

STUDY TO PROTECT MICHELANGELO'S DAVID FROM HVAC SYSTEM AIR POLLUTANTS

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The paper deals with the preliminary study to protect Michelangelo's David from air pollutants which is performed by the Centre of Research CITERA on behalf of Soprintendenza Speciale per il Polo Museale Fiorentino. The program is divided in four phases:

1. Study of the present state of the museum's air distribution in the room from HVAC system by means of a CFD tool, in order to identify air pollutants patterns around the statue.
2. Identification of measurement most relevant location and characterization of substances around the statue.
3. Fluidodynamic simulation of potential air distribution design hypothesis as a consequence of the optimisation of the air distribution system.
4. Draft design for the new museum's air conditioning system.

This study of the air flow around the monument is undertaken using a finite volumes model. This is implemented on the surface of the statue to reproduce the surrounding environment. In order to accurately carry out the model, the analysis is extended to the surrounding environment, including the gallery.

The paper analyses the preliminary study of integration between the statue's mesh (obtained with reverse engineering techniques) and the numerical code which includes the entire gallery where the monument is located.

This study also characterises the field of pressures and speeds caused by the existing air distribution system in order to identify anomalous conditions of stagnation or of dangerous dispersion of pollutants from the museum's visitors.