Assessing Vertical Attacks Against Tall Buildings

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Destroying high-value iconic targets, such as tall buildings, has been and remains a high priority in terrorist groups' targeting selection process. Violent shooting attacks have also been launched from top floors of tall buildings, often inflicting mass casualties. In other cases, terrorists have attempted to use vehicle borne improvised explosive devices (VBIEDs) bombs to destroy such buildings, as was witnessed in the 1993 World Trade Center bombing. All of these attacks require an understanding of the structural distinction between such tall buildings, the different types of attacks conducted against them, the varying motivations that drive attackers to conduct such attacks, and the 'game changers' caused by such attacks and the counter-measures that have been put in place following these different types of vertical attacks. These are the issues that are discussed in this article.

The Spectrum of Tall Buildings

Tall buildings are distinguished by three types of structures and heights. These are high-rise buildings, skyscrapers and tower buildings. In the first distinction, the threshold for a high-rise building is defined as being higher than 75 feet, or about seven floors. A skyscraper is a tall building of at least 40-50 floors. Most skyscrapers are designed for office, commercial, and/or residential uses. Although a skyscraper is also termed a 'high-rise,' it is generally used for buildings higher than 328 feet (or 100 meters). Thus, a 'high-rise' could be considered a building that is up to 328 feet. In a final distinction are buildings with high towers. The buildings themselves may not be high-rise, but their towers are much narrower than their base building. This was the case with the University of Texas at Austin's Library Tower, and its observation deck (see below), which is 307 feet high (about 30 floors).

Significant Vertical Attack Incidents

As shown in the incident chronology listed below, the first significant vertical attack incident occurred in 1966, with the most recent taking place in October 2017. These incidents took place in the United States.

- August 1, 1966: Charles Whitman, 25, a student at the University of Texas, Austin, ascended to the university library tower's 30th floor observation deck, and used several firearms to fire at the people below, killing 14 and wounded 31 others. The attack's duration was one hour and 36 minutes.
- February 26, 1993: An al-Qaida cell detonated a truck bomb in an underground garage at the World Trade Center's North Tower, in lower Manhattan, New York. The bomb was intended to propel the North Tower into the South Tower, thereby causing both towers to collapse. The bomb failed to detonate as planned, although six people were killed, with over a thousand wounded and injured.

- July 1, 1993: Gian Luigi Feri, 55, entered the offices of the law firm Petit & Martin on the 34th floor of the high-rise office building at 101 California Street, San Francisco, CA, and opened fire. After roaming the 34th floor, he moved down one floor through an internal staircase and continued shooting. Nine people were killed, and six were wounded. The attack continued on several floors before Ferri committed suicide as San Francisco police officers moved in. The attack lasted four minutes.

- April 19, 1995: Timothy McVeigh, as part of a three-man terrorist cell, parked his truck-laden bomb on the side of the Alfred P. Murrah Federal Building in downtown Oklahoma City, Oklahoma, which he detonated. The explosion killed 168 people, and wounded and injured more than 680 others.

- September 11, 2001: In a series of coordinated, simultaneous attacks, al-Qaida terrorists overtook two passenger airliners and flew them directly into the World Trade Center's twin towers. Within an hour and 42 minutes, both 110-floor towers collapsed, with the resulting fires causing the collapse of other neighboring buildings, including the 47-floor 7 World Trade Center tower (see photo, below). The attacks killed 2,996 persons, with more than 6,000 others injured. The attack's duration, including its direct aftermath, was 102 minutes.

- September 24, 2009: Hosam Maher Husein Smadi, 19, was arrested in Dallas, TX, and charged in a federal criminal complaint with plotting to use a weapon of mass destruction. He was arrested near Fountain Place, a 60-floor glass office tower in downtown Dallas, after he had placed an inert/inactive car bomb at the location. The imitation car bomb had been provided to him by undercover FBI agents, who had been surveilling him.

- October 1, 2017: Stephen Paddock, 64, used his room on the 32nd floor of the Mandalay Bay Resort and Casino, in Las Vegas, to fire onto a large crowd of concertgoers at the outdoor Route 91 Harvest music festival, below, killing 58 persons and wounding 546 others. The attack's duration was approximately 10 minutes, with the shooter found dead of a self-inflicted gunshot about an hour later.

Motivations for Vertical Attacks

Terrorists and other violent actors, such as active shooters, select and either directly attack hard targets or use them to launch their attacks for a variety of reasons. The capability to evade and bypass the security of tall buildings and to carry out a mass casualty attack in such heavily populated facilities, solidifies their stature as 'world-class' destroyers. From a tactical perspective, attackers also know that security and police response will be delayed and hindered by the restricted nature of high rise access, especially to higher floors (e.g. stairwells, elevators, etc.) This was the case with Charles Whitman, Timothy McVeigh, al Qaida, and Stephen Paddock, whose attacks against or at such tall buildings gained them world-wide notoriety.

'Game Changers' and New Countermeasures Introduced by Vertical Attacks

Each of the six vertical attacks listed in the incident chronology represented a critical turning point. The 1966 Texas Tower attack was the first time in U.S. history that a shooter had purposefully carried his weapons to an elevated position and positioned them to achieve maximum casualties among defenseless targets below. Stephen Paddock's 2017 shooting, which inflicted mass casualties from a "sniper's nest", much like the Texas Tower incident, may have been patterned on Whitman's modus operandi.

Al Qaida's 1993 attack against the World Trade Towers, which had failed to bring them down using a conventional truck bomb, returned to the scene of their earlier abortive attack in 2001. This time, however, their innovative and adaptive modus operandi represented the first time that airliners had been used as weapons of mass destruction to destroy skyscrapers. The difficulty of evacuating the buildings' office workers led to an overhaul of the way tall buildings are designed to accommodate evacuations, which previously had been designed to handle the evacuation of a single floor at a time.

Following al Qaida's first attempt to destroy the World Trade Towers, as well as McVeigh's truck bombing of the nine-story Murrah Federal Building, to prevent such tall buildings from being attacked by VBIEDs, such as Smadi's attempted plot, exterior defensive measures were increased and enhanced to mitigate the possibility of such attacks. These developments included placing bollards, concrete barriers, and even tiered landscaping, to make approaching such buildings more difficult. To mitigate the impact of a potential chemical, biological, or radiological (CBR) attack, building security departments deploy CCTV cameras to monitor access, for example, to exterior and interior air intakes.

In the case of Gian Luigi Ferri, although his shooting attack did not cause mass casualties, the difficulty and longer timeframe of police response to his attack, which occurred on several top floors, made it a critical turning point in police response to a shooting attack in a high-rise building. Such incidents have led to the implementation of security measures, such as installing security stations in lobbies, requiring employees to carry identification badges that granted them access to their offices and procedures to manage the movement of vendors and visitors. In certain states, such as New York, tall buildings are required to implement emergency action plans (EAPs) and to integrate all tenant employers under the command of the building's EAP Director. Such emergency plans also include guidelines for response protocols in a tall building, such as knowing how to shelter-in-place, follow a partial or full evacuation, and using elevators or stairways, since not all floors might be affected by an incident.

Finally, in the aftermath of the October 2017 shooting rampage in Las Vegas, particularly the shooter's ability to carry a large cache of weapons and ammunition to his hotel room, several hotels began implementing short-term measures such as using handheld wands to scan guests' bags, increasing the presence of security officers, training staff to recognize suspicious

behaviors, and being on the lookout for a guest who might leave a "do not disturb" sign on their door for more than 24 hours.

In conclusion, it is possible to see how adversarial adaptation to previously tested attack methods provided terrorists and active shooters greater chances of circumventing any related security enhancements in order to increase the likelihood of a successful attack against or involving tall buildings. This ongoing evolutionary process is certain to continue into the future, as both attackers and defenders apply lessons learned to their respective goals. It is equally certain that terrorists and active shooters will continue to target tall buildings, given the potentially highly lucrative nature of these facilities in generating often global publicity and notoriety for the attacker. As such, security organizations must evolve equally in order to best be able to combat expected threats, and to anticipate that the enemy will likely make every effort to learn from the past in order to maximize their chances of success in attacking their selected targets.