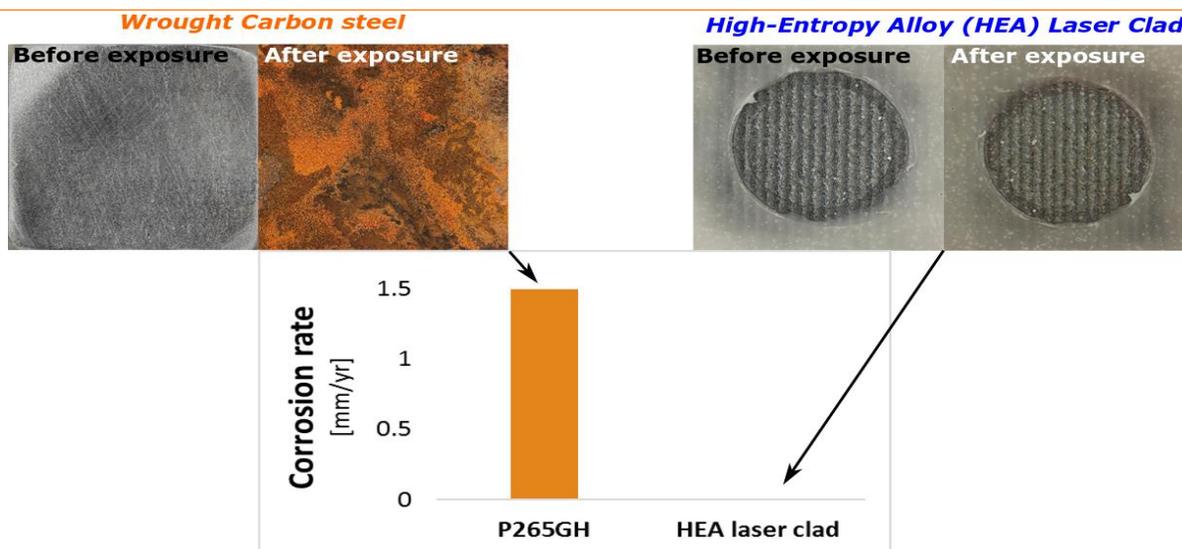


Developing
high
performance
coatings for
geothermal
applications

Initial results and impact

Lab-based tests have been performed in order to down-select, among all the coatings/MMCs developed in the project, two materials per application. Performance analysis included, apart from microstructural characterisation, corrosion resistance, contact angle, erosion wear resistance, sliding wear resistance, erosion-corrosion wear resistance and cost.



Surface photographs and measured corrosion rate for wrought P265GH carbon steel and high entropy alloy laser clad coating showing the good corrosion resistance of the latter system developed in the project.

Down-selected systems included a high-velocity oxygen fuel deposited cermet, two laser clad high entropy alloy coatings, Inconel type 625 and Titanium Grade 5-based MMCs with SiC and TiB₂ reinforcement phases. Electroless plating conditions for Ni-P-PTFE coatings have also been optimised. Tests are currently being performed, on the down-selected systems, in real geothermal environment. Results are expected by the middle of next year.

By: Dr. Francesco Fanicchia, TWI Ltd.(UK)



Developing
high
performance
coatings for
geothermal
applications

In-situ testing in Icelandic geothermal environment

In-situ testing is an important way to assess the performance of the Geo-Coat solutions in real geothermal environment. In situ is a Latin phrase which means "locally, "on site" or "in position" and in material testing refers to testing in actual environment outside the laboratory. The various Geo-Coat solutions will be initially tested in three different environments within Hellisheiði power plant. The first location is within a geothermal wellhead, where the un-altered geothermal fluid will engulf and flow past the material samples.



The second and third tests use specialized equipment to increase and alter the type of corrosion induced on the samples. The second test uses geothermal steam that has been separated within the geothermal plant. The steam is fed into a pressure vessel which holds the samples and oxygen is added into the vessel to increase the corrosive effects and to simulate the axial seal system suction path where corrosion is pervasive in many geothermal plants.



The third test flashes fluid coming straight from a geothermal well onto the samples to induce erosion-corrosion akin to what can be experienced in a number of places within the production line. The in-situ tests are an important part in ranking the performance of the coatings in terms of geothermal erosion and corrosion.

