Testing and Assessment of Stress Corrosion Cracking in Yellow Brass: When an Environment Meets its Material

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Materials properties dictate the performance of that material, but performance is relative to the application. This concept becomes especially important in a discussion of environment. Failure, or being defective, is assessed relative to the expected performance and the requirements of the application. In some sense, a material can't be defective on its own. Processing, storage, installation, maintenance, contamination and atmosphere can make otherwise suitable materials unacceptable. Which of these factors are part of the environment?

In this presentation we will first discuss, broadly, what constitutes *environment*, and how environmental considerations dictate the flow of a forensic investigation. Does unsatisfactory consideration of the environment constitute a defect? How can environmentally assisted failures be presented in the legal space to illustrate causation?

Then, we will present work conducted at S-E-A to interrogate stress corrosion cracking (SCC) in yellow brass. S-E-A has conducted testing of brass products according to both ASTM B858 and ASTM G39, as well as other relevant standards. The results provide an enhanced understanding of the effect of zinc content in yellow brass as it pertains to both SCC and dezincification. Development of the testing processes, as well as a review of the results will be provided. Some of the findings are surprising, while others left us thinking "we really should have seen that coming."