



MSEN 681 Seminar Series

4:10 PM, Monday, September 29, 2014 • 104 Jack E. Brown

Effect of Relative Humidity on Time of Wetness and Corrosion

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As new corrosion protection systems and practices have developed, it has become clear that current accelerated test protocols lack the ability to accurately predict their relative performance. Recent evidence suggests that cyclic accelerated corrosion test methods provide a more realistic assessment of corrosion damage observed in the field. However, different cyclic test methods produce different rankings of protective coating systems. In order to better define environmental conditions for new accelerated exposure tests, advanced atmospheric corrosion studies have been undertaken to gain an enhanced understanding of atmospheric corrosion phenomenon.

abstract

It is known that the corrosion rate under atmospheric conditions is a strong function of the relative humidity (RH). In this work, the role of relative humidity on corrosion processes under salt deposits is studied in greater detail. Surface wetness for steel is measured as a function of RH and salt composition. The relationship between corrosion rate and surface wetness is examined for various conditions of RH and salt loading using multi-electrode techniques. The correlation of surface wetness and corrosion rate is presented for cyclic RH conditions to gain improved insight into the role of drying during cyclic exposures. The effect of crevice environments on wetness and corrosion rate is presented as a function of cyclic exposures for steel electrodes. Additionally, the effect of varying RH on galvanic arrays of aluminum and steel electrodes will be discussed with an emphasis on measuring corrosion inhibition by chromate containing coatings. Finally, implications of these results for the development of improved accelerated atmospheric corrosion environments will be discussed.

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