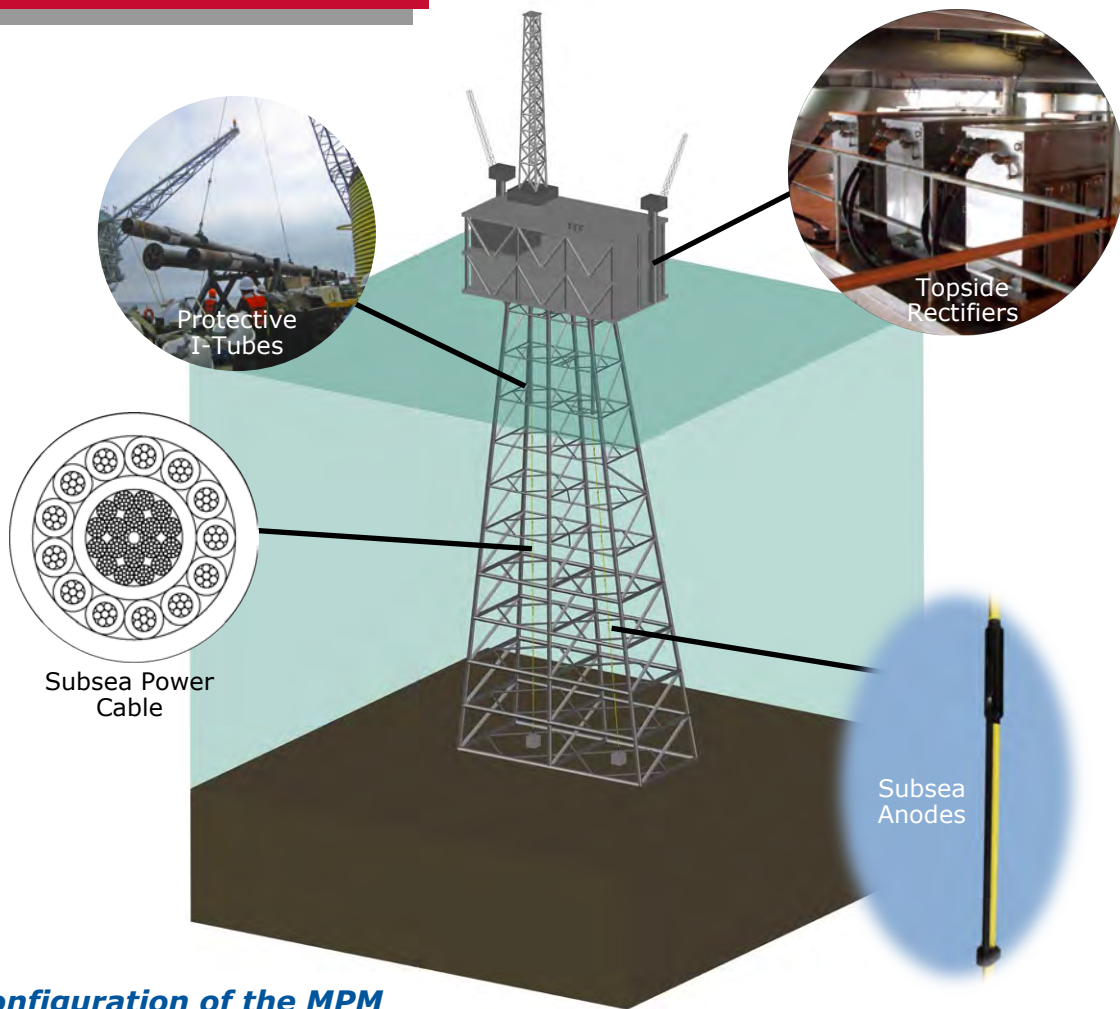


*Extending your offshore facility field life?  
Aging submerged assets?  
We have your corrosion protection answers.*

# OFFSHORE FACILITY CATHODIC PROTECTION RETROFIT

MPM's system provides long-term subsea corrosion protection for standard jacket configurations (shown below), FPSOs, floating drilling and production systems, and associated pipelines.

## MPM Deep Anode String™ (DAS) Cathodic Protection System



**General configuration of the MPM  
Deep Anode String™**





## 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:

#### **Proven Design**

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

#### **Handling**

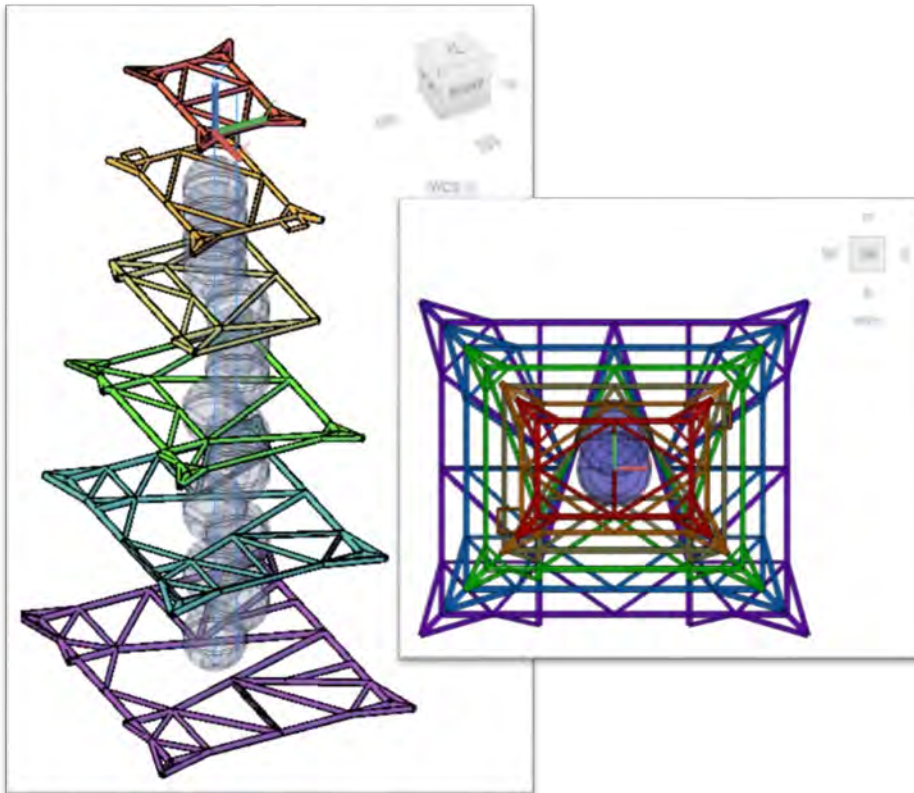
- √ The DAS can be spooled on standard cable reels, which greatly reduces shipping, handling, and installation costs over conventional string anode systems that must be flaked out and boxed to prevent damage to the fixed anode

#### **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 ROV's in some cases
- √ No oil filled junction boxes, which are prone to leakage



## 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 are as follows :

- √ MPM provides a one stop shop for the 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.
- √ MPM's design team generates 3-D models of the structure and appurtenances, defines cable routing and loading, and works closely with the owner's structural, electrical, operations, and HSE teams regarding equipment positioning and loading, electrical routing, and identifies logistics and construction constraints.
- √ MPM understands marine construction and equipment capabilities and constraints, and is typically able to design the installation utilizing locally available resources.
- √ MPM has the global depth record for ICCP retrofit of conventional jackets utilizing ICCP Sleds and DAS.
- √ HSEQ – MPM has been in business since 1996 executing in excess of 1.9-million man-hours of operations without accident, incident, or environmental issue, and is ISO 9001:2008 certified.

## MPM Cathodic Protection Services

### CP Survey Services

MPM provides complete CP survey services, using the MPM Cathodic Protection Survey System (CPSS). CPSS 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). CPSS 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 of underwater pipeline in the towed fish configuration, and over of 3,000 miles of pipeline in the ROV configuration.

[www.mpmi.com/services/cathodic-protection-services/](http://www.mpmi.com/services/cathodic-protection-services/)

### Existing CP System Evaluation

MPM evaluates existing jacket and/or pipeline CP system life using surface area calculations and performing comparative analysis of historical potentials and survey data. If supplemental CP is needed, MPM can evaluate the requirements to extend the existing facility's operational life.

### ICCP System Design

- √ Anodes — Output calculations, structural design, soil analysis, remote distance calculations, anode position scoping, etc.
- √ I-tubes and I-tube Clamps — Location determination, structural design, installation appurtenance design, CP design, fabrication drawings, etc.
- √ Submarine Power Cable — Electrical, structural, catenary, VIV analysis, etc.

- √ I&E Design — Interface with the owner's I&E staff to complete the I&E design utilizing MPM interface components.
- √ Structural Evaluation — Local analysis and interface with the owner's structural support team for global analysis.

### System Installation and Commissioning

- √ Installation Planning/Facility Interface — MPM is ideally suited to plan installation of MPM cathodic protection systems. We are highly proficient in installation operations utilizing diving and ROV equipment, construction support vessels, rigging, and all associated equipment and personnel requirements. Further, we are familiar with drilling and production operations, allowing us to interface with the facility team during development of the execution plan, risk assessments, etc.
- √ System Construction and QA — MPM utilizes its Inspection & Test Procedures (ITP's) for installation aids, rigging, and installed system components.
- √ Topside Construction Operations — MPM can subcontract the topside work directly, or preferably, interface with the owner's topside construction team.
- √ 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 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 20 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 9001:2015

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.



CERTIFICATE NO. 7625

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