

Applied Engineering Models Suggesting Strategies to Reduce Casualties During a School Active Shooter Event

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Abstract

Given the fact that active shooting incidences can have severe consequences to public safety and society confidence while impacting to create significant numbers of casualties and injured individuals, this research project analyzes four possible scenarios for responding to an active shooter in a public school including locked doors, security officer, a small percentage of concealed carry staff and all of the above.

Using historical literature data to populate agent-based model distributions developed in AnyLogic software, our results show that to decrease the number of casualties, the response time must be reduced. The model data shows that the most efficient way to reduce response time is to have armed personnel assigned to the school who can engage the active shooter prior to law enforcement arrival. The effectiveness of this method can be optimized by having both armed resource officers and armed teachers or staff members with concealed weapons with which they can engage the shooter if he enters their rooms.

With 50 simulation runs of the 4 scenarios, casualties and time to engage the shooter were reduced from the locked door scenario with over 23 individuals injured with an average response time of 12 minutes to 9 casualties with an average response time of just over 6 minutes with all mitigation methods.

While controversy and debate will exist over whether non-law enforcement personnel should be able to react to an active shooter situation, our model allows for testing of alternative policies for reducing risk to students in an active shooting event. The models also may be used to suggest additional training requirements of both law enforcement and concealed carry personnel that

would be required. Further research on the benefits and consequences of this topic should be done to determine daily risk impact to achieve a hypothetical events casualty reduction.