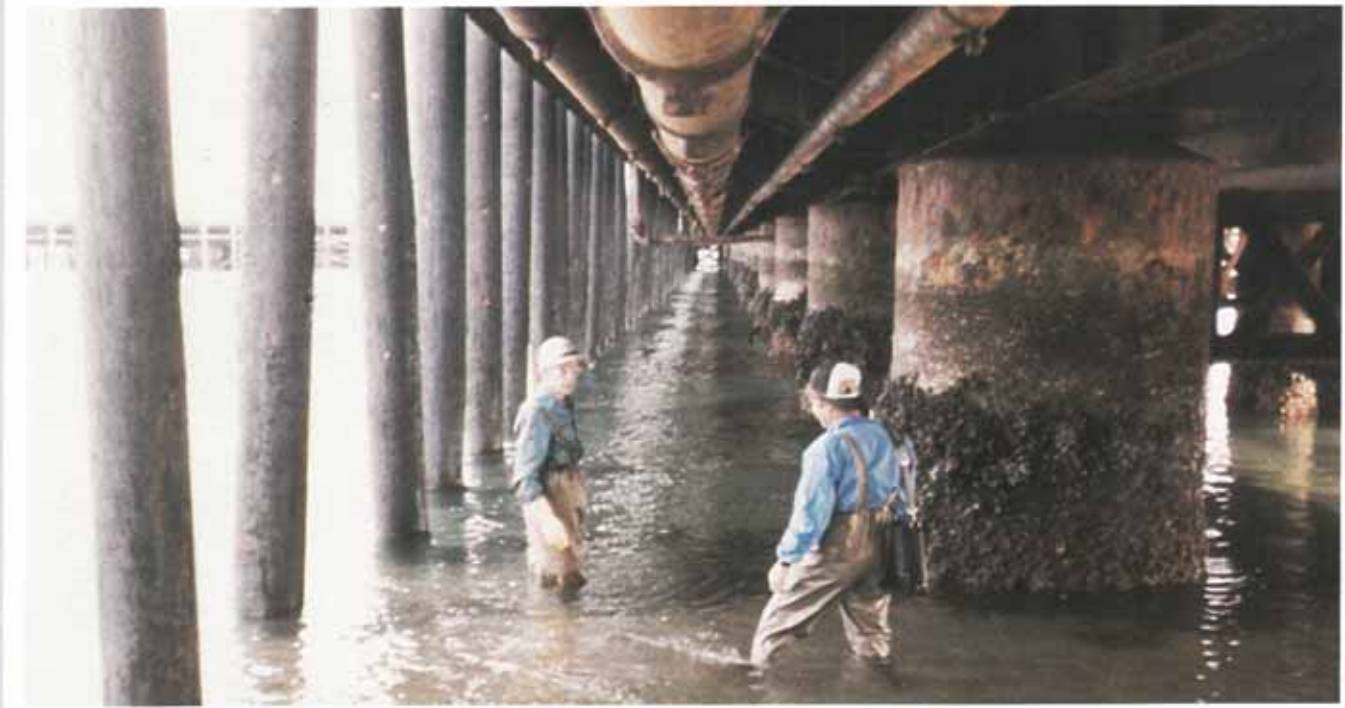




**NORTH  
AMERICAN EDITION**



Jetty pipeline of various diameters was Denso wrapped without damage to the environment.

# US NAVY

When deliberating which system of corrosion protection to use on their jetty lines, US Navy engineers at Point Loma Fuel Pier, San Diego didn't have far to look for evidence of efficient performance by one of the contenders.

A test section of 12in (300mm) diameter pipeline had been Denso wrapped in 1972 and was still in excellent condition despite the very aggressive marine environment.

But reliable long term performance, very important though it is, was not the only factor that prompted the use of Denso Tape. Environmental legislation forbids the depositing of sand and refuse into San Diego Bay – sand blasting the pipe was out.

So the US Navy stayed on the right side of the law and of its budget by using Denso petrolatum based tape which does not demand disruptive and expensive surface preparation of the metal surface. Manual removal of formed rust is all the preparation needed before priming with Denso Paste.

43,000 sq ft (4 000 sq m) of fuel pipeline ranging in diameter from 4in to 20in (100mm to 508mm) and running beneath the Point Loma Pier were wrapped with cold applied Denso Tape, the conformable system adapting itself well to the intricate profiles of flanges, valves and fittings to ensure complete exclusion of the aggressive marine environment.

The conformability of Denso Tape ...

... is well illustrated on these complex profiles.





The Powell Duffryn Terminal.

# POWELL DUFFRYN

A simple but effective Denso treatment has been made at Bayonne, New Jersey on liquid chemical storage tanks newly built for Powell Duffryn Terminals Inc, whose customers include many of America's chemical giants.

The application:— after cleaning and priming with Denso Paste, a single run of 8in (200mm) wide Denso Tape — right around the circumference of each steel tank onto the concrete pad.

Its purpose:— to act as a preventative against emergency, an extra precaution against corrosion at the vulnerable base of the tanks where moisture tends to collect.

80 tanks, ranging in diameter from 25ft to 50ft (7.6m to 15.2m) were so treated.

A simple but effective application of Denso Tape.



# ST ANDREWS

The abundant fish stocks of its rivers, lakes and oceans represents one of Canada's most valuable natural resources. Researching and managing those resources has long been a priority, as evidenced by the existence since 1898 of a marine laboratory at St Andrews, New Brunswick, Canada's first fisheries research institution.

At St Andrews Biological Station — one of several Atlantic coast research stations — investigation is under way on fisheries related environmental problems including the biological effects of pesticides, acid rain and offshore oil development. Alongside this work, the applied research concentrates on the development of fish farming and maturation of lobster, salmon, etc.

The marine location means that all metal installations are at risk from corrosion caused by use of and proximity to salt water. These freshwater dechlorinators are a case in point. Their function is to

remove from the municipal water supply all traces of chlorine — one of the many chemicals toxic to fish. How long they could continue to do so was debatable — salt water corrosion had brought them near to the end of their service life.

Their premature retirement was avoided by treating the tanks with a Denso Paste and Denso Tape application — thereby giving the dechlorinators many more years of satisfactory service. And for a very small outlay — no minor consideration!



# VANCOUVER WHARVES



Denso wrapping protects from chemical corrosion such as potash . . .

Situated in North Vancouver, British Columbia, on 200 acres (81 hectares) of harbour front property, Vancouver Wharves has berths for over a dozen freight ships. Its network of rail lines and equipment make this facility the ninth largest railway in Canada. As well, it is the largest privately-owned firm in its field on Canada's west coast. Mr Bill Pearson, Electrical Superintendent, believes it would be almost impossible to equal Vancouver Wharves' unique combination of corrosive

problems. It handles sulphur, potash, phosphate rock, copper, lead and methanol. To make matters worse, it has to combat marine salt water conditions. In fact, the only non-corrosive products handled are pulp and paper. The photograph can only touch on the role Denso Products play on combating corrosion at Vancouver Wharves. Denso protects conduit, junction boxes, gears, machined shafts of motors and equipment stored in the elements, conveyor bearings, etc, etc.

. . . sulphur . . .



. . . as well as a marine environment.



# DU PONT

In August 1978, duPont, Sabine River Works in Orange, Texas was experiencing corrosion problems with a tank outfall pipeline located in a below grade sump. The original plan was to drain the tank, remove the pipe to a yard where it could be sand blasted and painted with an immersion grade coating. Since the pipe was located in a sump the worst case had to be assumed – the sump could be full of water over an extended period. Consequently, an immersion service coating was the strongest candidate to arrest the corrosion.

Removal of the pipe was necessary to sand blast and coat – no blasting is permitted in the tank farm. After an on site inspection by the local Denso Agent, the recommendation was made to wrap the outfall line with Denso Tape. By using Denso the cost of the

project was reduced to a fraction of the original amount deemed necessary to protect the line. No longer would the tank need to be drained. No sand blasting would be involved, not even a compressor. The pipe could be protected in place. Also, the two short pipes and flanges which are connected to the tank bottom and to the opposite end of the sump respectively, would now be protected (a feature which the original spray applied paint system could not offer to the in place flanges and piping) thus removing any weak links in the corrosion control system. As a matter of fact the Denso Tape could be applied to the pipe even if the sump was full of water, by switching to Denso S105 underwater primer and wrapping the line underwater.

The Denso was applied by an in-plant three man maintenance crew in half a day.

The system was inspected in the spring of 1984 and found to be in excellent condition after some five years service.

Tank outfall pipe in below grade sump ...



... still OK after five years immersion.



# PROCOR

Millions of years ago Central Alberta and Saskatchewan were an inland salt water sea. Later the Rocky Mountains were formed. As these mountains eroded, the sea was buried, leaving vast stores of salt 6000 ft (1830m) underground.

First Procor Limited drilled down to the salt deposits and pumped fresh water in to dissolve the salt. As more fresh water is injected, the brine is forced out and 500,000 barrel capacity storage caverns are developed.

After the caverns are developed, liquefied products are pumped down into the caverns and brine is forced up to the surface where it is stored in polyethylene lined holding lagoons.

The caverns store liquefied propane, butane, ethane and diesel fuel under pressures as high as 2500 psi (172 bar). It is essential to keep the caverns filled with liquefied gases or with brine under pressure to help maintain the size and integrity of the cavern. At Redwater, Alberta, Procor has nine caverns with a capacity of 4,500,000 barrels.

Products arrive via pipeline, rail, car and tank truck. One pipeline, the Cochin pipeline, travels east through the USA and terminates at a large petrochemical complex at Sarnia, Ontario.



Total cover against corrosion.

The brine operating environment previously caused maintenance problems, however, since 1978 Procor has kept the couplings, valves and pipe as new by using Denso applications. Denso products are used on equipment in the surface pump stations and on associated piping and equipment.

Pictured is a 1978 Denso application which has kept equipment in new condition since that date.

The petrolatum compound (brown) still adheres to the black metal substrate.



# OIL GIANT

A major petrochemical plant located on the Texas Gulf coast was experiencing extensive corrosion problems of instrumentation boxes which had been installed when the plant was built several years ago. Corrosion was so extensive that water entering through perforations in the boxes threatened the actual operation of the units in the plant. Over 150 boxes throughout the plant were deteriorating at an alarming rate.

Sand blasting and painting in service instrumentation control boxes was out of the question. The boxes had to be repaired in place and in operation with a minimum of disturbance to the boxes, the interior connections and the production units.

Denso Priming Paste and Steelwork Tape were applied to the entire exterior surface of the control boxes. The application was designed to allow periodic inspection and access to the interior of the boxes after they were wrapped and protected. The job was done by an area painting contractor using a three man crew equipped with nothing more than wire brushes to clean the metal, a brush to apply the primer and scissors to cut the tape. Five control boxes were completed per day until every box in the plant had been wrapped. . . affording maximum corrosion protection with minimal disruption and minimal cost.

Protection without disruption was the problem.



The solution was provided by Denso Steelwork Tape.

Soon 150 control boxes were protected.



# ELDORADO

Today Canada is the world's largest producer and exporter of uranium, some fifty years after the discovery by Eldorado of the country's first radioactive orebody and the opening of Port Radium on the shore of Great Bear Lake in the Northwest Territories.

In those early pioneer days, ore produced at Port Radium was shipped to Eldorado's original refinery at Port Hope, Ontario, where radium was extracted for the early treatment of cancer.

In 1942, soon after the splitting of the uranium atom, the Canadian Government acquired Eldorado to refine uranium oxide, a waste product in the radium extraction process and through this unique process supplied uranium for America nuclear research. In 1944 Eldorado was made a Crown Corporation and it has played a significant part in mining, northern

Two college girls working their vacation ...



development, nuclear power, nuclear medicine and chemical engineering in the intervening years.

The discovery of near surface orebodies in the uranium rich Athabasca basin region of Northern Saskatchewan has meant that open pit mining has become the largest source of Canada's uranium. Eldorado's refinery operation has shifted too. Now this is concentrated at Blind River, where "yellowcake" uranium concentrate is refined with chemicals to produce uranium trioxide.

This is transported to Port Hope where it is converted into ceramic grade uranium dioxide for eventual use in CANDU heavy water reactors, or into uranium hexafluoride for foreign reactors.

These processes require enormous quantities of cooling water and in summer 1983 it was decided to protect against corrosion some 700ft (213m) of 20in (508mm) diameter above ground cooling water pipe with Denso Tape.

The work was carried out by two college students working for Eldorado's maintenance department during their summer vacation.

... soon had this line taped.



# CN MARINE

The Abegweit



CN Marine, one of the CN Group of Companies, operates a fleet of 17 ferries in Eastern Canada linking the island provinces of Prince Edward Island and Newfoundland with the mainland provinces of Nova Scotia and New Brunswick. Nova Scotia is joined with New Brunswick and the New England states of the USA across the Bay of Fundy through terminals at Digby and Yarmouth.

Spare tail shafts for three of CN Marine's fleet of vessels are stored in the elements at CN purchasing and stores yard in Moncton, New Brunswick. The ferries are Bluenose, John Hamilton Gray and Abegweit. The Bluenose is named after the famous sailing vessel of the same name. The John Hamilton Gray is named after one of the original Fathers of Confederation. The Abegweit is an Indian name meaning Cradle of the Waves.

The shafts are wrapped with a double layer of Denso Tape to protect them from corrosion for an indefinite period of years. This protection assures that they will remain rust free until they are needed in service.

Marine, Industrial & Technical Sales, Saint John, New Brunswick, supervised the application of Denso to these shafts. MIT Sales is responsible for all Denso marketing in Canada's Eastern Provinces and also Newfoundland.

# ROSSDALE

The Edmonton, Alberta office of Stanley Associates Engineering Ltd designed and engineered the current expansion of the City of Edmonton's Rosssdale water treatment plant.

This large Western city is situated on the banks of the North Saskatchewan River, in the Province of Alberta, oil capital of Canada. Since the Rosssdale water facility was built in 1947, the city has mushroomed to its present population of over 600,000.

As a result, it is now necessary to add a reservoir, a high-lift pumping station plus associated high and low pressure mains. The cost of the project is many many millions of dollars and will take over a year to complete.

Dresser couplings link old mains to new.



Rosssdale, Edmonton.

To facilitate connecting new mains to old, both in and out of the pumping station, it was decided to use Dresser couplings.

Couplings are faster to install than welding, thus cutting down shutdown time of the old mains. As you can imagine, shutdowns are severely restricted. Dresser couplings from 24in (610mm) to 60in (1524mm) in diameter are being protected from corrosion by application of Densyl Mastic and Denso LT Tape.

Pairs of couplings accommodate movement in every direction and Denso remains permanently plastic, thus Denso products are an excellent choice for this severe underground exposure.

Stored shaft will remain bright under Denso membrane.







Water lines at blast furnace pump house.

# STELCO

In 1910, the late Max Aitken, at that time an aggressive young Canadian financier, persuaded several small steel companies in the provinces of Ontario and Quebec to merge their operations. At that time, the successor company was named The Steel Company of Canada Limited.

Max Aitken was later to achieve world-wide fame as Lord Beaverbrook, eminent British newspaper publisher, wartime cabinet minister and confidant of prime ministers.

In the years since 1910, Stelco Inc has grown into Canada's leading integrated steel manufacturer, with an annual capacity for production of raw steel in excess of seven million tons. The company is 95 percent Canadian owned and employs close to 20,000 people. Its wide range of steel products, which are manufactured in four plants, enables Stelco to serve virtually every segment of Canadian industry.

The pre-eminent position which Stelco holds today in world steel making circles is largely the result of an ongoing policy of plant modernization and expansion and raw material and products development which, during the past twenty years, has involved expenditure of more than two billion Canadian dollars.

Since 1910, Stelco's principal plant has been its Hilton works complex in Hamilton. This plant occupies 1000 acres (400 hectares) at the western end of Lake Ontario. For many years, Denso products have played an important role in corrosion control at Hilton Works. These pictures, taken recently at the plant, illustrate a few of the many Denso related applications there.

Water tower and quenching station at coke oven battery under Denso wrap.



# INDIANA UNIVERSITY



The Assembly Hall.

One of the oldest universities in the USA, Indiana University was founded in 1820 and today has a total enrolment of 70,000 students studying at eight campuses throughout the state.

At Bloomington, the oldest and largest campus, over 30,000 students are enrolled in a wide range of disciplines from music to sciences, with enviable sporting and academic facilities to help them. Well over half their number can be seated at one time in the University Assembly Hall which has a capacity of 16,700. Commencements, conventions, sporting and theatrical events are all held here.

The concave roof structure of the hall is supported by a series of eight 2½in (65mm) diameter

galvanized cables, each 130ft (40m) long. The exposed location of the cables had caused them to corrode, but before serious damage could occur Indiana University maintenance engineers stopped the problem with Denso materials.

The system, a simple one involving wire brush cleaning of the cables, priming with Denso Paste and spiral wrapping with Denso Tape, was applied by university personnel without the need for outside contractors.

Up aloft applying Denso Tape.



# HAMILTON WENTWORTH

The Regional Municipality of Hamilton-Wentworth is located at the western tip of Lake Ontario in southern Ontario, halfway between Canada's largest metropolis, Toronto, and the United States border at Niagara Falls. This area is known as the Golden Horseshoe, because it is the largest economic unit and industrial complex in Canada.

The region is comprised of the cities of Hamilton, and Stoney Creek, the town of Ancaster and Dundas and the townships of Glanbrook and Flamborough. It has a population of 414,000 people and a total area of 430 sq miles (1114 sq km).

Because of the ever increasing development of industrial lands in Stoney Creek, the engineering department of Hamilton-Wentworth drew up plans and specifications last year for the extension of a 30in (360mm) trunk watermain. This project consisted of the installation of approximately 6400ft (2000m) of 30in (760mm) prestressed concrete pressure pipe and the building of 13 valve chambers. These chambers contain a variety of bolted valves, couplings, fittings and pipe.

Because the engineers were concerned about the corrosion protection of all the bolted fittings in these

chambers, they specified Denso products. The specification called for all bolted joints and flanges to be coated with Denso Paste, Densyl Mastic and wrapped with Denso Tape. All other piping in the chambers received two coats of Densocoat, a brush applied film coating based on petrolatum.

Denso materials have been used in 13 valve chambers.





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