

A Dynamic Approach for Evaluating the Climate Change Risks on Building Performance

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Abstract : A simple dynamic approach is presented for analyzing thermal and moisture dynamics of buildings, which is of particular relevance to understanding climate change impacts on buildings, including assessment of risks and applications of resilience strategies. With the goal to demonstrate the proposed modeling methodology, to verify the model, and to show that wooden materials provide a mechanism that can facilitate the reduction of moisture risks and be more resilient to global warming, a wooden church equipped with high precision measurement systems was taken as a test building for full-scale time-series measurements. Sensitivity analyses indicate a high degree of accuracy in the model prediction regarding the indoor environment. The model is then applied to a future projection of climate indoors aiming to identify significant environmental factors, the changing temperature and humidity, and effective response to the climate change impacts. The paper suggests that wooden building materials offer an effective and resilient response to anticipated future climate changes.

Keywords : dynamic model, forecast, climate change impact, wooden structure, buildings

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