

Corrosion-Based Service Life Analysis For Adhered Masonry Cladding Systems in Canada

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Abstract:

A corrosion-based service life algorithm was developed to estimate the service life of zinc galvanized metal lath used in the installation of adhered masonry cladding systems in Canada. Using climate data from 14 different Canadian cities representing a broad spectrum of environments, a service life algorithm capable of predicting both corrosion initiation and corrosion propagation times was used to estimate the service life of commercially available zinc-galvanized metal lath embedded in the mortar of adhered concrete stone cladding. Service life was estimated from an approach based on Fick's law of diffusion and the International Standards Organization (ISO) CORRAG corrosion rate model A. Adjustments were made to the corrosion propagation rate to account for the shape of the lath and temperature fluctuations. The service life of the metal lath was expressed as the sum of the corrosion initiation time and the corrosion propagation time.

The results of the analysis demonstrated that using diamond mesh metal lath protected with the most thick commercially available zinc coating (CSA Z275) provides sufficient corrosion resistance to achieve the desired minimum 50-year service life for adhered masonry cladding systems installed in the Canadian Prairies. However, CSA Z275 zinc coating was found to be insufficient to achieve a 50-year service life for claddings installed on the west coast and in Atlantic Canada even when 18 gauge welded/woven wire mesh metal lath and a thicker cover (76.2 mm, 3 in) were considered. For adhered masonry cladding installations in central Canada, it was necessary to utilize an 18 gauge welded/woven wire mesh metal lath protected with CSA Z275 zinc coating and to maintain a minimum cover of 76.2 mm (3 in) thick over the wire mesh in order to achieve the desired 50-year service life.

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