

## NUMERICAL INVESTIGATIONS OF THE AIR FLOW PATTERNS AND TEMPERATURE DISTRIBUTION IN A MUSEUM SHOWROOM, KING TUTANKHAMEN'S GALLERY, EGYPTIAN MUSEUM

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### ABSTRACT

The use of numerical simulation methods for the Cultural Heritage is of increasing importance for the analysis, conservation, restoration and appreciation of works of art. This is particularly important when their preservation and planned maintenance is the primary aim [1, 2]. King Tutankhamen's gallery at the Egyptian museum is chosen for our study. The conservation of such artworks requires precise control of the indoor microclimatic conditions. Thus, a suitable HVAC system with reliable control is often necessary for a museum, to maintain acceptable indoor thermal-hygrometric parameters and air velocity and also to minimize the deviations of these parameters from the design values. An investigation of airflow characteristics inside King Tutankhamen's gallery at the Egyptian museum is studied. The effect of visitors within the gallery space is discussed. Lighting is mainly neglected and its effect is shown in a limited procedure. The variability of inlet air velocities and the grills location in the gallery is studied to achieve a better understanding of the closest solution for air distribution within the gallery.

**KEYWORDS:** Air Conditioning, Historical Buildings, Museums, CFD, Simulation