OFFSHORE AND PROTECTIVE COATINGS
WE’VE GOT IT COVERED!
Corrosion is a natural reaction where steel under the influence of water and air transforms to rust. The speed of corrosion is enhanced by the presence of salt. Corrosion can also occur when steel comes in contact with corrosive chemicals even when at first sight this is not expected. For instance coal in its basic form is harmless but coal ore may contain sulphur impurities, which in combination with moisture forms sulphuric acid, a strong corrosive chemical. Another type of corrosion that deserves mention is biological corrosion caused by organisms such as the sulphate reducing bacteria (SRB). SRB are widespread over the world and flourish under conditions when oxygen is absent as can be found in for instance buried structures or water ballast tanks. The bacteria use sulphate as their source of oxygen and in turn produce sulphide ions, which are highly corrosive.

Corrosion in open air is dependent on the location and the climate. For instance, a constant high level of relative humidity has more corrosive effect than occasional rainfall in less humid climates. Air pollution, especially sulphur dioxide (“acid rain”) even has greater influence on corrosion. By now it will be clear that protecting steel against corrosion requires a strategy where factors as steel exposure conditions and intended functional use of steel structures have to be considered.
Transocean gets the best out of your maintenance budget

A protective coating system should offer anticorrosive power whether by using active anticorrosive pigments such as zinc, or by using the barrier principle, aiming to prevent penetration of water or water vapour through the coating film.

It also should adhere firm to the substrate but also cohesion between paint layers must be appropriate. Also, the system must be resistant to corrosive agents and to the expected mechanical activities of the environment. Various factors can determine the choice of a system and in order to come to a decision, it must be clear which one has the highest priority. Of course the technical service requirements related with the nature of the project will mainly determine the type of binder suitable. However other project factors can affect the system features as is demonstrated in the table.

The table shows the consequences of a fact inherent to the nature of the project on the features of the protective coating system. For instance, the available time for maintenance can vary from a couple of months when a project is not in service due to general maintenance to the reality that maintenance has to be carried out when the project is in full service. One can imagine that the window of opportunity has its influence on whether or not blast cleaning is possible as a method of surface preparation. Also, specifying a paint system for a lifetime of 5 years instead of 15 years can make a complete difference regarding the type of paint, its dry film thickness and the quality of surface preparation.

Therefore standard paint systems are difficult to give although per industry activity, some key features can be discriminated.

<table>
<thead>
<tr>
<th>SYSTEM FEATURES</th>
<th>Type of binder</th>
<th>Choice of surface preparation method</th>
<th>Paint application method</th>
<th>Tolerance to lower degree of surface preparation</th>
<th>Coating thickness</th>
<th>Thinner, cleaner selection</th>
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</thead>
<tbody>
<tr>
<td>Object service conditions</td>
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<td>x</td>
<td>x</td>
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<td>Climate</td>
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<tr>
<td>Health, Safety &amp; Environment requirements</td>
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<td>Available time</td>
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<td>x</td>
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<td>x</td>
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<tr>
<td>Desired lifetime/budget</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Desired esthetical quality</td>
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</tbody>
</table>

x = Direct consequence of project factor on the various system features
Preparations are chosen, like, for instance alkyd or chlorinated rubber paints. These products allow an easy maintenance and especially the latter also show good protective characteristics against chemical attacks and humidity. The system is generally made of three or even four layers reaching thicknesses that may vary between approximately 150 and 200 microns. With the use of two component products, such as epoxy, higher chemical resistances and the possibility of applying thicker coats can be obtained. In some cases, mixed systems are specified or used that combine the better durability of an epoxy primer and intermediate coat and the easy maintenance of a single pack finish.

This is a field where a protective system can less than ever be generalized. A bridge in mountainous zone will certainly be subject to a much lower environmental corrosion than a similar construction located near chemical industries along the coast. Even the design of the bridge can in many ways, influence the choice of the protective system as well as the maintenance schedule. Typical steel bar, cage-constructed bridges have numerous edges, nuts and bolts to protect while in suspension bridges this is certainly less.

In colder climates the use of salt as antifreeze, increases the corrosive attack tremendously. Considering that the expected life of a bridge is about a century or more we can understand why the reliability of the protective system is given the utmost importance.

**Protection of your facility?**

**Transocean knows!**

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**General Steel constructions**

Usually ISO 12944 is referred to describe the conditions of the object to protect.

For a moderate aggressiveness degree a system with one-component products that do not require intensive
Storage tanks

For fixed roof tanks, the same system can be used for the shell, for the roof and also for the accessories. In general the environment dictates the choice. For floating roof tanks, the roof painting system should foresee the formation of zones where rainwater might collect resulting in a highly corrosive condition. A careful blasting and a painting system as impermeable as possible in the expected working conditions are recommended. Regarding tank interiors, the choice of the type of system depends on the product or products that the tank will contain, as well as the washing methods it will have to bear with each change or for routine cleaning. Blast cleaning to ISO 8501/1- Sa 2,5 or better is usually required. Proper cleaning after blasting is of paramount importance since even the smallest abrasive particle that has not been vacuumed off can cause osmotic blistering or delamination of the coating.

Offshore structures

Offshore structures, especially the splash zone areas face severe corrosive conditions. Maintenance of these structures bring several problems. In some areas of the world, the climate is very unpredictable implicating that in general thorough surface preparation is not possible and painting work can be interrupted unexpectedly. For this reason in general the whole coating process should be done in a limited time period. Surface tolerant epoxy coatings such as Transpoxy Masterbond, applied in one or two coats are therefore typical products of choice in this field.

Extend the service life with Transocean systems.
Freight containers have a rough life; they are exposed to salt-spray and face severe impact during loading and unloading. In addition, customers expect containers to stay looking good but at the same time want to have the maximum return on investment. These facts have lead to products specially developed for the container industry. Transocean for many years have the Transobox range of products established in the market. Products allow easy spraying in any automatic application system and provide good adhesion on various substrates. Various Transobox systems carry approval from Konstandt Laboratories.

Power plants

Although the service requirements of coating systems are dependent on the type of energy generation method, all power stations have in common that they should be reliable and as little out of service as possible. This fact determines the initial choice for highly durable paint systems aiming at a long service lifetime. Maintenance not often has to be carried out when the station is in full service or has to be carried out in the time reserved for general maintenance of the whole operation. Exterior esthetical requirements are of minor importance, although perhaps there is one exemption in case of the water pipes of hydroelectric power stations where Transurethane Finish is widely used.
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