

Facilitating fire and smoke simulation using Building Information Modeling

Chengde Wu, Saied Zarrinmehr, Mohammad Rahmani Asl and Mark J. Clayton

Texas A&M University

{chdwu22, szarinmehr, mrahmaniasl, dr.mjclayton}@gmail.com

Abstract. CFAST is a two-zone model which simulates fire growth and smoke transport. Manually modeling a building using CFAST user interface is a time consuming and error-prone process. In addition, the limitations in CFAST structure impede data transfer between CFAST and BIM (Building Information Modeling). In this research, we identified major limitations of CFAST, proposed solutions to the limitations, and developed a system for data interchange between BIM and CFAST. This greatly facilitated fire and smoke simulation. We further developed a visualization module to visualize the simulation results to overcome the problems when using SmokeView, an application developed by NIST (National Institute of Standards and Technology). A pilot test is conducted using this system. The simulation process was done in just a few minutes. This is expected to help architects to design buildings safer from building fires, and help students in learning building safety and fire related building codes.

Keywords: Fire simulation, building information modeling (BIM), CFAST, building fire evacuation