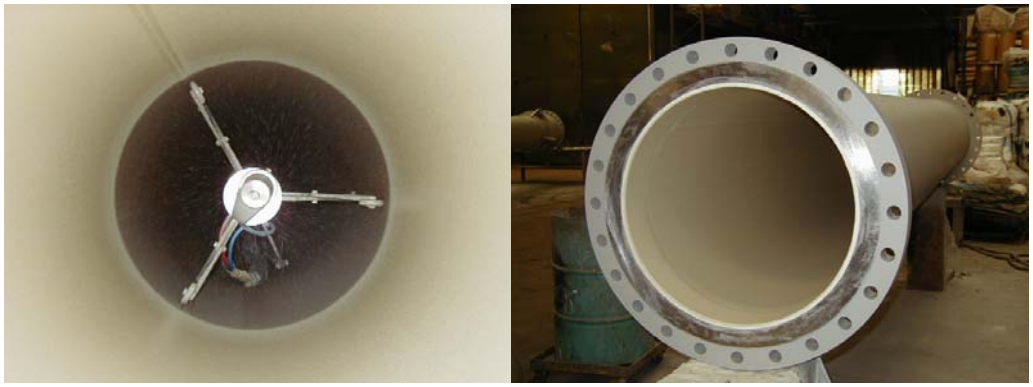
Anti-corrosion technology at work

September 2004

CORROCOAT NEWS

The Italian Job!



Coating pipe internals using Corrocoat's proprietary internal pipe spraying rig

The concept of the world as a 'global village' is getting closer – witness a recent Corrocoat UK project where an English company was specified by an American giant to carry out work in Italy, destined for eventual use in Tunisia!

That was the story behind Corrocoat's Italian job, where our products and services were specified by Bechtel for the internal lining of three new 762mm diameter sea water intake caissons associated with the British Gas Miskar Compression Platform, Tunisia.

The Italian link? The caissons had been fabricated by Rosetti Marino in Italy, and that's where the Corrocoat crew had to go to complete the job!

To withstand immersion in seawater at a maximum temperature of 43^{o}C, at water velocities of 2–4m/second during a 20 year design life, high levels of resistance to erosion and abrasion were required. Bechtel specified Corrocoat's Polyglass VEF materials for the 31m length caissons, spray applied in multiple coats using the company's proprietary internal pipe spraying rig.

The contract was carried out on time and to budget. Commenting for Bechtel, the company's coatings specialist professed himself delighted with the finished result. "Ability to withstand the flow velocities was of prime importance," he stated. "Our experience of Corrocoat flake glass linings indicated their suitability for this project. The Corrocoat team exhibited both expertise and professionalism in their work, and the levels of quality attained have well satisfied our required standards."

Corrocoat at NACExpo 2004, New Orleans

Corrocoat exhibited at NACExpo 2004, held this year in New Orleans, now recognised as the world's foremost showcase for the corrosion industry.

The exhibition was reported to be extremely busy, with visitors from across the globe attending the prestigious Conference run alongside the show and hosted by NACE.

Corrocoat's Technical Services Director Graham Greenwood-Sole gave a paper entitled "New glassflake technology for offshore applications" as an integral part of the conference proceedings.

"The exhibition was worthwhile and positive," confirmed Graham, "and has generated a high number of good quality leads for Corrocoat."

High Speed Customer Response Service

Sometimes, speed is of the essence!

When Mitsui Babcock needed a job turning round urgently for Hunterston Power Station,Corrocoat rose to the challenge.

An 18" pipe spool and four adapter plates were delivered in to the company's workshops just before midnight on the Tuesday.

By 10.30 on the Wednesday morning, the components were on their way back to the power station – protected internally with Polyglass VEF and externally with a universal primer.

In This Issue

Achieving added Corrosion Protection for Fan Unit

The Spire Airvent fan, completed and ready for installation.

The coated impeller

Matthews and Yates Ltd, specialists in the design and manufacture of heating and ventilation fans for industrial and commercial applications worldwide, have specified Corrocoat materials and services to protect a bifurcated fan unit, which was designed for use in aggressive conditions, to guard against atmospheric corrosion.

Matthews & Yates' bifurcated fans are specifically designed to handle corrosive fumes, hot air and gases, working by isolating the motor from the system airstream. This particular unit was developed for use at a duty incorporating 1% hydrochloric acid, 500ppm mono-chlorobenzene and moist air at 30^{o}C, operating at a maximum of 1339rpm and requiring additional protection to guard against corrosion attack.

Following construction at the company's factory in Colchester, the unit was delivered to Corrocoat's workshops in Leeds. Here, the impeller was grit blasted to BS 7079, SA 2.5 and treated using Corrocoat's own Corroglass 600 Series materials – a vinyl ester flake glass filled coating, offering outstanding protective performance together with excellent levels of chemical resistance.

The casing was also grit blasted to the same standard, followed by application of Corroglass 600 Series to a minimum dry film thickness of 1mm, carried into the flange rebates and finished flat to ensure optimum performance in use.

Both units were subject to thickness checks and spark tests, with the impeller dynamically balanced prior to completion of the project.

The external area surface was grit blasted to SA 2.0 and protected using two coats of Plasmet ZF, an epoxy-based surface tolerant coating formulated to give good protection against atmospheric corrosion. Corrocoat also treated two in-let cones for use in the same application, using Corroglass 600 Series materials.

The coated fan is now installed and operational.

International Support for Corrocoat Worldwide

In a move to strengthen its international representation, Corrocoat has announced the appointment of Nicole Ballantyne as Business Development Manager, with special responsibility for promoting the use of Corrocoat's product range for major national and international projects and developing the company's global network of licensees and joint ventures.

Nicole's role will focus on expanding and supporting the network worldwide, as well as developing business with specifiers and consulting engineers.

Nicole joins Corrocoat from Carnaud-Metalbox Engineering Ltd, manufacturers of canmaking machinery, where she worked as a European sales executive with specific responsibility for the Northern and Eastern European market. Having joined Metalbox as an under-graduate trainee in 1989, she held various posts in the UK and Europe, initially in maintenance/process engineering and quality management, and latterly in project leadership.

Nicole has a Bachelor of Engineering degree in Mechanical Engineering from Imperial College, an MSc from Cranfield and is an Associate Member of the Institute of Mechanical Engineers.

Nicole is looking forward to the new challenges presented by her role at Corrocoat. "There is tremendous potential for Corrocoat's unique package of products, services and expertise around the world, which is ripe for further development," she stated. "I aim to build a firm foundation for the continued development of the Corrocoat name across our globalised market place."

CORROCOAT AT WORK ON FOOD GRADE PROJECTS

Remedial Works to Water Liquor Storage Vessel

When routine maintenance work at a brewery exposed severe pitting to the floor of a hot water liquor storage tank, the company turned to Corrocoat for a fast and effective solution.

Following blast cleaning to SA 2.5 standard, the loss of metal caused by the pitting was reinstated using Corrocoat's Corroglass 602 series filler materials.

The entire floor of the vessel and the floor/wall interface was then refurbished using multi-directional woven roving and laminating resin.

The vessel was coated internally using Corrocoat XT, a material developed by Corrocoat to perform well in immersed conditions at temperatures up to 160°C and in non-immersed environments up to 220°C *(these temperature values may vary, dependent upon environment).*

Successfully combining superior levels of resistance to chemical attack with excellent high temperature properties, Corrothane XT offers a cost effective option for the long term protection of vessels operating in higher temperature service environments.

Pitting to the tank floor

Remedial Works to Lard and Hard Oils Storage Tank

When severe pitting to the floor of a lard and hard oils storage tank caused leakage problems for a Yorkshire-based food company, Corrocoat were called in to provide a solution.

The vessel in question was a vertical, cylindrical storage tank with flat bottom and flat top, manufactured from 316L stainless steel, used to store product at a maximum temperature of 65°C. The vessel has an internal diameter of 2750mm.

Corrocoat blast cleaned the floor of the tank and 300mm up the side walls to SA 2.5 standard. Following removal of the residue, the floor of the tank was reinforced using multi-directional woven roving and laminating resin before the blast cleaned area was coated using Polyglass VEF materials.

Polyglass VEF is a vinyl ester acrylic coating developed by Corrocoat, loaded with flake glass and reinforced with fibre. Ideal for aggressive environments, it offers superior corrosion, chemical and temperature resistance.

The tank was put back into service immediately.

"Ideal for aggressive environments, Polyglass VEF offers superior corrosion, chemical and temperature resistance."

New Corrocoat Licensee in the Ukraine

Expanding the company's existing international activities, Corrocoat has established an operation in the Ukrainian market.

Headed up by Alexander Muzychuk, Corrocoat Ukraine will provide a full range of protective coating services for this developing market.

On the border of the soon to be enlarged European Union, the Ukraine's fast developing economy offers significant opportunities for Corrocoat.

Establishing a presence in the market puts the company in a position to respond swiftly and accurately to individual industry sector requirements.

CORROCOAT

Corrocoat South Africa Lines Chemical Transport Tanks

Close up of the portafeed portable chemical storage tanks.

"Results achieved using this system were excellent, and this is now recommended as the specified lining for the company's portafeeds."

Whilst working on the site of a large chemical manufacturing plant, Corrocoat South Africa were requested to take a closer look at corrosion problems which were being experienced with portable chemical storage tanks.

These tanks had initially been lined with a roto–moulded HDPE lining. The HDPE did not bond properly to the internals of the portafeeds, and where mechanical damage had taken place, ingress of acid under the lining was evident.

Corrocoat proposed the Polyglass VEF system as a solution. Initial trials showed promising results, and the solution was then modified using Corroglass AR4 with a proprietary veilcoat. Corroglass AR4 is a brominated interpenetrating polymer network system loaded with glass flake, formulated to offer excellent resistance to base environments.

Results achieved using this system were excellent, and this is now recommended as the specified lining for the company's portafeeds.

The tanks are collected from the customer and protective rubber strips applied to areas that could be affected by blasting before blast cleaning to SA 2.5 (near 3). The first coat of AR4 is applied, followed by a second build coat to the required dft. The coating is then spark tested and a third build coat applied. Following a second spark testing, the veilcoat is applied and post cured.

As the portafeeds are constantly on the move, they are subject to mechanical damage, which makes it very difficult to estimate the life expectancy of the coating. The customer remains more than satisfied with the significant increases achieved, and Corrocoat has now lined more than 300 units in total.

Hong Kong Chillers Made Good

Corrocoat offers a specialist service for tube bundles, including fitting 'Corrosert' tube nest inserts to protect against further corrosion.

Corrocoat in Hong Kong reports significant levels of business coating York, Carrier and Trane air conditioning chiller unit tube plates using Corroglass 200 Series materials. These chiller units are commonly located in hotels, hospitals and commercial centres.

The procedure for these coating repairs includes abrasive blasting, plugging the tubes, application of Corroglass 200 Series materials, making good the surface, spark testing and finally an application of Corroglass 252 and removal of all plugs.

Notes from our colleagues in Australia show that the Adelaide Hyatt Hotel recently inspected its air conditioning chiller unit. The tube sheet and end covers were coated by Corrocoat 16 years ago and proved to be in excellent condition – exceptional service life for any coating system in this environment.

GLOBAL VIEW

Corrocoat Australia – A Gold Award for Performance

Corrocoat in Australia continues to achieve excellent results with Polyglass VEF as a protective coating applied to adsorption tanks used as part of the CIP gold recovery system to recover gold from pulp.

At Newmont Pajingo Gold Mine in Queensland, Corrocoat has now completed a successful project on adsorption tanks which had been in service for a number of years, and were suffering from general corrosion and severe pitting. Epoxy, polyurea and polyurethane systems had been applied to halt the corrosion, without significant success.

To rectify the problem, Newmont had installed new floors and plated the tank walls before calling in Corrocoat to provide protective coating solutions. Corrocoat mobilised its specialist teams to abrasive blast the refurbished surface to the required finish before applying Polyglass VEF, a vinyl/ester acrylic co-polymer loaded with extra corrosion resistant (ECR) glass flake. The work was completed and the tank put back into service well ahead of schedule.

Polyglass VEF has been used extensively throughout the gold mining industry in Australia and South Africa for many years, where Corrocoat's recommended material and application specification continues to provide exceptional levels of protection - supported by a documented 10 year performance record at Boddington Gold Mine in Australia.

Corrocoat is recognised as the established technological leader in this field. Polyglass VEF performance advantages include low moisture vapour permeability, underlining the strength of the coating, extremely high substrate bond strength, and high abrasion resistance due to the flake glass content. The material is also suitable for continuous immersion up to 115^{o}C (dependent upon the process chemistry).

"Corrocoat provides effective protective coating solutions for carbon in leach tanks."

Making Performance and Quality Count in Indonesia

Between January 1993 and December 1998, Corrocoat Indonesia refurbished a total of 22 vertical lift and split casing pumps for an oil refinery handling sea water.

With all the refurbished pumps operating well, and the operating company now accepting coatings as an effective solution for corrosion problems in pumping equipment, the decision was made to put future work out for open tender to achieve further cost savings.

As a result, for three years between 1999 and 2002, Corrocoat Indonesia lost this work to a cheaper competitor. However, evaluation of the performance of the competitor's coating work in 2003 resulted in the oil refinery resuming direct appointment to Corrocoat.

The first of the 22 pumps (originally coated in January 1993) has now been returned to Corrocoat Indonesia after almost 10 years in service. On inspection, the pump was found to require only limited coating repair near the cutwater, and a clean up of the brown staining to return the coating to virgin white.

Corrocoat branches worldwide have been successfully refurbishing pumps for almost three decades, returning damaged and corroded equipment to 'as new' condition.

Protecting Rail Rolling Stock Brake Cylinders

Brake cylinder prior to coating

The coated product

Anti-corrosion coatings developed and manufactured by Corrocoat are finding their way into an ever-expanding range of applications throughout industry.

When a team of specialist maintenance engineers needed to refurbish and return to original tolerances a series of rail rolling stock brake cylinders, they turned to Corrocoat for assistance.

The Corrocoat team proposed a proven combination of coating and engineering techniques to achieve superior corrosion resistance in use, prolonged service life and reduced maintenance costs.

The 14 inch bore brake cylinders were pre-machined to their maximum allowed inner diameter, gritblasted to SA 2.5, coated using Corrocoat's own Polyglass VEFT material and then post-machined back to the minimum allowed diameter.

Polyglass VEF is a vinyl/ester acrylic co-polymer loaded with flake glass and reinforced with fibre. The product offers excellent corrosion, chemical and temperature resistance.

Extensive trials at Corrocoat have already proved the potential for Corrocoat materials in this environment.

Research and development work to examine coated cylinders for mechanical robustness involved the construction of a test rig designed to cycle a piston and diaphragm within a coated brake cylinder on a continuous basis.

After in excess of 7000 cycles the rig was dismantled and the cylinder examined and measured, with the internal diameter showing neither dimensional loss nor deterioration of the coating.

To date, Corrocoat has refurbished in excess of 50 units for rail industry customers.

Polyglass Protection for Lake Glenmaggie Spillway Gates

The spillway gates at Lake Glenmaggie

Close-up of a gate treated using Polyglass VEF

One of the largest reservoirs in Australia utilises a total of fourteen spillway gates to add to its capacity, as and when required.

Originally coated in coal tar epoxy, the asset owner / manager - Southern Rural Water - put an extensive refurbishment programme into operation in the early 1990s.

Low cost, low film build epoxy resins were tried first, but early coating break-down and a growing requirement for touch-ups were recorded in just the first couple of years. – despite the use of established coatings, reputable painting contractors and stringent third party QA inspection procedures.

In 1995, our colleagues at Corrocoat Engineering Victoria were contacted to refurbish three gates as a result of a thorough total life cycle cost comparison, illustrating the benefit of using Polyglass VEF over low cost epoxy resins.

The work was carried out by Corrocoat and the gates put back into operation immediately.

Inspections completed in 2004 have revealed that whilst further deterioration of the epoxy resin coated gates is evident, no such deterioration of the three gates coated using Polyglass VEF was noted, with the equipment remaining in excellent condition.

As a result of these inspections, refurbishment work on a further three gates has been awarded to Corrocoat Engineering Victoria, to be completed during 2004. This confirms Southern Rural Water's complete satisfaction of the value of Corrocoat's long term solu-

Polyglass Pipes for Project Sea Bird

Located in Karwar, Karnakata, Project Sea Bird is a Government of India, Ministry of Defence project set up to facilitate year-round repair of naval vessels. The project involves lifting vessels to dry, above-sea locations for repair and maintenance procedures.

The fire hydrant service on Project Sea Bird consists of ductile iron pipes carrying seawater at a pressure of 14kg/cm^2. Protecting these pipes against the possibility of corrosion attack and thus maintaining fire water service was a priority.

This involved coating the externals and internals of some 800 individual pipes with diameters ranging from 100mm – 250mm. Phase One – totalling 535 pipes and 132 fittings – was a significant contract to be completed within a six week timeframe, The specification called for internal lining of the pipes with Polyglass 100, applied using our pipe spinning technique, and hand application of the same material to the pipe externals.

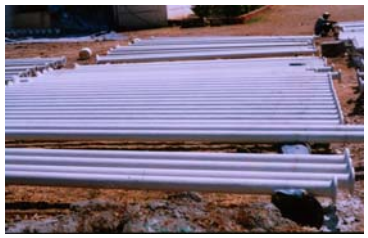
Corrocoat's Indian licensee Kirloskar Brothers took up the challenge.

The company created a purpose-built application site specifically for the project, levelling land, erecting a workshop and engaging some 40 operatives to complete the task within the set time-frame. Equipment included an 8 ton hydra crane as well as two pipe spinning rigs and a compressor.

Phase One swung into action on 27 January 2004, with the operation working six shifts a day, six days a week on internal application and two shifts a day, seven days a week on external application. No fewer than fifteen trucks were used to despatch the quantities of coated pipe to site!

In total, the Kirloskar team lined 1171m^2 internally and coated 1417m^2 externally, treating on average 24 pipes per day. The project was completed on schedule by 15 March, 2004. and the corrosion protection is expected to give a better than 25 year service life.

Loading the coated pipes to return to site



All in a day's work – pipes awaiting transport

Corrocoat completes Pump Bowl Repairs for Sulzer

Anti-corrosion engineers Corrocoat have completed a refurbishment project for Sulzer Pumps, returning to its original tolerances a 54" axial pump bowl which is operational within a cooling water system in a seawater environment at a coastal power station.

When removed for overhaul during a routine outage, it was discovered that the bowl of the single stage lift pump had suffered significant metal loss to leading edges.

Sulzer sent the pump to Corrocoat's workshops to assess the component for repair, utilising the company's proven combination of engineering and coating techniques to return the bowl to 'as new' condition. The Corrocoat team gritblasted to ISO8501-1 : SA2.5 to assess the extent of the damage, then flashblasted the unit to remove the remainder of the existing coating.

Following this, the company then applied multiple coats of its own Corroglass 600 Series material to achieve a minimum dft of 1.5mm. Corroglass 600 Series is a high build flake glass filled coating, offering outstanding performance with good resistance to corrosion, erosion and abrasion damage. The material is used extensively worldwide to provide corrosion protection for pumps, valves, pipework and engineering components.

Following thickness checks and spark test of the coating, engineers at Corrocoat then machined the top and bottom spigots and two bearing housing locations to Sulzer's previously specified diameters, returning the equipment to original tolerances.

The pump has now been returned to service, and Sulzer report that it continues to operate satisfactorily.

Pump bowl prior to refurbishment

Pump bowl after repairs have been completed

CORROCOAT

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Established in 1975, Corrocoat is one of the world's leading names in anti-corrosion technology, with over thirty years of experience in the development, manufacture and application of high performance corrosion-resistant coatings.

Based in the UK, Corrocoat operates across five continents from more than thirty locations worldwide. In addition, the company exports its coating products to users across the globe, offering long term solutions to corrosion problems.

Corrocoat's proprietary high technology coating systems are backed up by advanced levels of technical expertise and proven performance attainments in many different corners of industry worldwide.

Sustained investment in R&D and the design and testing of new methods and materials keeps Corrocoat at the leading edge, and gives the company the necessary flexibility of approach to combat the many different corrosion problems faced by modern industry.

"Corrocoat methods and materials are used successfully worldwide to reclaim often severely damaged components – at a fraction of the replacement cost."

Corrocoat Appoints Site Contracts Manager

With demand for the company's professional on-site repair, refurbishment and protective coating services increasing rapidly, Corrocoat Leeds has announced the appointment of Phillip Watkinson as Site Contracts Manager with responsibility for all site work undertaken in the UK and selected projects overseas.

Philip has spent the last two years working for Corrocoat in Malaysia, managing the day-to-day business of the company's Malaysian operations, and returns to the UK to take up his new role. This will include not only the planning and management of on-site contracts in the UK but also larger, more complex projects across the globe, where Corrocoat puts in skilled teams to ensure efficient completion in line with the stated objectives and deadlines. Phillip's first task as Site Contracts Manager was to manage an on-site project at one of Britain's largest nuclear power stations, refurbishing and coating valves, puddle pipes and CW pipework as part of routine maintenance work at the station. Since then, he has assumed responsibility for projects both in the UK and overseas.

Corrocoat provides a specialist service for the power generation industry, with on-site and workshop based teams providing expert refurbishment and repair solutions for units ranging from pumps and valves through to pipework and ancillary equipment.