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**A simulated study on the correlation between stable behavior and the rate of decay in traditional Sri Lankan mural paintings**

Traditional Sri Lankan mural paintings are subject to continuous deterioration. This is a result of complicated decay actions taking place due to the complexity of their heterogeneous stratified structure. Development of a standard general method that can be applied to minimize the rate of decay is necessary to take appropriate steps to preserve them. The essential requirements of the development of such a methodology are the identification of the main processes of decay that have an effect on other decay actions and testing whether the stabilization of behavior of the painting with respect to them brings about a reduction of rate of

decay. The dynamic actions of moisture transmission through the layers of the paintings and the thermal movement were identified as the principal processes. The relationship of their stabilization with the composite rate of decay was examined with simulated samples. The traditional techniques were critically analyzed to determine the production process of samples. Two categories of samples were produced to simulate the processes that occurred in paintings. The first category of samples was produced with a clay based ground and organic paint, the second category with a lime based ground and mineral paint. Stabilization intervention was done by controlling the main factors that determine the behavior of a painting, the moisture gain through support, relative humidity and temperature. The behavior was quantitatively measured by the amount of water gain, amount evaporated through the surface paint layer, surface moisture level and thermal movement. The rate of decay was measured according to the surface defects, color change, microbiological growth and the amount of reduction in the compressive strength. In a completely randomized design, the results obtained were highly significant ( $<0.01$ ). A nonlinear correlation existed between the state of behavior and the rate of decay. A negative correlation existed between the degree of stabilization and the rate of decay ( $r = -0.81$ ). It was possible to determine that the rate of decay of a mural painting could be minimized to a practical minimum by ensuring that its behavior is in equilibrium with the environment.