

Effect of stress concentration on the Weathering Mechanism of Sandstone Pillars of Angkor Wat, Cambodia by means of numerical simulation

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Since Angkor Wat is located in a tropical monsoon climate, the sandstone building materials are strongly affected by weathering related to high temperatures, heavy rainfall and intense solar radiation. Weathering damage can be observed on a number of pillars, however, the outer pillars exhibit little weathering damage compared to the inner pillars, even though the outer pillars are more exposed to the rain and sunlight than the inner pillars. To understand the effect of stress concentration on the weathering sandstone pillars, we carried out the measurement of the degree of weathering damage of pillars, in-situ measurement of humidity and temperature change near the pillar and the numerical simulation for structural analysis. As a result, the weathering damage is not necessarily only due to the wetting-drying cycle. Since relatively large compressive stress is applied to the base of the inner pillar where the weathering damage is large, therefore, the weathering rate could be accelerated by the compressive stress concentration.

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