



GPS Technology: A Key Part of Field Assessment

Since its introduction a few years ago, the Global Positioning System (GPS) has become an integral part of our lives both recreationally and commercially. GPS is a satellite-based navigation system developed by the U.S. Department of Defense to provide a consistent, accurate method of locating structures and simplifying navigation. It has been broadly adopted within the pipeline industry.

There are many types of GPS systems used in pipeline integrity assessment. For survey purposes, MATCOR typically employs differential sub-meter technology. According to Nigel Strike, the MATCOR Manager of Integrity

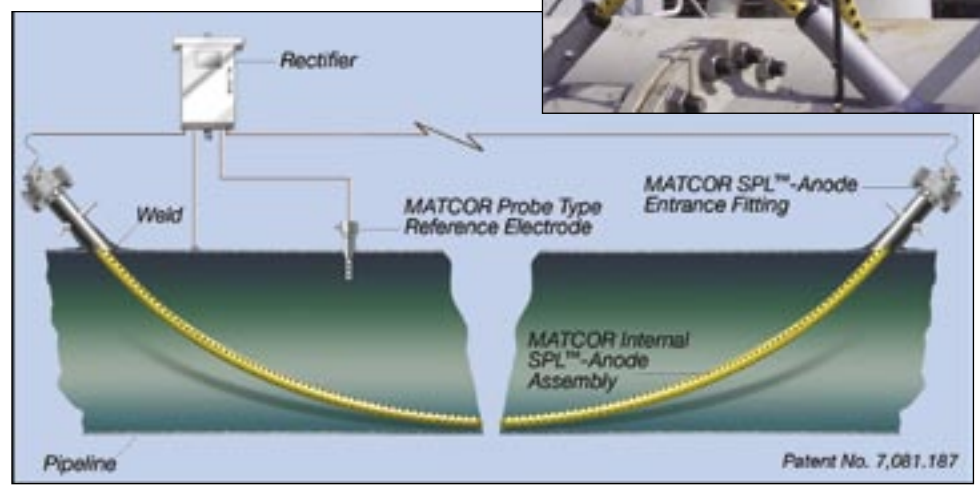
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MATCOR Innovation Combats Internal Corrosion in Denmark

A recent photo of the Krüger Aquacare system.



A sketch of the MATCOR patented product.

In 2004, the Krüger Aquacare search for an engineered solution to cathodically protect the internal surfaces of its seawater piping system in Denmark led them to MATCOR. Internal corrosion of the seawater intake pipelines was a major concern for this large Danish water distributor.

MATCOR initially considered using probe-type anodes. While standard for many internal applications, probe-type anodes have a very limited current throw and thus many anodes spaced closely together would have been required. MATCOR looked at its linear anode family of products and decided that this anode system could be adapted for the internal CP of piping.

The MATCOR SPL™-HDP impressed current system is designed so the anode can be placed in the pipeline through special pressure fittings that seal the pipeline. The system is inherently electrically isolated from the pipe and is designed to allow for the replacement of the anode. The system is supplied with anode entrance and exit fittings for the specified pipeline diameter with anode assemblies spanning as long as 200 ft. between entrance fittings.

William Schutt, the MATCOR President and Founder, worked closely with Krüger's engineers to ensure the system's success. The custom SPL™-anode was installed inside of production pipes that are only in use seasonally from the start of September to the end of January.

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MATCOR Commissions CP System in Sakhalin Island, Russia

Recently Tony Ray, a MATCOR CP Engineer and a project lead for many MATCOR global engineering projects, traveled to Russia's Sakhalin Island. Sakhalin Island is situated along the eastern coastline of the Russian mainland, immediately north of the Japanese island, Hokkaido. The island spans 948 km (589 miles) long from north to south and 27 to 160 km (17 to 99 miles) wide from east to west. This oil-rich area has been designated by the Russian government as environmentally sensitive, and great care must be taken to preserve the region while still allowing access for oil and gas production.



The MATCOR SPL™-Anode System protects tank bottoms and buried piping

To minimize the environmental site impact, efficient, precision drilling equipment was installed including a large drill rig nicknamed 'Yastreb.' Yastreb, which means "the hawk" when translated from Russian to English, in any language is one of the most advanced pieces of drilling equipment available worldwide. It has the capacity to drill down vertically and then horizontally out a total distance of up to 11 km (6.8 miles).



Sakhalin Island's Sea Eagle, the Orlan

system to ensure its operability and effectiveness for long-term protection of the facility and the sensitive environment around it.

Significant for Ray as the Corrosion Control Specialist on-site, and many who have worked on the project since inception several years ago, is an appreciation of the area's indigenous tribes and unique populations. Ray took a moment to capture photos of a few area reindeer shepherds as they managed their herd and of the protected island sea eagle, known as the Orlan, on a recent trip.

A related MATCOR project for Korean contractor POONG LIM, takes place in the Dekastri Export Terminal. In fact, it utilizes in excess of 10,000 linear feet of SPL™-Anode to protect buried piping at this mainland Russian facility, which receives the oil production from Sakhalin and allows it to be shipped around the world. ●

For more photos and details, visit the vendor project site at <http://www.matcor.com>



From left, Tony Ray and Glenn Shreffler (MATCOR) on site with a key member of the Fluor Project Team

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MATCOR Innovation Combats Internal Corrosion in Denmark

After emptying the pipes for visual inspection, a process which occurs annually, Krüger found no internal corrosion. Krüger placed additional orders for the SPL™-HDP system as a result of its successful initial implementation.

The positive experience that Krüger Aquacare has enjoyed is typical of the innovative spirit that MATCOR provides to many of its clients. Taking a different approach to achieve corrosion protection for our customer assets is part of a 30+ year tradition of creative excellence. MATCOR continues to take great pride in its culture of innovation.

Update: NASA VAB CP System Fully Operational

Since the Fall issue, MATCOR, Inc. and Cathodic Protection Technology (CPT) technicians successfully started-up the new CP system on the NASA Vehicle Assembly Building roof in Cape Canaveral, Florida. This system is one of the largest concrete CP projects for MATCOR with approximately 224,000 sq. ft of coverage. Following an initial 30 days of operation to allow for polarization of the reinforcing steel, MATCOR will conduct final testing in early 2007.



Before: An actual roof section demonstrates the rebar corrosion prior to installation of the MATCOR CP system.



After: With the roof clear of damage, the customized MATCOR CPBD system now protects the VAB roof.

Caribbean Aquarium Features CP Exhibit

Credit – To follow is a Letter to the Editor on a MATCOR CP Project, originally published in the August 2003 issue of Materials Performance.

A vacation typically provides one the opportunity to put aside work-related concerns for a brief period. Such was not the case for NACE International member Dave Boreman, who recently returned from a vacation with his wife on St. Thomas in the U.S. Virgin Islands.

Boreman, a NACE Cathodic Protection (CP) Specialist who works as a Project Engineer with Yankee Gas Services Co. (Danbury, CT), was touring the Coral World Marine Park and Undersea Observatory on the east end of St. Thomas when he found the unlikeliest of exhibits at a tourist attraction: a display explaining how CP is used to protect the tower that houses the observatory.

"The observatory is designed to give you a 360-degree view from 15ft [4.6 m] beneath the sea," explains Boreman, add-

ing that the majority of displays educate visitors about the marine life native to the coral reefs and water of the Virgin Islands. *"I was very surprised to see such a display [about CP]. I cannot recall in my over 26 years in the industry ever having seen a display such as this outside of an industry event. I was also very proud and somewhat happy to see an educational display at such a public venue concerning my NACE International area of expertise."*

The display explains that the tower is constructed of steel-reinforced concrete. It points out that the CP is necessary to prevent contaminants such as seawater, salty air, and beach sand from lowering the PH of the highly alkaline concrete and attacking the steel. It also includes simplified diagrams of the CP system and educates the public about CP fundamentals.

"Originally opened in 1977, the park closed after hurricane Marilyn devastated the island in 1995," says Donna Nemeth, Coral World's former Curator of Exhibits (she left

her position with the park shortly before publication of this article). *"It was then purchased by a corporation and reopened in the summer of 1998 after a \$9.5 million renovation. One of our more unique or signature exhibits is the Undersea Observatory Tower, and this is where we use CP to reduce the corrosion problems found in this concrete tower partially submerged in the ocean."*

Nemeth says that the tower was constructed on land in 1977 and sunk in its present location. Significant corrosion problems had become evident by 1985, when a CP system designed by MATCOR, Inc. (Doylestown, Pennsylvania) was first installed. In 1997, the facility was reconstructed and the CP system was reinstalled. The present system includes a mastic coating over the grid of wires carrying the protective current. *"In other areas, we try to use structural fiberglass and plastic wherever possible, 316 stainless steel (UNS S31600), or aluminum,"* adds Nemeth.

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Services, modern-day GPS sub-meter technology is extremely precise and can pinpoint a location within 3 feet. As a comparison, recreational GPS units such as models sold by Garmin or Magellan, usually have an accuracy of 30-45 feet.

[The Office of Pipeline Safety (OPS) mandates that all pipeline operators with more than 500 miles of pipeline provide data, and coordinates interstate and intra-state underground pipeline infrastructure in the U.S.] Part of the National Pipeline Mapping System (NPMS), many GPS providers have responded with customized end-to-end pipeline mapping solutions for the oil, natural gas and petrochemical industry to better monitor and track structures and operations.

In addition to our wealth of GPS experience, MATCOR contracts with a number of leading vendors for equipment, service and GPS training. Dennis Heath, CEO of Tri-Global Technologies, LLC and a MATCOR vendor, agrees that accuracy is the key to his business.

According to Heath, accuracy and the 'cool' benefit of GPS in our lives was particularly critical in February 2003. After the crash of the Space Shuttle Columbia in February 2003, Heath's team used GPS technology as part of disaster recovery efforts that included a team of 3,500 searchers per day and the cooperation of NASA and 6 other U.S. agencies. The team coverage included mapping a 240 x 10 mile debris field that spanned Eastern Texas and parts of Louisiana. Heath is particularly proud that the same technology employed by MATCOR for pipeline assessments could assist in key recovery efforts such as aiding in the location of the fallen shuttle's nose cone and in locating other pieces of disaster evidence.



MATCOR Field Technician DeRon McDonald uses GPS on a customer pipeline in NJ

Meet Linda Sprague



Approaching her ten-year MATCOR anniversary, Linda has a B.S. in Electrical Engineering from Widener University and recently obtained her NACE certification as a Level III CP Technologist. Prior to joining MATCOR in 1996, Linda worked for a Philadelphia-area company on the design of control panels for a number of manufacturing customers.

Linda's extensive CP project history includes: a key role in protecting the roof of the NASA Vehicle Assembly Building, an ABB Lummus grass roots petrochemical facility in Brazil, numerous plant piping projects in the US and abroad; cathodic protection of Artesian wells in Puerto Rico, Coral World in the Bahamas, and the concrete grandstands at University of Pennsylvania's Franklin Field; pipeline integrity assessment field surveys; condenser water box CP designs and testing for power plants and many other varied applications. Linda enjoys doing work on her computer and spending time with her husband and her son.

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Caribbean Aquarium Features CP Exhibit

"Our park is located right on the edge of the ocean on a peninsula so we are directly exposed to salt air, and every piece of equipment that goes outside needs to be considered for protection from corrosion."

Rather than simply hide the CP system from public view, Coral World officials decided to use it as a tool to teach the approximately 100,000 people who visit the park each year about corrosion control. *"Part of the CP system is visible in the exhibit as wires bound with shrink tubing,"* says Nemeth. *"The decision was made to explain the role of CP rather than to hide it. The CP system is explained on one of six cylindrical graphic panels on the lower level that also display information about the local fish and coral reefs."*

For a CP professional like Boreman, Coral World's efforts are commendable. When asked to rate the quality of the display's content on a 10-point scale, Boreman enthusiastically gave it his highest praise. *"I have to give them a 10,"* he concludes.

For additional information about the attraction, visit the Coral World Web site:

<http://www.coralworldvi.com>

- M.V. Veazey

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