311/C

Investigation of design parameters of traditional Sri Lankan mural paintings

T D N Perera*
Centre for Heritage and Cultural Studies, University of Moratuwa

Design parameters of traditional Sri Lankan mural paintings were investigated to obtain a clear view and in-depth understanding about traditional technology and the production processes of mural paintings. Mural paintings in five traditional sites were selected for the study. Hourly variation of relative humidity and temperature of these image houses and surface moisture level, the rate of moisture evaporation and surface movement in paintings were measured and absorbed amount of water per day was estimated. Simulated samples of traditional mural paintings were produced, these samples were placed in constant environment and above parameters were measured. Surface conductance and mass difference were the actual parameters measured. Movement was observed

under the microscope. Surface movement observed in sites amounted to the order of 10 μm h^{-1}. It was found that the surface movement was due to moisture evaporation caused by thermal energy. Painting samples absorbed water at a rate of 0.8 to 2.0 L per 1.0 m^2 area of a painting per day. Evaporation was at a rate varied from 60 to 70 % of this absorption rate. It was found from obtained results that the paintings in porous support absorbed moisture from support and evaporated through the permeable areas in the paint layer called windows. Paintings on rock support absorbed moisture from air through windows and dispersed in the ground layer. Painting ground needs a minimal amount of water to upkeep its adhesion and cohesion; surface must evaporate moisture at a rate that prevents accumulation of moisture in the ground. A constant amount of moisture should be in the surface layer to prevent its thermal expansion. This amount is decided by the temperature and relative humidity of the chamber. From these observations, following factors were identified as parameters necessary for successful functioning of paintings: Painting ground must have adequate porosity and the paint layer must have the required area of windows to facilitate moisture absorption/evaporation and a prescribed constant amount of moisture to prevent thermal expansion. Design parameters of paintings are related to these three requirements. These design parameters are porosity, hence composition of ground; thickness of ground and relative area of windows in the paint layer. It was understood from the study that traditional artists paid their attention to following factors: production of painting grounds that absorb water rising in the support, provision of an adequate area of windows in the paint layer to absorb/evaporate relevant amount of moisture, prevention of accumulation of water in the ground, avoiding over-drying of ground and reducing surface movement by controlling the amount of moisture in the surface layer.

Acknowledgement: Ford Foundation, USA

*4s7ni@gsl.net Tel: 071-6212365