

USING QUANTITATIVE AND QUALITATIVE ANALYSIS TO INFORM MANAGEMENT PROTOCOLS FOR THE PRESERVATION OF ARCHAEOLOGICAL IRONWORK

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Heritage preservation often seeks to fulfil an unrealistic goal of stopping decay, whereas controlling decay rate is a more realistic option. To develop pragmatic management based on limiting decay of heritage material requires predictive strategies. These can only be developed by quantifying the decay rates of heritage materials as functions of their intrinsic and extrinsic factors. This data facilitates prediction of object longevity and incremental loss of heritage value, which provides management with an evidence base for decision making that maximises use of resources and provides cost benefit. This evidence based management approach and the challenge it faces are discussed by relating the corrosion rate of archaeological iron objects to management strategies for its preservation.

A combination of quantitative analytical methods developed a strong evidence base for managing the preservation of archaeological iron. The corrosion rates of over 100 archaeological iron objects were determined as a function of relative humidity by recording the oxygen consumption of individual objects. This data was then qualitatively linked to the physical damage that corrosion produced in objects using criteria anchored assessment and was quantitatively related to object chloride content using digestion. Predictions for loss of heritage value as a function of corrosion could then be made. Prompt Gamma Activation Analysis (PGAA) at the Budapest Neutron Centre was later employed to link chloride distribution within objects to the physical damage produced by corrosion to facilitate refinement of the predictive corrosion model. English Heritage has published sector guidelines for storing archaeological iron using this research.

Keywords: heritage, iron, corrosion, chloride, relative humidity, management

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