

A MESSAGE FROM OUR MANAGING DIRECTOR

Welcome to the latest issue of Corrocoat News. We're already halfway through the year and it has been a fantastic year so far. Amongst our exciting and diverse projects, there have been some key shifts in the energy and renewable energy sector. This is an exciting time for us, as it presents great opportunities to expand our turnkey offering and expertise in mechanical engineering and corrosion protection, while also contributing to global environmental change.

In the UK, we've attended and exhibited at key industry events, networking with decision makers and showcasing our offerings. For more information, please refer to page 12.

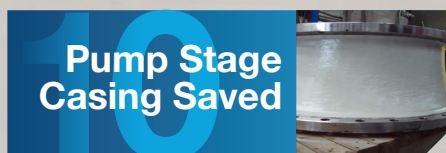
We're also witnessing a shift in our clients' mindsets, as they become more conscious of their environmental impact. They are increasingly opting to repair and refurbish damaged equipment instead of replacing it. Two case studies on this subject, featuring Corrocoat UK and our partners in India, can be found on pages 10 and 11.

Our partners in China recently worked with a client who chose to protect a new open drain caisson to prevent leaks. Typically, such equipment is repaired underwater when issues occur, but this method is costly and harmful to the environment. The client decided that protecting the pipe from the start with Corrocoat was the best option. More information about this project is available on page 3.

On page 5, we share a case study from Corrotech, our partners in the Czech Republic, who successfully repaired and protected the internals of a chemical storage tank. The project, completed in 2½ months, satisfied the client's requirements for a full turnkey solution.

Corrocoat USA recently provided a turnkey

Also in this issue...



solution for a sodium hypochlorite containment project in Florida. The client chose Corrocoat USA due to our ability to offer a warranty, which was a requirement. Details about this project can be found on page 8.

From protecting a corrosion-damaged floor in Kuwait (page 7) to providing corrosion protection for Agitated Nutsche Filters in India (page 6), our specialist projects vary widely from country to country.

Our partners in Indonesia share a case study on a project completed at a sugar mill on page 9. Impressed with the results, the client contracted Corrocoat Indonesia for their expansion and preventive maintenance programs over the next 3 years. Additionally, Corrocoat Indonesia refurbished a heavily pitted 500 BBL frac tank, also on page 9.

Corrocoat Benelux showcases their expertise in repairing tanks on page 4, following a project to refurbish and protect a secondary settling tank that suffered severe corrosion over the past 10 years.

In India, Kirloskar Corrocoat Private Ltd (KCPL) recently repaired four vertical turbine pump impellers. The impellers had developed cracks and mechanical damage over time, and KCPL was able to provide a comprehensive turnkey solution to repair them using cold and hot refurbishment methods. For more information, please see page 11.

This issue of Corrocoat News is filled with exciting and challenging projects from our exceptional global team. Thank you to all the contributors and here's to the next 6 months and beyond!



Graham Greenwood-Sole
Managing Director

Industry
Focus

Renewable Energy

Anti-Corrosion Technology

Our protective coatings and glassflake linings provide long-term protection in arduous offshore environments.

Corrosion protection for:

- Monopoles
- Jackets
- Splash Zones
- Ancillary Equipment
- Process Equipment



Products

Our products are perfect for withstanding harsh operating environments. Our unique high-performance composites and coatings not only fight against corrosion; they also prolong the life of metals and machinery.

POLYGLASS ZIPCOAT

A rapid curing two-pack, multi-monomer isophthatic polyester glassflake coating.

NORSOK APPROVED

CORROTHANE AP1

A two-pack, solvent borne, isocyanate-free polyurethane/acrylic topcoat.

PLASMET ZF

A surface tolerant two-pack epoxy coating compound incorporating a rust inhibitor and passivator, with MIO and glass flake for increased protection (also available in an aerosol).

NORSOK APPROVED

POLYGLASS VEF

A glass flake vinyl ester acrylic co-polymer.

NORSOK APPROVED



high performance coatings



Prevention: Better and Cheaper than the Cure

Leakage Prevention and Protection for New Open Drain Caisson

One of the largest and most competitive engineering, procurement, construction and installation contractors of offshore oil and gas projects in the Asia-Pacific region, recently approached our partners in China, to protect a new open drain caisson from a future leak.

With leakages being a very common problem with this type of equipment, the client had considered repairing the issue as and when it would happen, using diving and injection repair. This approach is fairly common, but is expensive and may cause environmental consequences, with leakage of hazardous material to the sea.

The client decided protecting the 52-metre long caisson and extending its service life from the start, with Corrocoat, was the best and most viable option. As part of the project the client commissioned the team to also protect the internals of an attachment pipeline, which was to be inserted in the caisson.

The team completed the project on-site and selected Polyglass VEF to line the caisson internals, via spray application. The pipe internals were also coated with Polyglass VEF, after first being split in to 2 sections. Once cured, the client welded the pipe sections back together, and a total of 10 pipes were inserted in to the caisson.

When in position, the team re-prepared the field fit weld area and coated over the weld joints with Polyglass VEF to complete the corrosion protection. The conditions in the caisson to complete the final stages of the project were very challenging, with a restrictive workspace as a result of the diameter of the caisson and the inserted pipes.





Repair for Secondary Settling Tank Suffering Severe Corrosion

Our partners at Corrocoat Benelux, recently worked on a project to repair a secondary settling tank, which was suffering from severe corrosion. The tank, which had its last inspection over 10 years go, had been in service at a petrochemical plant, and was in much need of repair, having been subjected to waste sludge.

Following an on-site inspection, during an outage, it was discovered that the 2 outer shells, which were 2.4 metres high, with a diameter spanning 4.5 metres, were severely corroded.

Before transportation to the Corrocoat workshop, the skirt of the tank was dismantled by the Corrocoat team, to allow for easier transportation and repair. Upon arrival, the shells were abrasive blasted, before Corroglass 632 was applied to prime the substrate. Fibre glass matting was then applied to the damaged areas, ahead of 2 layers of Polyglass VEF.

The client was extremely impressed with the finished result, and the team are confident the protective coating would exceed a further 10 years in service.



Coating Credentials

Polyglass VEF

A glass flake vinyl ester acrylic co-polymer. Suggested for use in immersion environments where superior resistance to chemical attack is required. Polyglass VEF is suitable for many chemical environments within the full pH

range, it has excellent resistance to demineralised water and good resistance to many solvents. It is also used in aggressive atmospheric or spillage conditions (bund areas) and potable water applications.



Renovation of Corrosion Protection of Chemical Storage Tank Internals

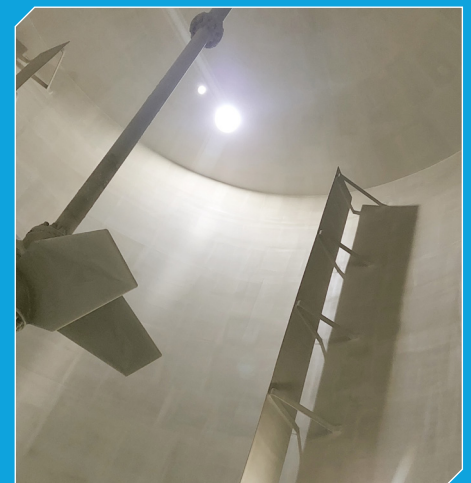
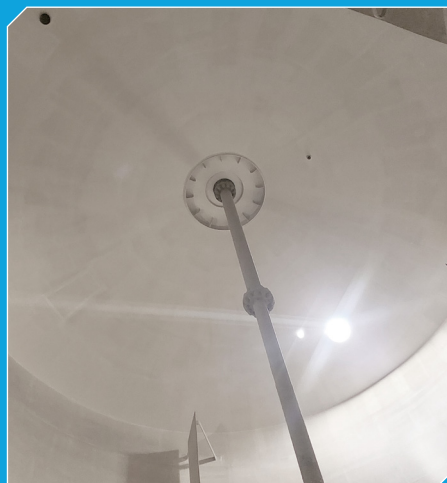
Our partners in the Czech Republic, Corrotech, recently completed a project at a Power Generation Plant, repairing and protecting the internals of a chemical storage tank.

The 960m² tank (12.5m diameter x 15m height), stored limestone slurry. The previously applied coating was extremely porous and had been poorly applied, which resulted in pitting on the carbon steel substrate. The client turned to Corrotech to provide a coating which would offer long term corrosion protection.

Undergoing the project in Winter, temperature regulating and dehumidifying equipment was required for blasting, and throughout all of the coating application. The team spent 72 days completing the work carrying out the following:

- Removing sediments and the previous coating
- Decontaminating soluble salts from the surface
- Preparing the surface to ISO 8501-1 with cleanliness Sa 2½ near to Sa 3
- Applying Polyglass PPA (as a primer) via airless spray application
- Applying Corrofill VE to fill in the pitted areas
- Applying lamination layer L600 + Fiberglass Cloth 600 g/m² to the tank floor and 1m of the shell wall.
- Applying Polyglass VEF as a corrosion barrier
- Quality assurance as per designed Inspection and Test Plan (DFT Test, Holiday Detection Test, Pull-off Test)

The client was extremely satisfied with the end results and the way in which the project was undertaken, as well as being very impressed with the full turnkey solution which was provided.





Agitated Nutsche Filter (ANF) in Chemical Industry

Long-Term Protection Against Chemical Attack & Erosion



Before



After

In chemical manufacturing processes, Agitated Nutsche Filters (ANF) are essential equipment for the separation and filtration of solid and liquid components. However, the corrosive nature of the chemical process liquids can pose a challenge to the ANFs, leading to degradation and equipment failure.

A renowned chemical manufacturing company in Maharashtra, India, approached Kirloskar Corrocoat Private Ltd, our partners in India, to provide long term protection against chemical attack and erosion for two ANFs. Each one measured 3m in diameter by 2.25m, and included accompanying components; the vessels, agitators, mesh plates and bottoms.

Due to the size of the ANFs, the project was completed on-site, with the team first dismantling them. The internals were grit blasted to ISO 8501 cleanliness standard Sa2½ and Polyglass PPV was then applied as a holding primer, with a top coat of Polyglass VE. Polyglass VE is perfect for immersion environments where superior resistance to chemical attack is required – this was critical for the longevity of the ANFs, in their corrosive service environment.

The team reassembled the ANFs and they are now fully operational.



Before

Agitator Blades



After

Agitator Blades



Before

Outer pipes



After

Side Discharge Outlet



Before

Filter bed bottom plates

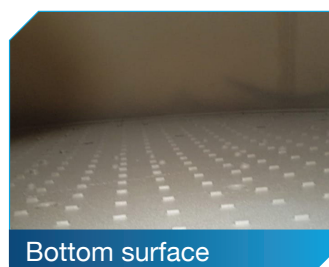


After

Filter bed bottom plates



Top surface



Bottom surface



Outer pipes



Side Discharge Knob



Long-term Cost-effective Protection for 500m² Concrete Floor

The largest oil services company in Kuwait, recently contacted our partners in Kuwait, Aja Technological Solutions Co. to provide long term protection to the floor of a containment area, spanning 500m².

Over the years the concrete floor had continued to suffer corrosion as a result of raw hydrochloric acid spills. To try and rectify the issue, the client would constantly re-concrete the floor, which proved both ineffective and extremely costly.

A team of 4 applicators completed the project in 24 days; preparing and coating a concrete floor which had been laid 28 days prior to work commencing. Initially, the surface was abrasive blasted to remove surface laitance or weak frangible material. Following the removal of dust and debris and thoroughly vacuum cleaning, the prepared concrete was then primed with Polyglass PPA, which was used as a penetrating primer and to strengthen the immediate top layer.

The team then applied a Corrocoat laminating system, prior to the application of Polyglass Standard, to 1500 microns.

Throughout this project the team faced numerous challenges. As the project was undertaken in an open space, considerations and allowances for changing weather were factored in. On alternative days, the team were required to provide a cover for the area, to protect the concrete from absorbing water. Also, as the project was conducted in the South of Kuwait, surrounded by desert, there were considerations regarding the 40°C summer heat, towards the final stages of the project.

The client was extremely satisfied with the solution provided and the guarantee of long-term cost-effective protection.





Turnkey Solution for Sodium Hypochlorite Containment Lining

Corrocoat USA was contacted by a general contractor that constructed a sodium hypochlorite containment for JEA; Florida's largest community-owned electric utility company, which serves more than 1 million Northeast Florida residents with electric, water, sewer and reclaimed water services.

The containment required a lining that met 3 requirements:

1. The manufacture of the material had to be approved by JEA.
2. The material had to also be approved by Florida Department of Environmental Protection for lining of sodium hypochlorite tanks.
3. The installation came with a 5-year material warranty from the installer and a 5-year labor warranty from the applicator.

As a result of the turnkey nature of the business and ability to provide the required 5-year warranty, Corrocoat USA were chosen for the project.

The surface was first wet abrasive blasted with Chlor[®]Rid to remove salts and remove laitance. It was then primed with Plasmert ECP; a high-solids, low viscosity, two or three-pack epoxy primer, used to prepare concrete surfaces that are damp, or where levels of moisture are approaching the saturation point of concrete.



Once the primer had cured, the surface was graded towards the sump using Corrocoat Zip E screed; an epoxy

glassflake coating with additional fillers, which provides cost-effective, durable protection in aggressive atmospheric conditions and aquatic immersion environments. It has excellent application characteristics, in single applications.

Following cure of Zip E Screed, all transitions and 100% of the sump area were laminated using Corrocoat Epoxy Laminating Resin and fiberglass matting. The surface was abraded to remove nibs and cleaned, then Plasmert AR3 was applied at 48-60 mils DFT, to provide the required protection.

Following the success of the project, Corrocoat USA has completed a second containment for the same contractor, and has a 3rd awaiting approval.





CO² Pipe, Scrubber, and Separator Internal Lining

In 2012 the maintenance team at a sugar mill in Indonesia were fighting a losing battle against corrosion on the welding joints of their CO² pipeline. The purpose of the CO² gas at the sugar mill was for carbonation, ultimately improving the quality of the sugar.

At that time, the plant was using SS304 & SS316L stainless material for their pipework. But, after just six months in service, the pipework was suffering leaks on the welding joints areas.

Over 220m of pipework was transported to the Corrocoat workshop (in Indonesia), where the team were tasked with providing a long-term solution. Polyglass was the recommended coating system.

So impressed with the result and performance of the Polyglass VE system, once the pipework was put back in to service, the client chose to downgrade their pipework material to carbon steel, and award Corrocoat Indonesia with additional contracts for their expansion and preventive maintenance programs, for further CO² piping systems, over the next three years.

Carbonation Technology:

In the carbonation process, the melt is spiked with lime [Ca(OH)₂] then CO₂ gas is flowed in the carbonation vessel, a precipitate of calcium carbonate (CaCO₃) is formed which absorbs/binds impurities, including reducing dyes so that the acidic pH dissolves again.

The source of CO₂ gas comes from boiler gas which has been purified through a scrubber.

The carbonation process is carried out in two stages:

1. Add lime as much as 0.5% brix together with flowing CO₂ equivalent to the amount of lime added
2. At the end of the carbonator completes the reaction with CO₂ flow until the pH drops to around 8.3, then the liquor is filtered in a pressure filter (leaf filter) to produce filter liquor and mud.



Internal Refurbishment of Frac Tank

A mobile frac tank storing Brine, KCL (Potassium Chloride) 4%, and solvents recently came to the Corrocoat workshop in Indonesia, with heavy uniform corrosion and pitting on nearly every surface visible.



Created with multiple connection hoses in order to pump fluid from the tank to the rig, the 500 BBL double wall horizontal tanks were primarily designed to store invert and base oil. The tank internals were in very poor condition, with holes in the floor and tank wall. The client attempted to patch up the leaks, but was unable to identify all of the defects, as the majority were hidden under debris and contamination. The corrosion had also consumed most of the floor, and the client had considered discarding the tank and replacing it, as previous attempts to fix, didn't offer a long-term solution.

Corrocoat carried out internal surface preparation via blasting, followed by replacing the entire floor. This was done by installing 5mm carbon steel plates. Blasting was carried out again until Sa2½ metal cleanliness was achieved, with a minimum profile of 50-75 microns. The weld joints and 90° angles were then stripe coated with Polyglass VE.

The next stage saw airless spray application of Polyglass VEF, with a layer of laminate to the floor and 25-50cm up the tank walls. In addition, Corrofill VE was used to smooth out any uneven surfaces.

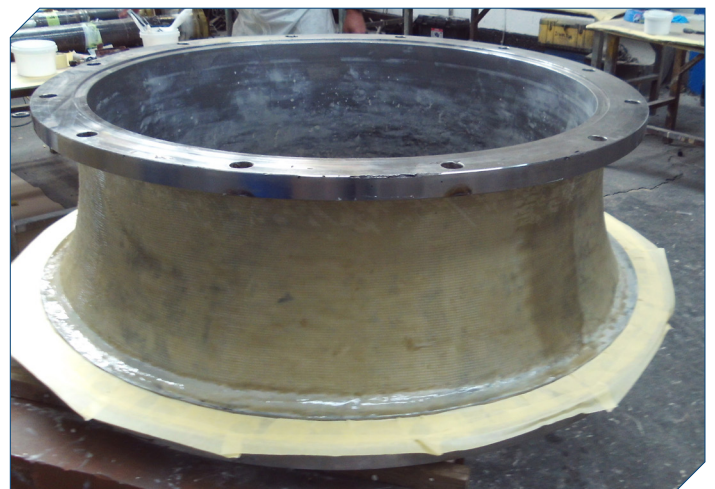
The inner side of the tank had a final coat of Polyglass VEF and was left to cure ahead of being leak tested with 32,000 litres of water. The test was completed without any issues and the tank is now back in service, at a fraction of the replacement cost.



Pump Stage Casing Suffering Severe Erosion Corrosion

A global leader in fluid engineering, recently sub-contracted Corrocoat UK, to repair and protect a pump stage casing. The casing had suffered chloride pitting as a result of being subject to sea-water for over 2 decades, at a power station.

Before



Having looked into disposing the damaged casing and purchasing a new one, which would need to be made to order, the client discovered this would be both a costly and extremely time-consuming process. There would be a lead time of anywhere between 6-12 months, due to the casting and machining process, not to mention the environmental impact of disposing of the damaged casing.

As an alternative, Corrocoat UK was contacted to offer a solution, repairing and providing long-term corrosion protection at a fraction of the lead time and cost of a replacement.

Following the necessary preparation of the substrate, the deep pits were filled with Corrofill E (a non-shrink filler and repair compound), on the internals and externals, and then smoothed back to suit the original profile. Our glass reinforced laminating resin was then applied to the external, offering additional protection and a water tight finish, ahead of Corroglass 600 series being applied over the top.

Corroglass 600 series was selected as it has excellent performance in immersed environments and exceptional resistance to de-mineralised water. The client was extremely satisfied with the end result, not to mention the significant cost and time saving, when comparing the repair of the existing stage casing, to replacing it.

After





Impeller Refurbishment & Coating in Thermal Power Plant

A thermal power plant in Gujarat, India required refurbishment and corrosion protection for four vertical turbine pump impellers. The pumps, which were made of super duplex steel and had no prior protective coating, had been in operation in sea-water for approximately 12 to 15 years.

The impellers had developed cracks and mechanical damage over time, which significantly impacted their performance. To address these issues, the client approached our partners in India, Kirloskar Corrocoat Private Ltd (KCPL). KCPL were to provide a comprehensive solution; repairing and rebuilding the blades, as opposed to replacing with new impellers.

Along with sister company Kirloskar Brother Limited; a global leader in pump systems, KCPL were able to offer a turnkey solution to repair the damage to the impeller vanes, using both cold and hot refurbishment methods, followed by DP (dye penetration) and UT (ultra-sonic testing). Polyglass VEHA was then applied, with an overcoat of Fluiglides.

Polyglass VEHA is a cold cured glass flake vinyl ester acrylic co-polymer, which was selected as its properties make it ideal for immersion environments, where superior resistance to chemical attack is required.

Whereas Fluiglides; a cold cured, highly modified chemically resistant, two-pack resin system filled with stabilising enforcement to reduce cold flow characteristics, was used to reduce friction and increase energy efficiency.

Following the mechanical refurbishment and coating work as per ISO 21940, the team carried out dynamic balancing of the impeller. They also successfully resolved the problem of uneven clearances between the impeller and liner, further optimising the pump's performance and efficiency.

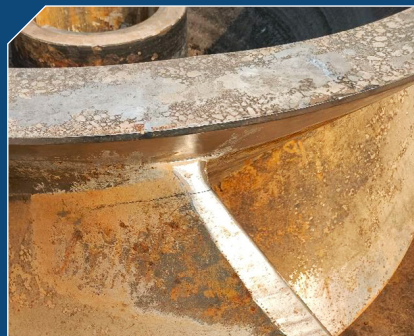
KCPL's specialist pump refurbishment and coating technology provided an effective and efficient solution for the client, ensuring extended lifespan and improved performance, and significant time and cost savings. The cost to refurbish each impeller was just 30% of the original price of the impeller, not to mention the short lead time to repair, as opposed to the delivery timescales for new impellers.



Impeller before



Crack on Impeller



Welding Work



Dye Penetration Test



Impeller after

2023 Events and Exhibitions

We've been very busy here in the UK attending events and exhibitions, to highlight our specialist range of protective coatings to industry professionals in key areas of industry.

Event:

Energy and Waste, the premier conference in the UK and Europe

Date:

15th and 16th March

Event for senior level decision makers across waste, energy, technology and project development to explore the latest developments in energy and waste industry.



Sergio Teixeira BEng
Corrosolve Sales Manager

Event:

Offshore Wind Connections Conference and Exhibition, hosted by Humber Marine and Renewables

Date:

3rd and 4th May

Attracted hundreds of regional, national and international delegates, providing invaluable information and contacts for companies that are well-established in the renewable energy sector and for those looking to enter or diversify into the market.



John Virando
Corrosolve Sales Manager

Event:

Renewable UK Global Offshore Wind 2023 Conference, at London Excel

Date:

14th and 15th June

Event to share new technologies, latest innovations and solutions with key industry professional and put suppliers in the spotlight.

Event:

NOF Scotland Supply Chain Conference and Exhibition (Scottish Projects for the entire UK Supply Chain)

Date:

29th June

Discussing Scottish Projects for the entire UK Supply Chain with key clients in Offshore Wind (Fixed & Floating), Hydrogen, Oil, Gas, CCS and Hydro Power.

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Corrocoat – Leading the Field

Since 1974, **Corrocoat** has led the way in anti-corrosion coatings. Our products have helped protect all kinds of industrial giants – some of the biggest names operating in power generation, oil and gas and petrochemical industries – from the harmful effects of corrosion.

At **Corrocoat**, we save our customers from expensive replacement costs. From traditional paints that repair and maintain, to unique glass flake coatings which excel in advanced corrosion protection.

Whatever the industrial sector, and whatever the application, we have a bespoke product and a specific set of skills to help. With a blend of high-grade solutions and highly-technical expertise, we're proud to provide corrosion engineering and long-term corrosion protection to all.