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DIGEST



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Welcome to a new selection of recent international project stories featuring the use of Denso corrosion prevention and sealing systems. The stories illustrate a series of demanding coating and lining applications, to steel, above and below ground, often in hostile environments.

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Maximum Protection and Reduced Maintenance Costs for Underground Vaults

Denso North America Inc., based in Toronto, has experienced a re-birth in the application of Denso petrolatum tapes in the water and waste water industries. After years of testing one protective product after another on underground water and sewage vaults, both the Region of Peel and City of Vaughan have decided to use the Denso petrolatum system comprising Denso LT Tape, Profiling Mastic and Denso Paste.

Many of these vaults are in excess of forty years old and must undergo maintenance procedures twice yearly. This includes the replacement of corroded valves, nut and bolt assemblies, and Viking Johnson couplings.

Denso petrolatum products were assessed through multiple demonstrations and consultations to confirm satisfactorily that only the Denso system could halt the corrosion process in the vaults.

The system involves a covering of Denso Paste, followed by application of Denso Profiling Mastic to smooth all the profiles. Finally, a wrapping of Denso LT Tape, overlapped 55%, ensures maximum protection.



Application of Denso Profiling Mastic smooths the joint profiles prior to wrapping with tape.

A joint is wrapped with Denso LT Tape to complete the protective system.



Not only does this ensure optimum protection, but it also enables the Region of Peel and City of Vaughan to inspect their chambers on a twice yearly basis without incurring any extra costs. This type of protective system will also reduce the yearly maintenance costs by eliminating the need to replace valves, couplings and nut and bolt assemblies.

Both the Region of Peel and the City of Vaughan have initiated programs, starting from May 1998, to commence wrapping these vaults. They have also scheduled yearly contracts to continue the process until all similar vaults have been protected.

Leak Free Joints for New London Docklands Bridge

A new footbridge over London's Royal Victoria Docks at Silvertown is due to open in 1998. Built for London Docklands Development Corporation by Contractors Kier London Ltd, it is a single span bridge based on the principle of the Transporter Bridge. Pedestrians will be able to cross the dock by foot on a lightweight bridge deck accessed from pairs of scenic lifts each end or, when all necessary approvals have been obtained, they should be able to cross inside a 'people mover' cabin suspended under the bridge. The footbridge links the West Silvertown area on the south side of the dock to the Custom House Docklands Light Railway and the former British Rail stations in the north.

Kier London Ltd chose Tokstrip as a concrete/grout sealant between the 4mm diameter cone-shaped bridge supports and the temporary soffits. This was used to provide

a leak-free joint for the grouting of the precast concrete cone-shaped supports onto the tubular piles.

The design of the bridge is based on an inverted Finktruss with six cable stayed masts providing support to the bridge deck which spans between 15 metre high trestles. No part of the bridge deck is less than 15 metres above water level and the bridge has a minimal cross

sectional area. Where the structure deepens, it extends above rather than below bridge deck level. This results in a series of distinctive humps on the bridge deck which are reminiscent of the keels of upturned boats and can be used as vantage point to watch sailing events in the dock.

The principal property of Tokstrip, which is Department of Environment approved, is that under compression it partially deforms through the joints to provide a flexible water-tight seal. Tests supervised by the Building Research Station have shown that Tokstrip sealed ogee pipe joints pass the internal hydrostatic pressure requirement of 1.4 bar and retain a seal under shear loading, angular deflection and straight draw.



Tokstrip was applied to the cone-shaped bridge supports before they were lowered into position on the tubular piles.



Refurbishment of New Zealand Sewerage Treatment Station Pumps

Archco-Rigidon 423D glass flake lining was selected by Hawkes Bay Regional Council to protect sewerage treatment station pump impellers and housings from the abrasive and corrosive effects of local sewerage.

The licensed applicators, Hawkes Bay Sandblasting Co. Ltd, Hastings, first sandblasted the pumps to Sa 2^{1/2} and to a profile of 60-70 microns (see photo nos.1 and 2).

Next, The PD-2 Primer was brushed on and allowed to cure, (see photo no.3).

Stripe coats of Archco-Rigidon 423D were brushed on to heavily pitted areas and allowed to cure.

A final coat of Archco-Rigidon 423D incorporating 10% w/w Polylite 61-8-1-modified styrene monomer was applied over the stripe coats. This imparted a non-stick surface (see photo nos. 4 and 5).

The result: re-furbished and protected from abrasive agents, these pumps are, once again, ready for service.



Photo 1.

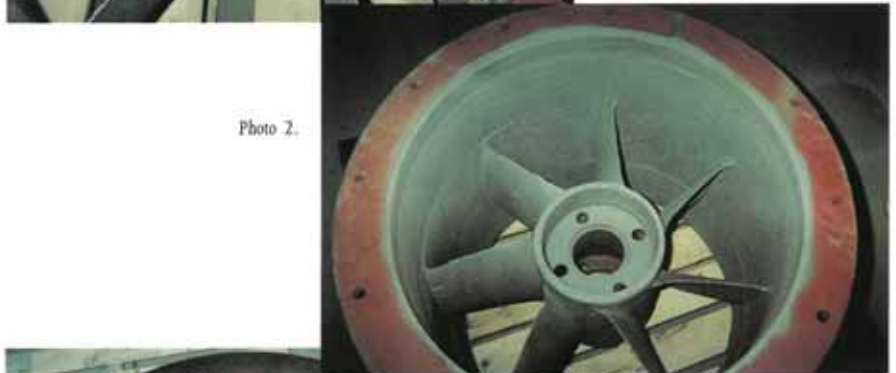


Photo 2.



Photo 3.

Photo 4.



Photo 5.

New Mile High Airport Relies on Denso for Below Ground Vaults

Business at Denver International Airport, Colorado recently got off the ground after several years of construction. Construction was no mean feat. The total area of the Airport is 53 square miles, twice the size of Manhattan Island, New York. Over 2.5 million cubic yards of concrete were used to construct five runways, taxiways and aprons. It is the most technologically advanced airport in North America today.



Denver International Airport.

Soon after opening, Denver Water became aware of a potential problem with over 200 of their meter and control stations located throughout the airport area. Most of these stations are located below ground in concrete vaults close to the runways, taxiways, and aprons. The watertight seals on the vault lids failed after the first year of installation. De-icing procedures allowed salt, water and a small percentage of glycol to drain into these vaults which accelerated the corrosion process on the meters and valves.

A team of Denver Water corrosion engineers and technicians faced several problems when they tackled the corrosion problem at the airport. They needed a coating that would be surface tolerant, easy

to apply, safe to use in confined spaces, and quick curing. Any paint system with solvents was out of the question. Even paint systems that relied on moisture curing presented problems with equipment and cure time. The Denso Tape System was demonstrated which solved their problems.

A system comprising Denso Paste, Denso Profiling Mastic and Densyl Tape was evaluated over a one-year period and then was specified to coat 204 vaults at the airport. Bids for the project were under budget across the board. The awarded contractor used almost 200 cases of Densyl Tape in various sizes and almost 1000 cases of Denso Profiling Mastic.

After finishing three weeks ahead of schedule and below his own budget, the contractor credited Denso Profiling Mastic for the fast pace of production. "The more mastic we used, the faster we were able to wrap and complete the vaults", he said.



Left: Densyl Tape is applied over the smooth contours of the Denso Profiling Mastic, speeding the wrapping process.



Below: One of the 204 vaults in close proximity to the airport runway.

Denso Tie-bar System for Cardiff Bay Barrage

Densopol Tape is playing a major role in providing long-term anti-corrosion protection for the Cardiff Bay Barrage Scheme being constructed for Cardiff Bay Development Corporation. Densopol Tape has been applied to 682 tie-bar and anchor bolt installations, many of which are over 30 metres in length. The main contractor for the project, Balfour Beatty-Costain Joint Venture, says that it is looking for a 120 year life for the barrage system, which includes the tie-bars buried in the sea bed.

The tie-bars were manufactured to Sir Alexander Gibb's specification by Normanby Industries Ltd of Scunthorpe. It was here that Denso Primer was applied followed by Densopol Tape, with the tape application being carried out by a hand operated Densoman machine. This has the advantage of creating the correct tension and overlap on the Densopol Tape whilst also enabling the work to be carried out much faster than by hand.

Rigorous inspection for freedom from holidays was carried out on each completed tie-bar system.



Surface of tie-bar is first cleaned.



Denso Primer D is applied to cleaned surface and allowed to dry.



Densopol Tape is applied by hand operated Densoman machine achieving fast uniform wrapping.



Close up of a protected tie-bar.

Designed originally for application by hand or machine to buried or submarine pipelines, Densopol has a thick backing film of PVC with a rubber/bitumen adhesive compound. The extreme toughness of the tape is achieved by the combination of the PVC backing and a fabric reinforcement contained in the bituminous adhesive layer. The tape is particularly resistant to damage that may be caused by sharp objects, such as in backfill.

Cave Air Conditioning Ducts at World Heritage Site Protected

The Naracoorte Caves Conservation Park is located in a region of marshland and limestone hills in the south-east of Australia. In caverns beneath the cave range visitors may view the delicate decorations of calcite or explore fossil caves and the home of the Bent Wing Bat.



The calcite decorations in the caves have continued to build over the centuries. This is a slow process which starts when mild acid or rainwater and carbon dioxide form on the limestone rock and slowly dissolve to form small droplets of solution on the ceilings of the caves. As droplets hang for eight to ten hours, carbon dioxide is given off leaving a minute deposit of calcite. Through time the particles build upon each other to form elaborate and beautiful shapes.

The Naracoorte Caves Conservation Park is the only listed World Heritage site in South Australia. It is estimated that approximately 40,000 people visit the caves each year. A new Information Centre is being constructed to improve the facilities available to the

public. The Densopol 60 Tape System was recommended by BESTEC (consulting engineers) to protect underground air conditioning duct work being installed on site.

The Densopol 60 Tape comprises a dual reinforced system combining an integral semi-elasticised reinforcing layer in polymer bitumen mastic, plus a specially calendered high-impact pvc backing. This ensured rugged durability, a remarkable degree of conformability and controlled elasticity. When applied with 55% overlap, this results in a full 3mm coating thickness, making the Densopol 60 System ideal for application on duct work and providing many years of protection against corrosion.



Air conditioning duct work protected with the Densopol 60 System.



15 Year Protection for Exxon Acid Tank

Archco-Rigidon 603D glass fibre resin system was chosen for the internal protection of a new carbon steel process vessel being incorporated into Exxon Chemical Ltd's petrochemical plant at Fawley. The 52.6m³ vessel contains 77wt% sulphuric acid and the 603D lining system is required to provide a minimum of 15 years protection without service or maintenance.

Left: Integrity testing of Archco-Rigidon 603D lining.

Below: The Exxon carbon steel process vessel.



Archco-Rigidon System 603D is a heavy duty lining formulated from a vinyl ester resin (Derakane 470) with chopped strand glass fibre mat. The lining is applied to suitably prepared steel (or concrete) substrates to a nominal thickness of 3mm comprised of:

A vinyl ester primer; a silica filled 603D resin base coat approximately 1.5mm thick; two layers of 450gm/m² chopped strand glass fibre impregnated with 603D resin; a layer of surface tissue and 603D resin; a final sealer coat of 603D waxed resin topcoat.

With its resistance to corrosive mineral acids, alkalis and salts at temperatures up to 75°C under immersed conditions and 140°C under fume conditions

(dependent upon the chemical type and concentration levels), Archco-Rigidon System 603D is already widely used in the chemical process and oil industries.

The contractors applying the lining were Sprayglass International Ltd, a subsidiary of Winn & Coales International. The Exxon process tank was transported to Sprayglass' premises at Slade Green, Kent, where the work was carried out.

The interior surface was first grit blasted to Sa 2^{1/2} standard before application of System 603D. As part of the contract, surface preparation and coating thickness integrity testing at various random locations was carried out by Sprayglass in the presence of Exxon Chemical's representatives.



Close-up of completed tank lining.

Steelcoat System for Pipebridge Renovation

Transco chose a Denso Steelcoat System for protection of two gas mains on bridges in a maintenance and renovation programme.



Transco gas main and bridge structure over the River Ancholme protected with the Denso Steelcoat system.

One bridge is at Brigg, South Humberside, where a 15 inch diameter gas main is carried over the River Ancholme. The other is near Doncaster, carrying an 8 inch main over the River Don. Both sections of exposed main are approximately 50 metres in length.

Following mechanical brushing to remove corrosion and old coating materials, the Transco workforce treated the pipes with the petrolatum based Steelcoat 600 system.

Sections of the support steelwork were protected with the Steelcoat 1000 system.

Denso Epoxy was selected as the top-coat.



New Cladseal Products Keep “Sharks” Dry

At Kings Park Rugby Stadium in Durban, KwaZulu Natal (home of the Coastal Sharks to those familiar with the Super 12 Tournament held in the Southern Hemisphere), a decision was made by the stadium operators to replace the roof cladding on the main grandstand, which had corroded badly in the last few years.



The stadium is positioned a few hundred metres back from the sea and experiences very hot, windy and humid conditions - ideal for fast rates of corrosion.

For the prevention of galvanic corrosion between the aluminium roof cladding and the galvanised steel purlins, new Denso Cladseal 300 was used.

Cladseal 300 is a self-adhesive 300 μ thick polyethylene tape. With no interleaving, it is easy to apply along the length of the purlin and acts as an excellent insulation medium between two dissimilar metals.

Cladseal 1500 was used to seal the side and end flaps of the roof sheeting itself. This is a

double sided, highly adhesive rubber bituminous tape available in narrow strips, which forms an impervious seal at the sheet overlaps.

The project was completed on time and within budget. It is hoped that the “Sharks” will be just as successful in their Super 12 campaign!

WINN & COALES INTERNATIONAL LTD
DENSO HOUSE, CHAPEL ROAD, LONDON SE27 0TR
TEL: 0181-670 7511 FAX: 0181-761 2456
EMAIL: denso@winn+coaleslondon.telme.com



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