A WEB-BASED SOFTWARE TOOL FOR PREDICTING THE LEVELS OF AIR POLLUTANTS INSIDE MUSEUM BUILDINGS DEVELOPED BY THE EC IMPACT PROJECT

Declan Kruppa, Nigel Blades and May Cassar, UCL Centre for Sustainable Heritage, University College London, UK

Externally generated air pollutants such as nitrogen dioxide, sulphur dioxide and ozone damage objects in museums. Yet many museums cannot afford to monitor or actively control these gases. This poster describes the development of a web-based software tool that can be used to estimate the levels of these air pollutants inside buildings and give information on the damage they can cause and how they can be controlled..

The work presented is part of the European Commission funded project *Innovative Modelling of Museum Pollutants and Conservation Thresholds* ("IMPACT"). IMPACT is an interdisciplinary research project involving universities (University College London & University of East Anglia); a research institute (Norwegian Institute for Air Research) with expertise in the study of air pollution; a manufacturer of pollution control equipment (EMCEL Filters Ltd); a museum (National Museum of Krakow) and a sub-contractor architecture practice (Architecture Project) specializing in heritage projects.

The software tool is being written as a Java applet that runs via an internet browser on any computer platform. The applet will be part of a website providing information for the user on interpreting results produced by the applet. The software is designed to encourage users to experiment with the input parameters and in order to gauge their relative importance in determining the air pollution levels inside museum buildings.

The indoor air concentrations of the pollutants under consideration are generally lower then outdoors because the gases deposit on interior surfaces and are removed from the air. To calculate the air concentration of a pollutant in a building, the software tool must sum the sources and sinks of the pollutants in a mass balance equation. For a single zone building the calculated indoor concentration is a function of the air exchange rate with the outdoor air, and the deposition velocities of the various indoor surface materials which quantify the rate at which a gas deposits onto a particular material. A version of the web programme which can model the concentration of air pollutants in multi-zone buildings is also under development. The model will calculate the airflow pattern in the building and the pollutant load from the user inputs.