

MPM CATHODIC PROTECTION (CP) RETROFIT

Cost Effective Impressed Current CP Systems

CP Data Evaluation and Design

Brownfield Topside and Subsea Interface

Project Management - Design through Commissioning

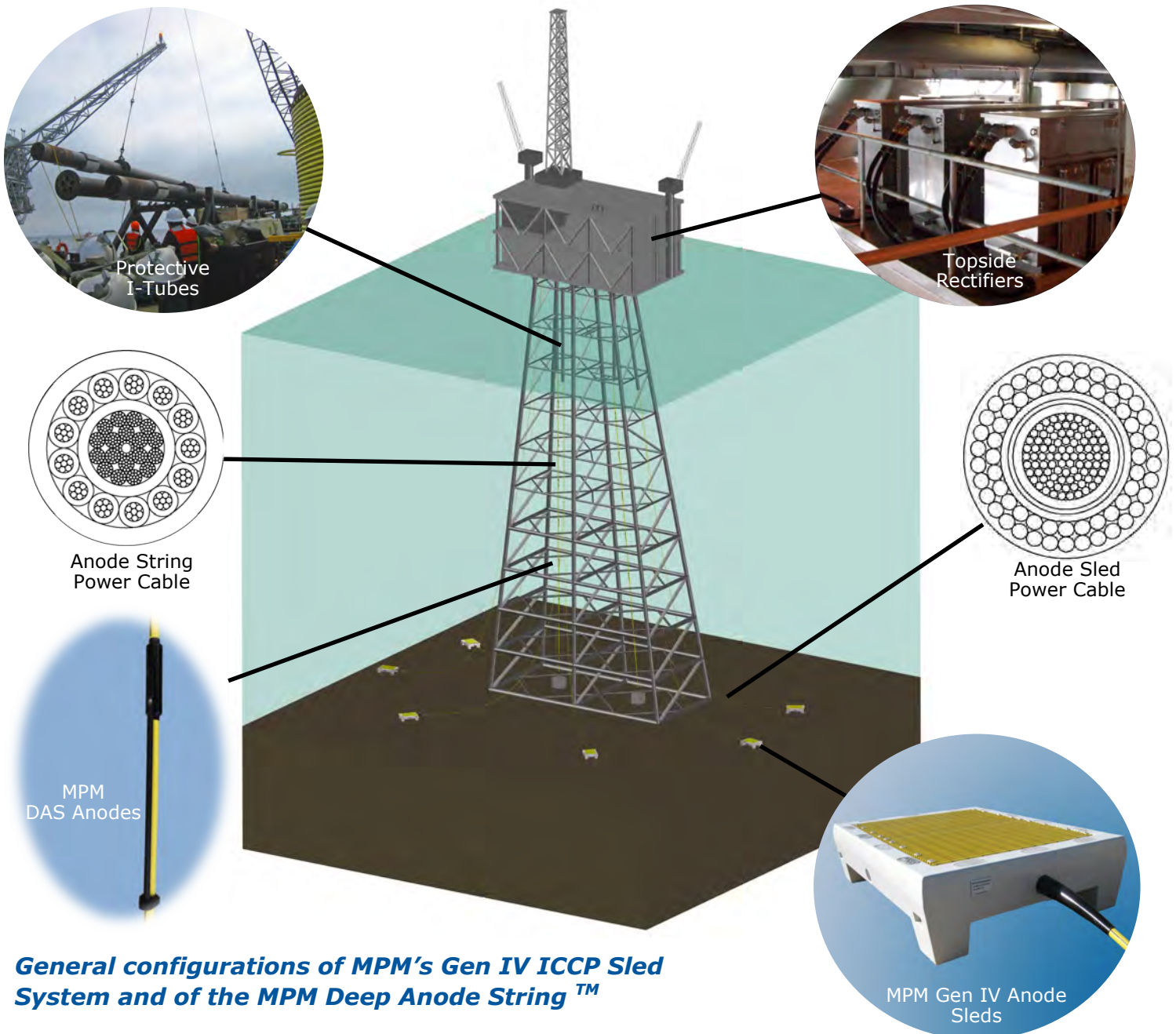
MPM, *THE* ADDED VALUE RETROFIT CONTRACTOR



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Impressed Current Cathodic Protection Systems

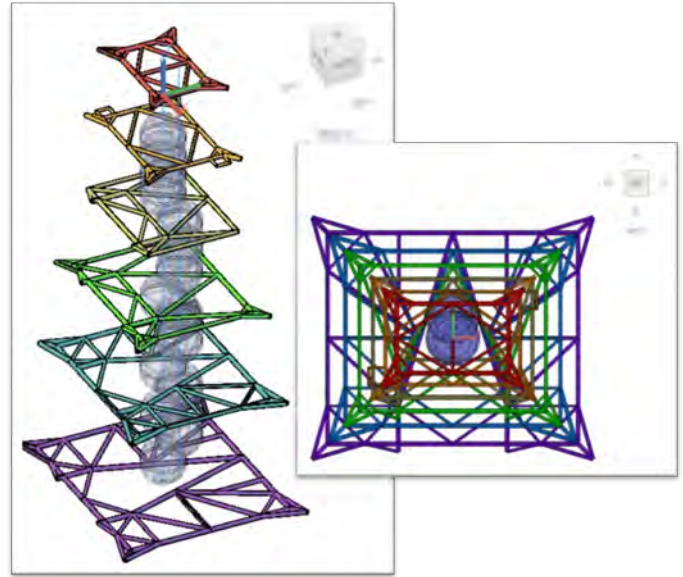
MPM-designed systems (anode strings and sleds) provide cost effective, long-term subsea corrosion protection for standard jacket configurations (shown below), FPSOs, floating TLP's, and pipelines. MPM provides added value with retrofit system design, system manufacture, installation, commissioning, and overall project management. This provides the benefit of having one qualified supplier manage the project from inception through commissioning.



MPM Design / Build Advantages

Marine Project Management, Inc. is first a marine project management and engineering firm, and secondarily a cathodic protection specialist. Advantages in utilizing MPM:

- √ MPM provides a one stop shop for the system design, installation, commissioning, and maintenance of your system.
- √ MPM understands that a CP retrofit is primarily a facility interface and logistics project and that the cathodic protection design, while important, is a minor component of the project. With this understanding we work closely with I&E design, HSE, structural, operations, and topside and marine construction groups to complete the project in a cost effective and safe manner.
- √ MPM's design team generates 3-D models of the structure and appurtenances, defines cable routing and loading and identifies logistics and construction constraints.
- √ Anodes - MPM develops output calculations, structural design, soil analysis, remote distance calculations, anode position scoping, etc.
- √ I-tubes and I-tube Clamps — MPM works through location determination, structural design, installation appurtenance design, CP design, fabrication drawings, etc.
- √ Submarine Power Cable — MPM analyzes loads including electrical, structural, catenary, VIV, etc.
- √ Marine Construction Operations — MPM will subcontract and manage the marine construction work for installation of MPM cathodic protection systems. This provides the owner with one qualified contractor retaining care, custody, and control of the system throughout the project.
- √ System Commissioning — MPM trains owner facility personnel in system operation and maintenance concurrent with the start up and commissioning operations.



MPM Deep Anode String™ design modeling

CP Survey Services

MPM provides complete CP survey services, with the MPM Subsea Inspection Management System (SIMS). SIMS is a proprietary Windows-based software package integrated with specialized hardware which is used for underwater pipeline, outfall, or platform CP surveys. The system is ideally suited for close interval underwater potential surveys configured either as a towed fish, or interfaced with a remotely operated vehicle (ROV). SIMS is particularly well suited to perform interrupted and/or EFG surveys due to the system's high accuracy and sample rate.

The system has successfully surveyed over 5,000 miles (8,000 km) of underwater pipeline in the towed fish configuration, and over of 3,000 miles (4,800 km) of pipeline in the ROV configuration.

www.mpmi.com/services/cathodic-protection-services/



MPM Impressed Current Cathodic Protection System (ICCPS) Sleds

MPM Gen IV anode sleds are specifically designed to be low profile and trawl friendly and incorporates ROV-compatible installation and recovery rigging features. Each sled is constructed of molded fiberglass, housing a mixed metal oxide (MMO) mesh anode. Durable grating is included above and below the anode protecting it from damage during installation, dropped/lost article impact, and ROV contact. The fiberglass components are non-corrosive and chlorine compatible, eliminating risks of deterioration.

The sleds are ballasted utilizing a proprietary concrete mix design that is seawater and chlorine compatible.

The sled has been designed to withstand 2G dynamic loads, allowing offshore dynamic lifts during installation. The sled structure is able to accept the full power cable installation and in-service loads.

MPM's patented* Anode Sled Kit is a low cost, lower output system designed specifically for shallower depths and/or smaller marine structures. The sled "kit" may be assembled at the client's job site, or shipped fully completed. The system is ideally suited for shallow platforms, ports, harbors, or marine terminals, and has a service life of up to 30 years.

Why MPM GEN IV Sleds?

Cost Effective

- ✓ Requires no subsea maintenance.
- ✓ Costs less than half of traditional CP retrofits.

Designed for Durability

- ✓ Anode and connection are protected within the structure, not exposed in the water column.
- ✓ Low-profile design helps protect from trawling, mooring operations, ROVs, or construction.
- ✓ All materials and components are the of highest quality, thoroughly tested, and designed and manufactured specifically by or for MPM.

Proven Electrical Connection

- ✓ No moving parts and nothing to fail due to fatigue.
- ✓ Single electrical connection for each anode has been proof tested to 850-psi/1,900 FSW (581m).
- ✓ No oil filled junction boxes which are prone to leakage.

Proven Reliability

- ✓ Design life up to 40 years.
- ✓ More than 50 sled systems installed and presently in service - some in areas with current velocities up to 6-knots.
- ✓ Previous generations in operation since 1996.
- ✓ Rectifier alarms and continuous monitoring available to identify rectifier failure or unintentional shut down.

Installation

- ✓ MPM Gen IV Sleds are designed specifically for ease of installation.

MPM Anode Sled Specifications

High Output Model (HO) Up to 1000A

Weight: Shipped = 970 lbs (440 kg)
Completed Dry Weight = up to 9,600 lbs (4,354 kg)
Dimensions: 120" x 96" x 29" (305 x 244 x 74 cm)

Standard Model (STD) Up to 800A

Weight: Shipped = 780 lbs (353.8 kg)
Completed Dry Weight = up to 7,900 lbs (3,583 kg)
Dimensions: 96" x 72" x 29" (244 x 183 x 74 cm)

Anode Sled Kit Up to 220A

Weight: (Assuming 140 lb/ft³ concrete):
4,200 lbs (1,905kg)
Shipping Weight: Based on configuration & cable length
Dimensions: 123" x 44" x 19" (312 x 118 x 48 cm)

*Patent information: www.mpmi.com/patents



MPM Deep Anode String™ Cathodic Protection System

MPM Deep Anode String™ (MPM DAS) is the cost effective long term solution for retrofitting cathodic protection systems where the system must be installed inside the structure's perimeter. MPM's design eliminates issues found in other products which affect installation methodology and cost, long term performance, and depth limitations. Internally positioned string anode systems have advantages including:

- ✓ **Reliability/Performance History** – String anode systems have been used to retrofit shallow water structures since the 1970's in a variety of environments. String anode system failures have historically been due to lack of cable protection in the active splash zone (no I-tube), faulty routing design, or improper sting design.
- ✓ **Ground Bed Resistance** – Linear anode configurations utilized in string anode systems reduce mutual anode interference providing a much lower ground bed resistance than configurations utilizing clustered or parallel anodes, or sleds. This allows for the use of much lower voltage rectifiers to achieve the desired D.C. current output.
- ✓ **Current Distribution** – Use of "semi-remote" tension string anodes has been proven to result in excellent long-term current distribution.

Why MPM Deep Anode String™?

MPM's design incorporates decades of experience in cathodic protection system component design which includes advantages as follows:

Cost Effective

- ✓ Requires no subsea maintenance.
- ✓ Costs less than half of traditional CP retrofits.

Proven Design

- ✓ Cable incorporates MPM's proven submarine power cable design which meets or exceeds ICEA requirements for submarine power cable.

Handling

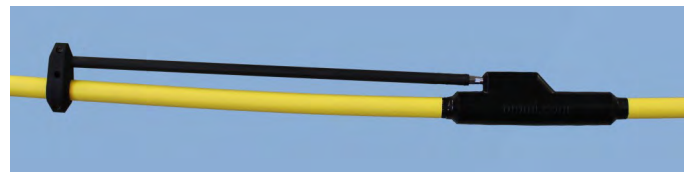
- ✓ The DAS can be spooled on standard cable reels, greatly reducing shipping, handling, and installation costs over conventional string anode systems that must be flaked out and boxed to prevent damage to the fixed anode.

Designed for Durability

- ✓ MPM DAS electrical connections and associated insulation waterproofing have been proof tested to 850-psi/1,900 FSW (581m).

Installation

- ✓ MPM's procedures allow for the economical installation of DAS on shallow water platforms (~200 FSW/60m) without the use of divers or ROVs in some cases.
- ✓ No oil filled junction boxes, which are prone to leakage.
- ✓ MPM has the global depth record for ICCP retrofit of conventional jackets utilizing ICCP Sleds and DAS.



MPM Anode String Specifications

MPM Deep Anode String™ (DAS) Up to 60A per Anode—Up to 13 Anodes per String

Weight: Shipped = 4lbs/ft (6kg/m)

Anode Dimensions: 36" - 48" (91.5-122 cm) Tubular



MPM Safety

MPM has a **100% accident free** safety record, and has extensive experience in successfully planning and implementing projects in the environmentally sensitive waters of Alaska, California, and the Gulf of Mexico.

MPM Safety Statistics

MPM Founded: 1996

Years of Business: In excess of 21 years

Total Hours Worked: Over 1,900,000 hours

Accidents or Incidents: 0

MPM Recognition

MPM has received an audited "A" contractor rating from Chevron, and a "Project Excellence" Award from Plains Exploration and Production (PXP).

Method

MPM places the highest priority on completing all operations safely. To ensure that all operations are completed without accident or incident, we have developed and implemented an active behavioral based health, safety, and environmental (HSE) program.

Quality Policy

As a Project Management and Cathodic Protection Services Company, we are committed to satisfying our clients by providing quality products and services. Our quality objectives are met by continuous employment of internal and external system improvement. Activities are carefully planned, managed, executed and controlled to exceed minimum contractual requirements. We learn from our experiences and from each other. We document these lessons and use them to continuously improve our systems.

ISO 9001:20015

The Marine Project Management, Inc. Quality Management System is registered as compliant with the of International Standard Organization ISO 9001:2015. To meet this standard, we have adopted a process approach to develop, implement, and improve the effectiveness of our Quality Management System to consistently provide services that meet our Mission Statement.



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