# Fire, Smoke and Evacuation Modeling: The Ideal Theater

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The design and optimization of assembly occupancies are most usually restricted by fire, building, and life safety codes. This can prevent even the greatest designs from ever being created. Benjamin Schlanger, a theater architect, designed the Ideal Theater for optimal viewing of plays and productions in the 1960s. This proposed theater was never created because of its conflict with fire safety codes. Despite this, its true safety may be evaluated using more modern fire protection engineering tools and simulations to find the theater's required safe egress time(RSET), otherwise known as evacuation time, and available safe egress time(ASET), otherwise known as time occupants have to evacuate. To accomplish this, both the smaller 30-foot proscenium Ideal Theater design and the larger 40-foot proscenium design's RSETs were simulated and compared against a code-compliant control theater: the Eleanor Roosevelt High School Gerald L Boarman Auditorium. Their ASETs were measured using fire growth equations. While the use of simulations and calculations only is limiting to the reality of the research, it would be unrealistic to gather hundreds of subjects into an auditorium. The evacuation simulation yielded results indicating that the Ideal Theater is in fact fire safe, even the larger model. This research has strong implications for the future of safety evaluation in fire protection engineering. While fire codes are helpful guidelines, they can not encompass each building's unique design and elements. Specializing an evaluation method like this one could be an innovative approach to green lighting construction on creative, previously unattainable buildings.

**Awards Won:**