

DENSO DIGEST



WINN & COALES INTERNATIONAL LTD

Designed for a Long Trouble Free Life

In this issue we feature a diverse selection of project profiles, from the installation of the Sheffield Supertram System, to the prestigious Second Severn Crossing.

Whether it is the flexible bonding of asphalt or the protection of steelwork against corrosion, the requirements are the same - long-term effectiveness coupled with minimal maintenance.

Denso Products are designed to incorporate these important qualities which are demonstrated in the projects illustrated throughout this brochure.

Contact our expert advisors for assistance with your anti-corrosion and sealing problems.

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Hartlepool's Historic Quay.

Northumbrian Water Clean Up Hartlepool Headland

The first phase of Northumbrian Water's £8 million scheme to clean up the waters around Hartlepool Headland is now substantially complete. The remaining phases of the scheme are expected to be completed next year. This will result in untreated waste, currently discharged via five outfalls into the sea off the Headland, being directed to the company's treatment works at Seaton Carew.

Hartlepool contractor, Seymour Civil Engineering, carried out the first phase of the works which involved laying 2km of pipeline from the Historic Quay area down to Northumbrian Water's Mainsforth Terrace Pumping Station. Densoclad Tape and

Overwrapping joint with Densoclad Tape.



Denso Profiling Mastic were chosen for the protection of joints and fittings to P2 specification on this pipe.

After an application of Denso Primer D, the Profiling Mastic was used to contour the joints prior to a spiral application of



Smoothing joint contours with Denso Profiling Mastic.

Densoclad Tape with a 55% overlap.

Densoclad Tape is specifically designed for the protection of pipe, welded joints, bends and fittings for below ground or immersed environments. The tough pvc backing combined with the polymer bitumen adhesive ensures complete protection and excellent resistance to damage by impact, poor backfill or aggressive ground conditions.

Sealing the Supertram Track

Showing the way for other UK cities to alleviate their ever increasing congestion, the South Yorkshire Supertram is already an outstanding success.

This multi-million pound project has received funding from the British Government and the European Community. The main contractors are Balfour Beatty, working on behalf of South Yorkshire Supertram Ltd and the Building Services Department of Sheffield City Council.

The Supertram's 29km route is in the form of a 'Y', with three routes feeding out from the city centre. The tram rails are laid on some 60km of track



Sheffield Supertram in operation.

bed, some of it over disused railway ballasted track, but the major part being on existing highways. Here the tram rail sits on a concrete bed 2.2 metres wide, with two pre-formed channels measuring 192mm x 165mm for the rails.

Tokband Spezial, a solid, polymer modified, rectangular bitumen strip, was chosen to form an effective flexible waterproof seal between the edges of the concrete tram track bed and the hot rolled asphalt road wearing course.

Tokband Spezial in position prior to laying asphalt wearing course.

Application of Tokband Spezial to edge of concrete tram track bed.



Close-up demonstrating the conformability of Tokband Spezial to the concrete joint face.





Laying asphalt wearing course against Tokband Spezial.

a special polyurethane based elastomer. The overall result is an inherently 'springy' system which reduces noise and vibration and, in conjunction with the Tokband Spezial joint sealant, insulates the tram system from the surrounding carriageway.

Tokband Spezial is now approved by the Department of Transport in the Manual of Contracts 7th Edition S.H.W. for use in asphalt wearing course joints to asphalt or concrete interfaces as an alternative to the previously commonly used molten bitumen sealants.



Rolling wearing course to complete carriageway modifications.

The Tokband Spezial was applied to the pre-primed vertical concrete face prior to laying the hot rolled asphalt. This not only provides a good bond between the concrete tram track bed and the hot rolled asphalt on each side, but also prevents the ingress of water into the joint from the surface. This method eliminates the expensive saw

cutting required by traditional practices. In some areas a textured coloured concrete was used to emulate the cobbled streets from the days of the early trams.

No ties are used to fix the rails which have concrete blocks positioned against the webs to reduce vibration. These blocks are secured in their channels by



Close-up of completed flexible joint.

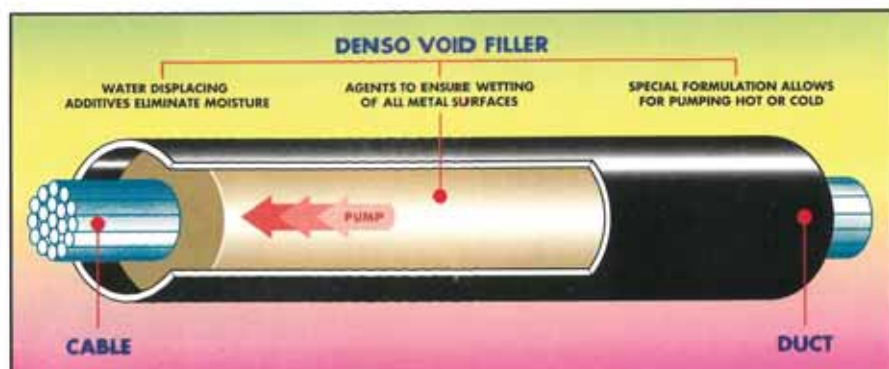


The Crossing during construction.

Denso Staying Power for the Second Severn Crossing

The £300 million Second Severn Crossing was opened in the summer of 1996. It is located in an estuarial environment and is the longest cable stayed bridge in Britain having a total length of 5km, including its associated approach viaducts.

Insertion of cables into the ducts.



Severn River Crossing Plc was formed to design, finance, build and operate the new structure and also maintain the existing crossing. The main contractors for the project were Laing-GTM Joint Venture who employed another joint venture, comprised of Sir William Halcrow & Partners and French consultancy S.E.E.E. for design. GTM-BTP of France were the subcontractors in charge of the prestressing works. The contracts to supply Denso Void Filler were won in competition against both UK and overseas companies.

All the bridge stay cables and external post tensioning steel strands were protected against corrosion by Denso Void Filler. Based on microcrystalline petrolatum containing corrosion inhibitors and moisture repellents, Denso Void Filler forms a permanently flexible medium for the encapsulation and protection of the steel strands which make up the tendons and stay cables.

The main advantages of using wax injection are that the tendons' flexibility is maintained, enabling removal for examination or replacement and individual steel strands or complete bundles can be readily

removed for inspection. With cementitious grouted tendons this is not possible as the strands are permanently bonded and cannot be removed without destruction of the tendon.

A major factor in obtaining the contracts to supply Denso Void Filler was that Winn & Coales' Engineering Division designed and manufactured the sophisticated temperature



Pumping Denso Void Filler into the ducts.



Special storage and pumping equipment, designed and built by Winn & Coales Engineering Division, in operation on site.

controlled on-site storage tanks and pumping equipment for the hot injection of Denso Void Filler. Each installer had different requirements and plant was designed to meet their specific needs. GTM-BTP, who installed the externally post tensioned tendons in the segmented decks and piers of the approach viaducts, wanted equipment to pump the Denso Void Filler into tendons up to 240 metres long; whilst P.S.C. Freyssinet who installed the main bridge stay cables had to have pumps to fill cables 250 metres long to a height of 100 metres.

Multi BRV, who made the back span tie down cables in their Stockport factory, used heaters and pumps of a design suggested by Winn & Coales. Transportation from the factory in South London to the sites on both sides of the Severn Estuary was by special road tanker.

On arrival at site the hot product was discharged into insulated storage tanks, each fitted with its own heating coil coupled to an on site heat exchanger, again

designed by Winn & Coales. This arrangement maintains the Denso Void Filler at its optimum injection temperature of 90°C.

The Winn & Coales contracts were completed within budget and by the due date.

Denso Void Filler can be supplied in bulk, i.e. 20 tonnes via insulated road tanker or in 200 litre drums for smaller projects. A range of heating, storage and pumping equipment is available for hire at reasonable cost.

250 Metre stay cables were protected with Denso Void Filler which was pumped to a height of 100m.



Flexible Seal for Blackpool Tram Rails

Tramway engineers at Blackpool Borough Council's Operational Services Department found that vibration of the rails on Blackpool's famous tram system was causing gaps to appear between the rails and the adjacent road surface.

Application of Tokband Spezial to tram rails.



The problems were on a 375 metre double track section which the trams share with conventional road traffic. The resultant gaps led to the ingress of water, often containing dissolved salts (being in a marine environment), leading to premature deterioration of the surrounding asphalt wearing course.

Close-up of tram rail showing Tokband Spezial in position ready for HRA wearing course.



Laying hot rolled asphalt wearing course.



Completed wearing course with Tokband Spezial forming a flexible seal between the rails and asphalt road surface.

When a new asphalt wearing course was recently laid by contractors, Tarmac Quarry Products Ltd, Blackpool Borough Council specified Tokband Spezial as a flexible seal between the rails and the asphalt wearing course. The properties of Tokband Spezial are such that, unlike bitumen sealants, it adheres to the metal rails as well as the road asphalt and has good lateral strength.

Tram in operation on Blackpool's sea front.



Hot Oil and Sea Water Resistant Coating Performs at Temperatures up to 140°C

Heatshield has been designed as part of Archco-Rigidon's ongoing research and development programme to meet the offshore industry's needs, both now and in the future, offering:

- Excellent corrosion resistance and undercutting resistance
- Very low permeability
- Good chemical resistance and temperature tolerance



Heatshield extends the temperature range over which existing Archco-Rigidon linings can operate and provides an effective and reliable lining for the offshore industry which will be resistant to sea water and oil at temperatures as high as 140°C.

The use of inert glass flakes in a lining has been proven as an effective means of reducing permeation, erosion and increasing resistance to impact damage, thereby substantially extending the life of the lining under the most severe conditions. Heatshield contains 0.4mm glass flakes and in each 500 microns thickness of lining there will be many individually interleaved layers.

Application to pipework and tanks can be carried out using hot spray, plural component equipment. Post curing after application is essential, although this can be achieved by exposure to the operating conditions. The hard high gloss finish helps to reduce friction and assist flow.

Our laboratory test results enable us to project a operational life of 10 years under total immersion conditions.



Part of Tioxides Greatham Works showing protected pipe colour coded in yellow.

Tioxide Pipeline Systems

Tioxide's Greatham Works, near Hartlepool, manufactures titanium dioxide pigment which is the principal white pigment used in paints, inks, paper and floor coverings. The manufacturing process involves some aggressive chemicals such as liquid titanium tetrachloride, chlorine and oxygen.

As a result of the chemical and marine environment, anti-corrosion protection must be provided for the external surfaces of pipework handling the titanium dioxide process chemicals. The Site Project Department has recently replaced a number of piping systems which had suffered from external corrosion.

Some lines carrying dry titanium tetrachloride and chloride mix have already been completed using Denso Petrolatum Tape overwrapped with PVC to colour code the pipe. These lines are rated for a pressure of 6 bar.

The oxygen pipework has also presented problems in that, as oxygen reacts with grease and can then combust, flange joints have to be 'gapped'. The pressure of the oxygen has to be reduced from 8 bar to 2 bar, with a corresponding drop in temperature. The result is that the surface of the pipe is constantly covered in condensation and inevitably corrosion sets in. Here again, a Denso system ensures no

corrosion occurs.

Eight years ago some existing piping had been wrapped with Denso Hotline Tape. Due to the success of this application it was decided that the replacement piping should be protected with the Denso Covercoat System incorporating Hotline Tape.

The contractors for the project, AHL Industrial Pipework Ltd of Jarrow, applied the Covercoat System comprising a spiral application of Denso Hotline Tape overwrapped with Denso Fabric membrane. The membrane was then coated with Denso Solvent-free Epoxy Resin in the appropriate pipeline colours.

Close-up of pipe and flange showing completed Denso Covercoat System.



Protection for Wear Sewage Pipeline Crossing

In February 1996 Northumbrian Water began the first of a three phase £50 million scheme to clean up the River Wear in the Sunderland area. To conform to the European Urban Waste Water Treatment Directive by 31st December 2000 all sewage discharged into the the River Wear and the North Sea will be treated.

Socket end of pipe pre-wrapped with Denso Tape.



Denso Profiling Mastic creates smooth profile on joint.

Although a network of interceptor sewers - installed since the late 1970's - transfers much of Sunderland's sewage to Hendon Treatment Works for screening and discharge into the North Sea, the sewers serving North and South Hylton, Castletown and North Quay discharge straight into the River Wear.

Under Phase 1 of Northumbrian Water's comprehensive clean-up plan, five transfer pumping stations are being constructed which will intercept flows from the river outfall pipes and pump them along new sewers. Three of the pumping stations will be on the north bank and will pump flows across the river and into the existing interceptor sewer, via a new pipeline which is being



Overwrapping with Denso Tape to P1 specification.



installed on the Alexandra Bridge at the South Hylton Crossing. The bridge previously carried a gas pipeline over the River Wear.

The contract for the three pumping stations, costing £4 million, is being carried out by Kennedy Construction as contractors and Entec UK Ltd as consultants. A key requirement for the pipeline in this estuary area is comprehensive anti-corrosion protection. Denso Tape and Denso Profiling Mastic were chosen to protect the pipeline joints to P1 specification.

This protective system consists of an application of Denso Paste after which the couplings and joints are contoured with Denso Profiling Mastic. The P1 specification requires two separate spiral wraps of Denso Tape, each with a 55% overlap, which provides four protective layers of tape.

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Front Cover: The Second Severn Crossing, opened summer 1996, stay cables and tendons protected with Denso Void Filler (see pages 6-7).
Back Cover: The Second Severn Crossing during construction.

