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

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Abstract: 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."

Biography: Dr. Riegner is a Senior Materials Analyst at SEA, Ltd. in Columbus, Ohio. He has nearly 10 years of hands-on experience leading and supporting multi-disciplinary failure analysis investigations across a diverse set of engineering problems. His work primarily supports clients in both the insurance and litigation spaces in cases involving fires, vehicle accidents, consumer products, water losses, corrosion and materials testing. These matters often center around specific interactions between materials and their environments. In this role, Dr. Riegner has both testified at trial and been deposed several times. Dr. Riegner is also a member of the ASTM 2417 Candle Fire Safety Subcommittee and serves on both the FAS International Relations Committee and the FAS Mentorship Program committee. Prior to joining S-E-A, Dr. Riegner earned his Bachelor of Science degree in Materials Engineering from Iowa State University, then completed a Master's of Science and Doctor of Philosophy in Materials Science at The Ohio State University.