



marine growth control

FOR OFFSHORE WIND TURBINE STRUCTURES

Driven by renewable energy (ocean waves and currents), this simple engineering solution has been applied on more than 500 offshore structures worldwide.

Together with the endless and free energy of nature work effectively to maintain protected structures free of all marine fouling.

OFFSHORE ENVIRONMENT IMPACT ON WIND TURBINE STRUCTURES

The offshore environment has extremely variable conditions that must be accounted for when designing offshore wind turbine. One such designing factor is the foundation of the wind turbine. The initial development of offshore wind turbine was typically monopile foundation. As the development of wind turbine generators advances into deeper waters, multi-pods structures (tripods and quad-pods) start to make way into the industry. The design and construction of multi-pod structures must allow these structures to withstand the effects of environmental loading such as wind, wave and currents.

Studies have shown that marine growth significantly increases pile diameter and drag co-efficient and subsequently the overall wave and hydrodynamic loading on the structures. Increments of such loading on the structures will result in degradation of ultimate structural strength and fatigue life. Hence, the need to control marine growth on these structures becomes imperative.

THE MARINE GROWTH CONTROL PHILOSOPHY

IEV's Marine Growth Control philosophy focuses on breaking down the marine colonization process. This is achieved by preventing the formation of microbial slime, or microfouling, which is a pre-requisite for macrofouling growth on offshore structures. By preventing microfouling, later groups of hard-fouling organisms such as barnacles, oysters and tubeworms, together with soft-fouling organisms such as anemones, hydroids and sponges are denied an environment of nutrients in which to breed.

Central to IEV's innovative Marine Growth Control Technology is the continuous rolling action of specially designed apparatus over cleaned surfaces to prevent the settlement of microfouling on submerged structures.

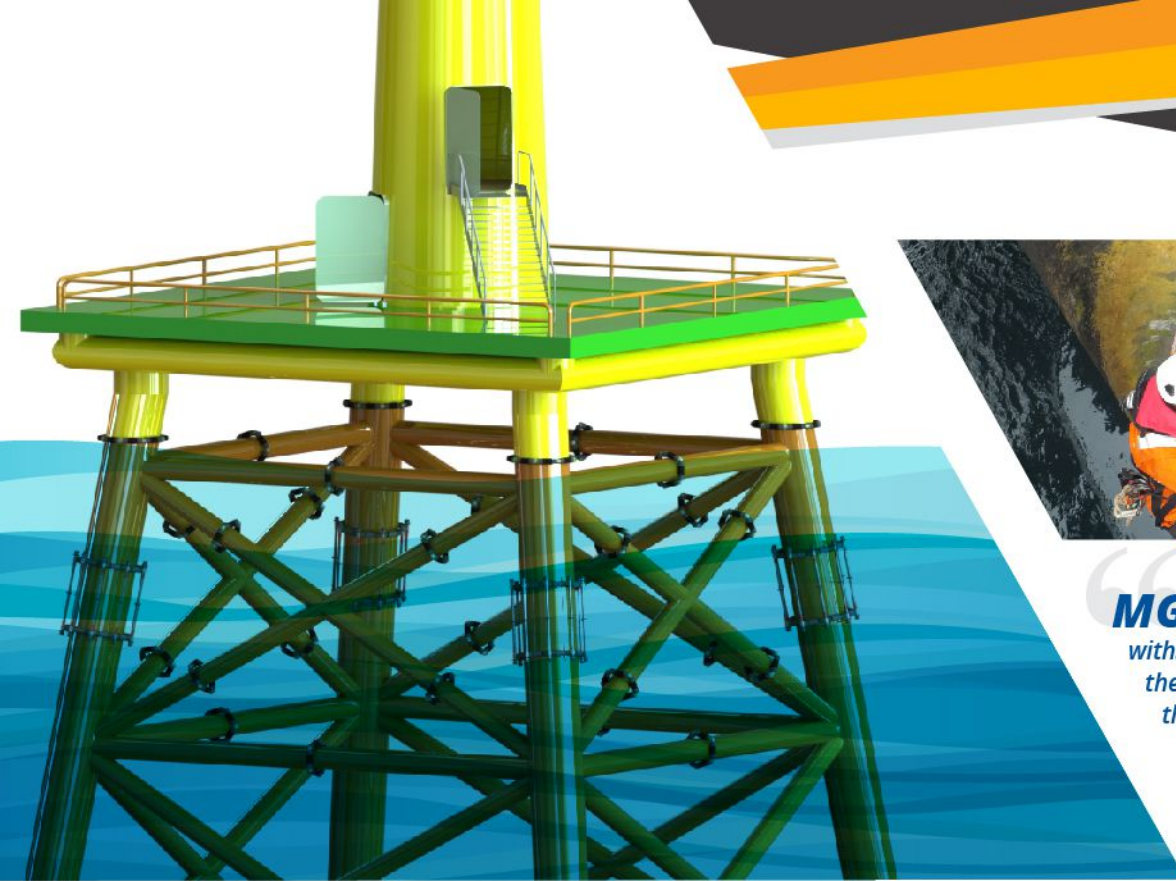
BENEFITS OF THE "OCEAN-POWERED" MARINE GROWTH CONTROL TECHNOLOGY ON:

Existing structures:

- maintains growth thickness within design allowances;
- enhances structural capacity to resist extreme
- prolongs fatigue life; and
- facilitates underwater inspection.

New structures:

- allows reduced design allowances for growth thickness and roughness;
- reduces static, dynamic & hydrodynamic loading and
- prolongs fatigue life; and
- reduces fabrication and installation costs.



MGP-i is specifically designed to withstand the rough environment of the splash zone level of the structures...

A HIGHLY COST-EFFECTIVE STRUCTURAL INTEGRITY MANAGEMENT AND LIFE EXTENSION SOLUTIONS

IEV's patented and typhoon proof MGP-i is specifically designed to withstand the rough environment of the splash zone level of the structures, where the product is subject to constant wave actions and possibly, impact with structural members at sea deck level and/or other structural components under extreme ocean conditions.

The product features composite rubber to remove and prevent marine growth settlement on structures without causing damage to splash zone coatings. The MGP-i is made from modulate components and can accommodate a large range of pile diameters and lengths. The MGP-i can remove existing marine growth and prevent regrowth in a single deployment from above water.

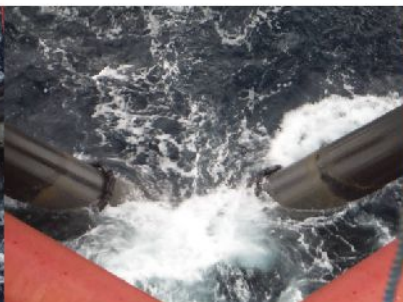
The MGP-i is equipped with self-cleaning rings on all non-contacting parts thus maintaining the products from fouling throughout its service life. The MGP-ii can be deployed on either new structures before load-out or existing structures.

OVER 30 YEARS OF TRACK RECORD

The Marine Growth Control Technology, an innovative creation of IEV, has garnered a track record of over 30 years since its first installation on an offshore oil platform. Today, a range of Marine Growth Preventers are available for new and existing offshore structures, jetties and terminals exposed to wave conditions and susceptible to marine growth.



Marine growth on a typical structure.



MGP-i cleaning in action



Structure free of marine growth



IEV GROUP OF COMPANIES
Menara PKNS, Block A, Level 5, No. 17 Jalan Yong Shook Lin,
46050 Petaling Jaya, Selangor
Tel: +6 (03)7931 9921 Fax: +6 (03) 7931 996
www.iev-group.com



Tianjin Dyne Ocean Engineering Corp., Ltd
Room 702, 26# Building, No.111, Gaoxinqi Street,
Binhai Hi-tech, Binhai District, Tianjin, China (330452)
F6, 16# Building, No. 30, Shixing Street, Shijingshan
District, Beijing China (100041)