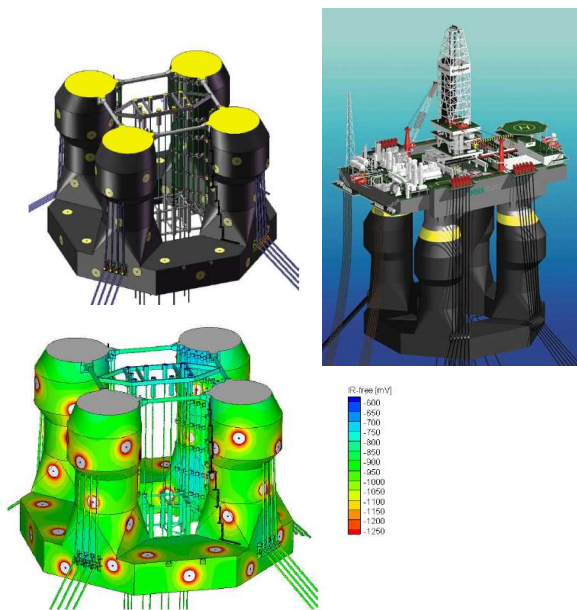


Off-shore Platforms Cathodic Protection Design/Retrofits

Elsyca's unique and comprehensive platform for simulation of the corrosion protection of off-shore vessels and platforms provides for designing/retrofitting effective cathodic protection installations as well as monitoring the corrosion protection over the asset's service life.

With this technology, corrosion protection reliability over the complete structure is assured, resulting in substantial cost reductions over the service life of the asset. The technology mitigates the risk of not meeting the design goals and enables future management of assets to be planned effectively.

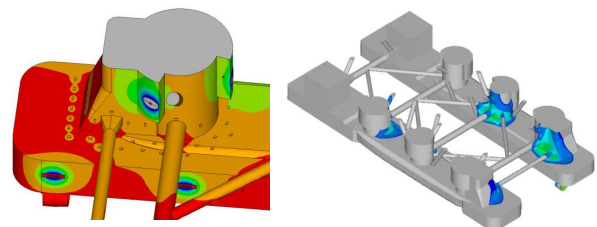
When steel structures are submerged in seawater, local electrical potential differences will result in corrosion of the structure. To avoid this, cathodic protection systems are installed to force the potential of the steel structure towards more negative values, thus making it in effect the cathode of a galvanic cell. This can be achieved by both sacrificial anodes (which deplete over time) or impressed current anodes (with the help of a DC power supply).



The picture above right shows the Octabuoy Classic oil platform (a dry-tree completion unit with production facilities and a complete drilling/workover rig). The top left drawing shows the resulting computer-generated model of the wetted surface of the oil rig, including 88 Ti MMO ICCP anodes and 20 reference electrodes, the design of which was done by Elsyca. It assures full protection, as shown on the bottom drawing after one year of activation (IR-free

potentials more negative than -800mV vs. an Ag/AgCl reference electrode). The dielectric shield to avoid overprotection directly near the impressed current (ICCP) anode location can be modeled/designed such that hydrogen embrittlement will not occur.

The use of Elsyca's technology helps identifying conceptual errors before any actual CP installation, by using accurate, inexpensive, and fast simulations. The technology allows the simulation of both impressed current (ICCP) as well as sacrificial anodes (SACP) and combinations of both. It takes into account all relevant parameters of the platform design, resistivity and flow of the seawater, coating degradation, including even a model for the build-up of calcareous layers. The simulation is done in a time-transient mode to account for the changes in the CP system performance from the start-up date and it can extrapolate to provide insights on the corrosion protection over the service life. The picture below is a case where Elsyca technology accurately predicted the as-is corrosion status of a semi-submersible drilling rig after 10 years of operation, and consequently designed a retrofit CP system.



Elsyca works with you to optimize and monitor through simulation the corrosion protection system of your on- and offshore structures, resulting in lifetime structure integrity as well as optimum protection of your assets and the environment.