MSE SEMINAR

November 3, 2017
113 McBryde Hall
3:30 – 4:30 PM
Refreshments at 3:00 PM

Ryan Taylor

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"Effect of a Simulated Butterfly Valve on the Erosion-Corrosion Rate of Nickel Aluminum Bronze Alloys in Highly Turbulent Seawater"

ABSTRACT

The corrosion of nickel aluminum bronze alloys in turbulent seawater found in heat exchangers and condensers downstream from butterfly valves has plagued the naval and maritime industries for years. The quantification of the effect that this type of valve produces on the erosion-corrosion rate of nickel aluminum bronze alloy is the aim of this project. The design of orifice plates with specific internal diameters and geometries have been shown to produce the same pressure drops across this type of obstruction as does an actual butterfly valve. By changing the degree at which the valve is open or closed, one can control the flow coefficient of seawater moving through this type of obstruction and thereby control the pressure drop also. Each design of an orifice plate represents a different valve position aimed to create the degree of corrosion produced by this butterfly valve under the same set of hydrodynamic conditions. The corresponding erosion-corrosion rate of nickel aluminum bronze piping downstream from each orifice plate design will be determined using ultrasonic thickness testing on the surface of the sample chamber used in the Virginia Tech High Turbulence Corrosion Loop (VTHTCL).

BIOSKETCH

Ryan Taylor is a Masters student in Dr. Hendricks's Corrosion group. He graduated from Virginia Tech with a bachelors of science in Materials Science and Engineering with a degree concentration in nuclear materials in 2016. In 2015 he began a senior design project guided to look at the materials degradation of 2024 aluminum samples inside of a corrosion loop he and his other team members built. He is also a member of the Materials Engineering Professional Society. His research focuses on the corrosion of nickel aluminum bronze alloys in highly turbulent seawater through simulated butterfly valves.