



Densoband is used as a flexible joint between asphalt and concrete at East Midlands Airport - see page 3.

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Sealing Mastics - Flexible Asphalt to Concrete Jointing

Densoband Joint Seal for East Midlands Airport

Denso has been used as a joint seal on recently completed contracts at East Midlands Airport and RAF Waddington, Lincolnshire, carries out by Cemex UK Construction Services Ltd of Saville Street, Sheffield

In both contracts the Densoband joint seal was applied to the interface between the tarmacadam asphalt and concrete slab areas. In the case of RAF Waddington a PQ high density concrete was used.

Around 300 linear metres of Densoband were laid at East Midlands Airport.

Densoband is a polymer modified bitumen strip which is approved by the British Airports Authority as well as the Department of Transport in the Manual of Contracts 7th Edition for use in asphalt wearing course joints for asphalt and asphalt to concrete interface, as an alternative to the traditional hot poured bitumen.

The Densoband sealed joint remains intact because it is unaffected by extreme

temperature changes which often lead to further deterioration and cracking. This also means that weed

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

seeds, salts, pollutants etc. cannot penetrate causing further damage.



Above and below: The tarmacadam asphalt being laid up to the concrete slab on the right with Densoband used as a joint between the two areas.





The M1 Motorway running over the Tinsley Viaduct, near Sheffield, Yorkshire.

Corrosion Prevention - Protection of Steel Support Columns

Denso Void Filler Protection for M1 Viaduct

Increased traffic density and the growth in the number of vehicles with 44-ton vehicle loading on the UK's motorways and trunk roads has meant the introduction of new traffic regulations. An outcome of this is that several road bridges and viaducts have had to be strengthened to meet the latest traffic requirements.

The Tinsley Viaduct at Junction 34 on the M1 near Sheffield has recently been strengthened by main contractors Edmund Nuttall, acting for Owen Williams. The secondary contractors were Cleveland Bridge Ltd, who had the responsibility of ensuring that all support columns for the viaduct are adequately protected from corrosion. The anti-corrosion treatment has included the use of Denso Void-Filler at the base of the steel support columns which rest on the A631 road running beneath the M1 motorway.

Each column base consists of a small chamber holding the

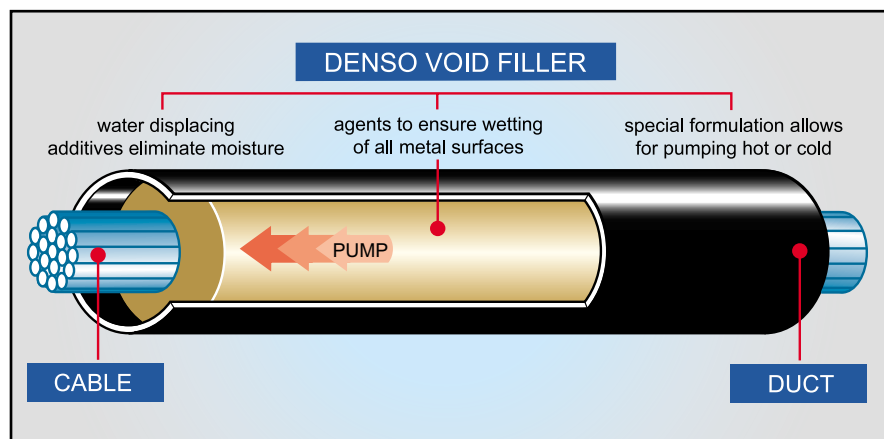
pivotal bearing and bearing block, which allows for expansion and contraction due to temperature fluctuation.

Denso Void-Filler was pumped into each chamber to

exclude moisture, highly corrosive road salts and air thus preventing corrosion. The product application was carried out by Central Industrial Services (Northern) Ltd.

Denso Void-Filler is based on a microcrystalline petrolatum containing corrosion inhibitors and moisture repellents. It forms a permanently flexible medium for the encapsulation and protection of bearings, tendons, stay cables etc. It has been used on a number of major civil engineering projects including both Severn Bridges

Diagram showing conventional use of Denso Void-Filler to protect prestressed cables and tendons.



Corrosion Prevention - Protecting Buried Pipeline

Densotherm HD Protects Water Project Pipes

The Berg River Project in the Western Cape consists of a dam, tunnel and pipeline which is designed to augment the provinces' water supply as a result of increased demand from development and agriculture.

The Dept of Water Affairs and Forestry (DWAF) specified the Densotherm HD for application to pipe sections and fittings. These were abrasive blasted, coated with Epoxy and then double wrapped with the Densotherm HD.

Cycad Construction was the pipeline contractor whose staff were trained to apply the tape in a cigarette fashion as well as to cut the tape to suit the detail work.

The sections were wrapped in Gauteng and then transported by truck to the site some 1200 km away and arrived in good condition.

Opposite: Aerial view of the the Berg River Project in the Western Cape of South Africa.



Above and below: Pipe sections were double wrapped with Densotherm HD at Gauteng before being transported to site.





'Pier of the Year - 2006', Worthing Pier, Worthing, West Sussex.

Corrosion Prevention - Jetty Piles

SeaShield System Protects Support Piles of UK's 'Pier of the Year - 2006'

Worthing Pier, constructed in 1862, was recently voted 'Pier of the Year - 2006' by all members of the UK National Piers Society. This Grade II listed building has become a landmark in the West Sussex seaside town of Worthing and is extremely popular with visitors and residents alike.

Recent installation of a SeaShield system to a new section of the pier.



Over the years this structure has endured fire, explosion and major storm damage and is regularly exposed to heavy seas during stormy weather. Given these facts, it is no small achievement of the Worthing Borough Council Engineering Team that it has survived in the condition it is today, estimated at being approximately 80% of its original 1862 state.

Regular maintenance has played an important role in preserving the pier and over the years the substructure has had various support piles protected by Denso SeaShield systems.



Case History

System installation date:	1984
Inspected:	2006
Service record:	22 years



Pictures: Battered by gale force winds, heavy seas and beach shingle the underneath of the pier looks at first glance, every bit of its 144 years of age. However, after cleaning off some of the surface marine growth (left picture), you can see that after 22 years service, the SeaShield jackets are still intact.

These systems comprise a petrolatum tape inner layer to protect against corrosion and a polypropylene jacket outer layer to protect against mechanical damage and marine growth.

The first protection system was installed in 1984 and subsequent ones have been installed during planned maintenance periods since. A recent inspection shows that the SeaShield systems are still in excellent condition and doing a great job helping to preserve the pier against the onslaught of sea and weather.



Above and below left: The Ford Island Bridge. Below right: A SeaShield Series 500 System Jacket Bottom: SeaShield Series 2000HD protected piles in situ.

Corrosion Prevention - Jetty Piles

Bridge Pilings Protected with SeaShield Series 2000HD and Series 500 Systems

The Ford Island Bridge was constructed in 1998 to connect Pearl Harbor's Ford Island to the mainland of Honolulu, Hawaii. To provide long term protection of the piles the SeaShield Series 2000 HD and Series 500 was selected as the system.



At the height of World War II more than 40,000 people lived and worked on the 450 acre (1.8 km²) island. The island was in the center of the Pearl Harbor Attack, because of the battleship moorings surrounding the island. Today, the island houses 45 naval families and 3,000 civilian workers. Also, the bridge is used for access to the USS Missouri and Ford Island Museum for Wartime Aircraft.

During the selection process the US Navy and contractor reviewed many different pile protection systems and chose the SeaShield System due to the excellent reputation of Denso

for providing superior products, customer service and long-term history worldwide.

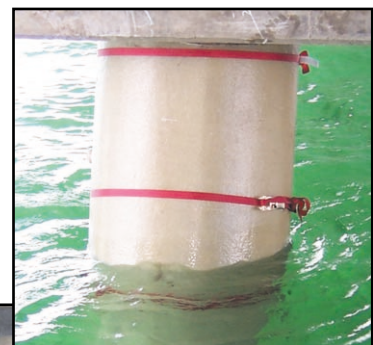
Sea Engineering out of Honolulu, Hawaii installed the systems. They completed the project on time and gave rave reviews on the ease of installation of the Series 2000 HD and Series 500 Systems.

All together the project included protection for approximately 4,378 LF of 24" octagonal concrete piles using the Series 2000HD System and 211 LF using the Series 500 System.

The Series 2000 HD System included SeaShield Marine Tape and custom fabricated 60 mil HDPE jackets. The tape was wrapped using a 55% overlap and then the jackets were secured into place using 316 stainless steel bolts.

The Series 500 System included fiberglass jackets that were constructed of 3/16" thick woven and roving fiberglass and gel coated. The annulus was then pumped and filled with the SeaShield 550 Epoxy Grout. The epoxy grout kits consisted of 1 gallon of 2-part epoxy and a 44 lb. bag of grout yielding 0.4 cu.ft.

Both systems will provide many years of additional service life to the Ford Island bridge pilings.





Installation of the SeaShield Series 500 system to eroded concrete marine piles on a jetty in the Bay of Fundy.

Corrosion Prevention - Marine Piles

Denso Canada Launches the SeaShield Series 500

Although the Canadian coastline is one of the most extensive in the world, very little of the vast coast itself is developed with ports, loading structures and docking facilities.

This lack of development somewhat limits the large potential for Denso Seashield systems sales. Denso Canada has however been extremely successful of late in capturing a large percentage of the available piling protection jobs on both the East and West Coast. Some of this work has involved Series 100, Series 2000HD and Series 90, as well as Series 500.

The most recent project was located on the East Coast of Canada in what is known as the Bay of Fundy. This particular bay has some of the worlds' largest tidal movements at approximately 30'.

This job involved the

application of Series 500 jackets and the pumping of 550 epoxy and aggregate. The job was very unique due to the characteristics of the tidal movement in this area of Canada.

Twice a day we experience high and low tide, over a distance of approximately 30'. Over a 12-hour period, the tide moves from a position of high tide to a position of low tide, with a brief resting period in between of approximately 15-20 minutes.

When the high tide begins to drop, or when the low tide begins to rise, however, the rate of change is 4'/hour, which is extremely fast for working in

the water and applying jackets, pumping aggregate etc. This job involved working from a small boat tied to the piling which added to the difficulty of the job.

The project involves the protection of approximately 200 existing concrete piles that have badly eroded down. Some of the concrete grout is eroded down to the original steel piling, making the annulus anywhere from ¼" up to 6" in some cases.

The job consisted of installing the jackets on stagings, as the pile protection was required part way up the pile, approximately 12' from the mud line. The 10' long jackets were then filled with aggregate by pumping from the upper deck where the epoxy and aggregate were mixed, for a distance of 63' from the pump down to the injection ports below the deck.

Overall, the job was very successful and we are looking forward to continuing with more piling encapsulation at this site in 2007.

Corrosion Prevention - Jetty Piles

SeaShield Series 250HD Protects Ferry Terminal Piles

The Toll Group's Inter-Island ferries are one of the main passenger, vehicular and rail links between New Zealand's North and South islands.

Toll's newest ferry, Kaitaki (which means 'challenger' in Maori), is now operating from her new Linkspan berth in Wellington Harbour.

The Kaitaki can carry up to 1600 passengers and 600 cars on 3 decks and has a trailer capacity of 1780 lane metres, making her New Zealand's largest vehicular passenger ferry. Due to the Kaitaki's length a new Linkspan terminal was built to allow her to berth at the Wellington Inter-Island

Terminal.

Because of its ease of application and level of protection, the terminal operators Centerport PLC Ltd. selected the Denso Seashield 250HD system to protect the first four piles. As the piles are relatively new, minimal preparation was required, consisting mainly of scraping and scrubbing off the marine growth and slime to a depth of 2 metres. Denso NZ, with our approved applicator, Dive Co



The Kaitaki Linkspan Berth in Wellington Harbour.

Ltd, applied pre-primed Denso Seal T Tape and the 250HD jackets over two days.

To offer an extra level of protection an outer layer of Rockmesh was added. Held in place by Smartband strapping, the Rockmesh allows service tenders to work alongside the piles, without damaging the SS250HD jacketing.

Dive Co divers fitting the SeaShield 250HD jackets.



Corrosion Prevention - Jetty Piles

Orontes Bank Navigation Beacons Protected with Seashield Series 250HD



Orontes Bank Navigation Beacon is positioned on a shoal in the shipping lane that leads up and down 'The Gulf St Vincent' in South Australia. Situated 25 nautical miles west of Port Adelaide, the beacon sits approximately halfway across the peninsular.

The tidal current is extremely strong over this shallow point due to the shoal outcrop. Due to the harsh conditions the robust 250HD System was selected.

Installed by Adelaide Salvage & Diving for the Australian Maritime Safety Authority, this rework was completed in under 3 days. The structure is inspected every 6 months and to date there has been no issues regarding the suitability of the system.

Another interesting point is that the Gulf of St Vincent, Spencer Gulf and the Bay of Mexico have something in common. These are the only places in the world that have what is known as a dodge tide.

The Seashield 250HD system



This is where there is no tidal movement for 24 hours. This is a very good time to fish especially during a full moon.

The Orontes Bank Navigation Beacon is subjected to extremely strong tidal currents.

