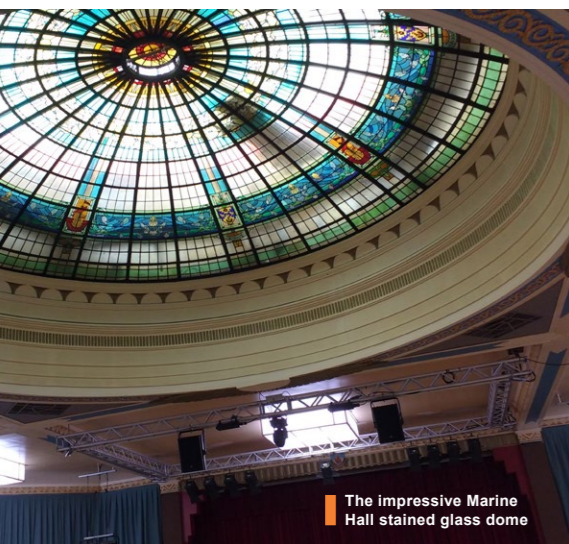
Wyre Council working in unison with Belzona



The YMCA building was among those refurbished



Inside of Fleetwood Markets



The impressive Marine Hall stained glass dome



Refurbished Marine Hall rooftop



A series of concrete pillars required repair



Belzona concrete repair materials in action

WYRE COUNCIL USES BELZONA POLYMERIC SOLUTIONS

TO PROTECT AND REPAIR THEIR BUILDINGS

With the help of Belzona's proven solutions, Wyre Council revitalised several buildings in need of significant maintenance

Wyre Council is the council for a region in the North West of the UK and home to over 100,000 people. In 2016, the Council became concerned when four of the key council buildings' roofs were showing signs of wear and deterioration.

It was then that Wyre Council turned to Belzona, as the company's large range of materials could address the four properties' individual roofing issues, as well as other structural problems. Primarily, Belzona 3111 (Flexible Membrane) was chosen, as this liquid-applied, versatile solution provides outstanding roofing protection to a range of different substrates.

Thornton Health and Fitness Centre

The Thornton Health and Fitness Centre saw a huge transformation in 2016, largely benefitting from Wyre Council's investment of over £5 million towards revitalising the local area's leisure facilities. To complete the restoration of the building, the roof saw a much-needed application of Belzona 3111.

Previously, the steel panel clad roof and metal box gutters had been suffering from cut edge corrosion which, if left untreated, can result in roof failure. However, Belzona 3111 provides the protection to counter this. The coating can last for 25+ years as

it waterproofs and weatherproofs buildings, whilst also allowing them to breathe thanks to its microporous nature.

The former YMCA building

The Former YMCA building had recently been renovated and was now being rented out. It was important to Wyre Council to invest in a reliable roofing system that would match the quality of these refurbishments and would not leak on its new tenants.

The roof was already coated in parts with other products but even with this patchwork, uneven substrate, Belzona 3111's excellent adhesion allowed it to bond successfully, encapsulating and thoroughly protecting the roof.

Marine Hall

Fleetwood's Art Deco Marine Hall is one of Wyre Council's finest gems, however, over the years, the ever-deteriorating roof has been a worry. Although roofing felt was used in areas to provide temporary protection, the council was looking for a more permanent and aesthetically pleasing solution. Belzona 3111 emits minimal odour which is perfect for this busy public building and as it comes in grey and white, it matched the existing substrate well.

Fleetwood Markets

Wyre Council's largest project was the Fleetwood Market Halls where, once again, damage to the roofing was specified for Belzona to repair.

As well as flat roof and gutter problems, the skylight's glazing bars had also seen damage. Therefore, Belzona 3131 (WG Membrane), a polymeric membrane designed to be applied in cold and rainy conditions, was brush applied on to complex contours, alongside Belzona 3111.

Meanwhile, part of the roof and gable were revealed to have been suffering from water ingress and so Belzona 3121 (MR7) was specified. This is an emergency repair and waterproof solution for roofs, which succeeded in making the area watertight within minutes of application.

Finally, it was decided to use a Belzona solution for the significantly degraded concrete pillars at the entrance of the Market Halls. Belzona 4141 (Magma Build) was chosen, as this lightweight repair composite was specifically designed to rebuild vertical and overhead concrete surfaces. As it cures to full mechanical hardness in only 24 hours (as opposed to concrete's 28 days), no bulky cast or former boards were needed to complete the application.



BELZONA[®]
Repair • Protect • Improve

