Corrosion Resistance in Earthmoving Equipment

Modifications for Marine Environments

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Earthmoving equipment faces harsh conditions within dredging and marine construction environments. Sometimes so extreme that machine modifications are necessary to optimize performance and protect or resist corrosion. While quality paint solutions can offer a minimal level of corrosion protection, the best solution is reached when this is combined with machine modifications as well as rigorous maintenance schedules in order to maximize on-the-job uptime.

When considering corrosion resistance or if you should invest in modified equipment, there are a few key factors to review:

- Identifying key areas of vulnerability
- Identifying solutions to address concerns
- Analyzing the solutions and costs

Corrosion in earthmoving equipment working in dredging and marine environments is a well-established challenge with considerable knowledge that can be deployed in a cost-effective manner, such as:

- Soft Coatings: serve to slow electrochemical corrosion, but must be periodically inspected and reapplied to remain effective. These products can also be used effectively to help with shipping and storage challenges.
- Paints: can improve surface protection in severe environments. Follow manufacturer's recommendations for both surface preparation and paint application. Special consideration should be provided to application at panel edges, where curing/drying can lead to reduced protection.
- Sprays, Coatings, Tapes, Sealants and Vapor Corrosion Inhibitors (VCI): used to prevent corrosion of wiring, connectors, fittings and tubing, which can corrode rapidly in marine environments.

There are also opportunities to prepare machines post-delivery for harsh environments, in a cost effective manner, with basic modifications.

- Breathers: for systems such as fuel tanks, hydraulic tanks, engines and transmission cases
- Engine Air Intake: pre-cleaners used to remove dust and sand are recommended
- Engine Enclosure: used to balance engine noise attenuation and cooling air flow, but also reduce the ability for sand and water to enter the engine compartment
- Hinges: application of a marine lubricant or grease fitting may be necessary
- Green Fluids: biodegradable fluids options to limit risk should a spill occur
- Guarding: used to minimize or eliminate abrasion from sand and salt that wears on cylinder surfaces
- Undercarriage: use of Rotating Bushing Track to reduce the effects of abrasives
- Electrical: use of coatings and tapes to protect specific electrical components

Placing standard, primarily steel equipment into dredging and marine applications will no doubt lead to corrosion and wear. Considering a combination of these corrosion-resistance solutions, machine owners can expect measurable improvements to machine reliability and durability.

In a WEDA Dredging Summit & Expo 2017 technical paper and presentation, Caterpillar outlines the details and efforts of our corrosion-resistance solutions, along with examples of customers who have put them to use.

Access the full presentation at www.westerndredging.org.

For more information about corrosion resistance solutions for the dredging industry, visit cat.com/dredging or contact us at dredging@cat.com.

Standard (left) and ducted (right) engine enclosures.


Taped hose couplings.


Various options for pre-cleaners.

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