

ABSTRACT

This research aims to investigate and enhance the wind performance of 3D-printed building construction. While 3D-printed houses are becoming more popular, the versatility of the manufacturing process to bring about wind-efficient designs has not been fully explored. Particularly, few studies have examined the wind pressure distribution acting on curved-shaped wall systems that often characterize 3D-printed manufacturing. This study will conduct a series of wind tunnel experiments to assess the mean and fluctuating pressure field on 1:75-scaled low-rise models. Multiple curved walls and roof shapes will be tested to identify aerodynamically efficient designs. These designs can disrupt strong vortices that produce localized peak wind loads on the building envelope. The research findings are intended to inform practitioners in the building and construction sector and assist in the decision-making process at the early design stages. The work will also advance knowledge in the field of wind engineering by discovering innovative building geometries that can mitigate wind load effects.