



The \$58 million renovation of New York's historic Battery Maritime Building incorporated the use of Denso SeaShield Fiber-Forms - See story page 6.

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Sealing Buried Ducting & Macalloy Bars

Denso Tape Seals Ducting on Slab Joints

Freysinnet Ltd, specialist civil engineering contractors based in Telford, Shropshire, are now using Denso Tape on a regular basis to seal ducting prior to it being buried in concrete.

Denso Tape, a non-woven synthetic fibre fabric coated with an adhesive compound based on petrolatum, is used to seal two spigots to prevent concrete entering the ducting when it is being laid. This application is

now used on all Freysinnet slab joints. Freysinnet also regularly use Denso Tape as an anti-corrosion coating on Macalloy Bars fixed to concrete bases.

Flexible and easy to apply,

To enable quick identification of the subject matter within each story in this brochure we have adopted the following colour codes.

PROJECTS INVOLVING:	
PROTECTIVE COATINGS FOR.....	
■	BURIED PIPELINES & LPG VESSELS
■	EXPOSED STEEL & PIPEWORK
■	SUB SEA PIPELINES & JETTY PILES
PROTECTIVE LININGS FOR.....	
■	STORAGE TANKS, PUMPS ETC
SEALING & WATERPROOFING.....	
■	SEALING MASTICS
■	MEMBRANES & FLASHINGS
■	INDUSTRIAL TAPES

Denso Tape is ideal for this type of application and is available in a variety of roll widths to suit requirements.

Denso Tape sealing the spigots prior to a concrete infill. Inset shows Macalloy Bars wrapped with Denso Tape.



Exposed Surface Coating - Protecting Bolt Heads

Denso Tape Protection for Northwich Swing Bridge.

A £3.5m refurbishment programme has been carried out on the historic Hayhurst swing bridge over the river Weaver in Northwich. British Waterways and Cheshire County Council worked in partnership to complete the refurbishment as quickly as possible as part of the new vision for Northwich, linked to the stabilisation of the salt mines.

Denso Tape, a non-woven synthetic fibre fabric coated with an adhesive compound based on petrolatum, is being used to protect stainless steel bolt heads underneath the walkways and on the angles of the bridge cantilevers.

Built in 1898, the Hayhurst

Bridge was Britain's first electrically powered swing bridge and is a Grade II listed structure. It was first refurbished in 1976 and is now in need of upgrading and strengthening to cope with modern traffic requirements.

The bridge incorporates an

innovative design that was arrived at due to a number of difficulties relating to the site, including a continuing subsidence problem due to salt extraction. It comprises a three span (tail, spindle and nose) swing bridge and two independent approach spans. The bridge rotates on 76 conical roller bearings and beneath the superstructure the bridge is connected to a sealed circular, segmented pontoon placed under the centre of gravity. The pontoon acts as a buoy supporting approximately two thirds of the dead load of the structure, the rest being supported on cast iron screw piles installed around the pontoon.

Denso Tape being applied to the stainless steel bolt heads under the bridge walkways.



Corrosion Prevention - Marine Piles

New York's Historic Landmark Renovation

New York's Battery Maritime Building received a \$58 million renovation in which Denso's SeaShield Fiber-Forms were used to rehabilitate the timber piles supporting the slips. The building is listed on the National Register of Historic Places built in 1909 in the 'Iron Age' with vaulted arches and ornamented structural steel. The building has over 140,000 square-feet and offers rare waterfront views of Manhattan and The Statue of Liberty.

In service for over 95 years, the timber piles had received marine borer damage, which threatened the structural integrity of the slips. The pile repair system chosen was concrete encapsulation with rebar and fiberglass forms. This major rehabilitation called for more than 5,000 linear feet of timber pile repair with Denso's Fiber-Forms. The fiberglass forms provide a strong rigid form to allow concrete to be pumped into the annulus space between the jacket and timber pile.

Denso's Fiber-Forms used for the Battery Maritime Building were custom fabricated to $\frac{3}{16}$ " thick utilizing woven-roven construction. Installation



included installing a reinforcement cage around the piles and then installing the fiberglass forms. The concrete was then pumped into the annulus space and to provide ease of



A photograph of the New York Battery Maritime Building taken during the early 1900s.

application the forms were fabricated in a translucent color to allow the contractor to view the concrete level during the pumping operation. The completed repair will provide years of maintenance free structural integrity to the timber piles.

The contractor, David Hoy of Weeks Marine stated, "The SeaShield Fiber-Forms were extremely durable, high quality and provided on-time delivery. The engineers and owners were pleased with the installation as the application was completed ahead of schedule."

Left: A recent view of the outside of the building



Above: Completed Fiber-Form installation to the timber piles.

Left: Outside of building during renovation work.

Corrosion Prevention - Protecting Buried Pipeline

Denso Protal 7200 used for New Pipeline Application

Denso Protal 7200 used for new pipeline application.

The main industry in the province of Alberta, Canada is oil and gas. It makes up about 60% of the local economy. Although most oil is extracted through the conventional drilling process, there is also a huge deposit of a product in northern Alberta. This product is known as Oilsand.

Oilsand is the term used for a composition of sand, bitumen, mineral rich clays, and water. Alberta's Oilsands contain the biggest known reserve of oil in the world. There is an estimated 1.7 to 2.5 trillion barrels of oil trapped in the Oilsands.

The Oilsand is partially mined in giant open pit mines. The process begins by clearing the land of trees, stripping the topsoil to reveal the ore body. The bitumen ore is loaded with huge electric shovels into 400 ton mechanical drive trucks. These trucks vary in size with the largest having 3500 horsepower, empty weight of 685,000 pounds and a loaded weight of 1,400,000 pounds. The Oilsand is then transported to a processing facility where the slurry is fed into a separation vessel where it separates into three layers-sand, water and bitumen. The bitumen is then transported to refineries in central Alberta and refined for consumer use.

Water makes up about 4% of the oil sand by weight. It surrounds each grain of sand, keeping it separate from the oil. Without this water envelope, the water-based extraction process now used could not separate the oil and the sand.

About 80% of the oil sands in Alberta are buried too deep for surface to open pit mining. A process called Steam Assisted Gravity Drainage (SAGD)

recovers this oil. Using drilling technology, steam is injected into the deposit to heat the Oilsand lowering the viscosity of the bitumen. The hot bitumen migrates towards producing wells, bringing it to the surface while the sand is left in place.

The upgraded bitumen product consists of naphtha, light and heavy gas oils that are combined to produce light sweet oil.

Denso North America Inc. recently completed a pipeline in northern Alberta in which Denso Protal 7200 was used to coat the weld areas of a 24" Fusion Bond Epoxy coated mainline. Denso Protal 7200 was chosen for its excellent performance characteristics, ease of application, and proven track record.

A completed Protal 7200 application.



Denso Protal 7200 is applied above the weld area of the pipe, prior to being spread out over it with a hand roller.

The surface was first prepared by grit blasting to clean, near white metal finish, SSPC-SP 10 / NACE No. 2. Because the application was done in the winter months, the girth weld was heated with an electric induction coil to 100 Degrees Celsius. The Denso Protal 7200 was then roller applied at pipe temperature of 80 Degrees Celsius to a nominal thickness of 30 mils. Because of the quick cure time of the Protal 7200, the product was cured before the surface of the pipe returned to ambient temperature. The welds were checked for holidays before the pipeline was buried.

Surface Preparation - Prevention of Flash Rust

HoldTight 102 - Flash rust Inhibitor

HoldTight 102 was recently introduced in the South African industry by Denso South Africa (Pty) Ltd. HoldTight 102 is an additive that prevents flash rusting of wet abrasive and water blasted iron and steel surfaces and of blasted surfaces in a pressurised washdown.

It also removes chlorides and other salts and contaminants very effectively, holding the ideally prepared surface in pristine condition until the application of the selected lining/coating.

HoldTight 102 has been successfully used on the following projects:

- ◆ SA Navy Tank Refurbishment Project : Simonstown
- ◆ Mine Headgear : Rustenburg
- ◆ Sasol : Pipe Gantries
- ◆ Sasol : Sulphur Houses

Below and inset: Foremost area of tank is coated with HoldTight 102. Flash rust is clearly visible either side of where the HoldTight was applied.

HoldTight 102 is now regularly specified at between 50:1 and 200:1 dilution to remove soluble salts prior to the application of Archco-Rigidon tank linings and Denso ST Epoxy coating.

View inside a tank where HoldTight 102 was applied to a panel. Note the flash rust that has appeared on the untreated area. HoldTight will hold the protected area flash rust free for 48 hours after application.



Exposed Surface Coatings - Protection of Bridge Pylon Sleeve

Denso Rigspray Micro Protects The Burnett River Bridge

The Burnett River Bridge located near the Queensland town of Bundaberg is a heritage listed structure, constructed in 1895 and still rated to 40 tonnes of traffic. The bridge is used by sugar cane farmers to transport product to the sugar refineries.

Following on from an inspection by the Queensland Department of Main Roads, pylon one was found to be splitting apart at the longitudinal weld and a long term refurbishment solution was required.

The selected system was a 7m x 2.3m ID Steel sleeve that required corrosion prevention able to provide long term service in all conditions. The Principal Contractor, Messrs Corroseal Pty Ltd contracted Bundaberg Sandblasting to apply two coats of Denso's 'Rigspray Micro' at a minimum 600 micrometres dry film thickness. This micro glass flake reinforced Isophthalic Polyester material is able to withstand the stresses associated with transportation, installation, varying river conditions and

thermal expansion as well as delivering outstanding corrosion and impact resistance.

The finished installation was inspected and approved by both the Client and an Independent Consultant.



Below: The steel sleeve coated with Denso Rigspray Micro being lifted from a nearby pier.

Above: The sleeve being fixed into position around the damaged bridge pylon.



Sealing Mastics - Jointing Asphalt to Concrete Surfaces

Densoband Used To Seal New Concrete Servicing Area Joints At RAF Waddington

Densoband, a polymer modified bitumen strip, has been used as a joint seal on a new aircraft servicing platform at RAF Waddington, Lincolnshire.

The 4,000m² concrete platform has been constructed by RMC Surfacing Ltd of Sheffield, who applied 430 linear metres of Densoband around its edges to seal the joint between the concrete and the asphalt standing area and runway.

Densoband is approved by the Department of Transport in the Manual of Contracts 7th Edition

for use in asphalt wearing course joints for asphalt and asphalt to concrete interfaces as an alternative to the traditional hot poured bitumen. Unlike its bitumen alternative, Densoband covers the whole depth of the joint face giving a much superior seal and its flexible composition makes it able to absorb a reasonable amount of



Easy to apply and flexible, the picture shows how Densoband follows the contour of the joint with ease.

thermal and mechanical movement without cracking. Because the joint stays intact, water, salts, pollutants and weed seeds etc cannot penetrate it and it remains unaffected by extremes of temperature and the rapid joint deterioration that can follow freezing and thawing weather cycles.

The application of Densoband to the joint face of the new concrete aircraft servicing platform at RAF Waddington.



Corrosion Prevention - Marine Piles

Denso SeaShield Series 100 System Protects Hadrian Bridge

As part of a major refurbishment programme for the Hadrian Road Bridge, North Tyneside Council has approved the use of SeaShield Series 100 System for improved anti-corrosion protection of the bridge piles.

The work has been carried out by civil engineering contractors Edmund Nuttall, who have installed the SeaShield System to protect 49 of the most exposed bridge piles.

When the bridge was built in the late sixties the piles were protected with a 50mm concrete jacket. Edmund Nuttall engineers have removed this concrete jacket before applying the Denso Marine Piling Tape followed by

the SeaShield jackets.

Denso Marine Piling Tape is a cold applied petrolatum based tape for application under water and is a key component of the SeaShield systems. The SeaShield jackets, which protect the tape from mechanical damage, are fabricated from uv light stabilised HDPE. They are fastened into position with either non-corroding bands or threaded fasteners.



View of the SeaShield Series 100 System protected piles under the Hadrian Road Bridge.

