

CORROSIVE EFFECT OF AIRBORNE POLLUTANTS ON HERITAGE MONUMENTS AND SURFACE PROTECTION BY NANOCOMPOSITE COATING

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Abstract

The main airborne pollutants affecting heritage building materials and art objects are sulphur dioxide (SO₂) and sulphates, nitrogen oxide (NO₂) and nitrates, chlorides, carbon dioxide (CO₂) and ozone (O₃). The increasing negative effect of airborne pollutants on the cultural heritage sites, due to our need of energy and industrial efficiency, in the last century has caused concern for conservators. The effects of particulate matter, especially from diesel vehicle emissions are of increasing significance. In museums containing historical artifacts or other works of art, indoor pollutants may cause significant degradation. These pollutants may either be lower concentrations of pollutants originating outdoors or other substances generated from synthetic materials, paints, varnish and display cases as well as from combustion for heating.

The materials most sensitive to airborne pollutants are calcareous building stones and ferrous metals. Manifestation of damage include loss of mass, changes in porosity, discoloration and embrittlement. This study describes briefly deterioration of two different heritage monuments built by sandstone located at different places. One is the centrally protected Shiva Temple located very close to the Indian Railways track in Deobaloda, district Durg (Chhattisgarh) and the other is the Mahadeo temple, located in Pali, district Korba (Chhattisgarh) near the National Highway 130. Both these monuments are highly affected by air borne pollutants mainly coal dust and emission from diesel engines. The need for further work, in terms of prevention of airborne pollution and how to deal with the consequences is of utmost importance.

Keywords: Airborne pollutants, historical buildings, artifacts, degradation, deterioration.