Corrosion of 3D-printed stainless steel coupons in seawater

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Background

Parts made by 3D printing in stainless steel are being considered for small marine fittings. Printed metal can contain small pores that may make it corrode faster than machined metal of the same grade.

Method

We printed 10 coupons and machined 10 coupons from the same steel grade. Half of the printed coupons were heat-treated after printing. All coupons were kept in natural seawater for 12 weeks and weighed before and after cleaning.

Synthetic example for the course Introduction to agentic AI. Not a real report.

Results

The printed coupons that were not heat-treated lost about twice as much mass as the machined coupons (0.42 against 0.20 mg per square centimetre). Heat treatment reduced the loss of the printed coupons to 0.27 mg per square centimetre.

Conclusions

As printed, the parts corrode faster than machined parts. Heat treatment closes much of the gap, so we recommend it for any printed part meant for seawater.

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