



Vehicular Terrorism

The Threat Behind the Wheel

EXECUTIVE OVERVIEW

Recent vehicular attacks in France and Germany clearly highlighted the viability of vehicle ramming as a legitimate terrorist tactic and one that should be a focus for law enforcement, especially during special event planning. These attacks vividly demonstrate how challenging it can be to stop a vehicular attack once it has been launched. The attacks also signal a new strategy in Islamic terrorism that uses small cyber-connected cells of radicalized Muslim militants.

The sudden increase of this activity leading up the 2016 Christmas holidays resulted in significant countermeasures by law enforcement and security personnel throughout the United States. In New York City, police dispatched heavily armed counterterrorism officers to stand guard at crowded pop-up Christmas markets in Union Square, Bryant Park and Columbus Circle only an hour after news of the attack in Berlin. Other cities followed with similar tactics.

In Chicago, police parked their vehicles diagonally at the corners of Daley Plaza to block any vehicular access to a Christmas market being held there. In San Francisco, motorcycle and mounted horse units patrolled high-traffic shopping areas. In Los Angeles, law enforcement placed rows of two to three cars or other large equipment in front of large event entrances, which included two massive parades in West Hollywood this year. In Boston, at the scene of the marathon bombing and throughout

other cities in Massachusetts, authorities went on a heightened state of vigilance.

The alert remains high and countermeasures are extended into the 2017 New Year. On Dec. 28, 2016, the Nashir Media Foundation, a pro-Islamic State of Iraq and the Levant (ISIL) group, urged ISIL supporters “to carry out attacks on targets such as markets and hospitals in Europe over the Christmas holiday period and urged Muslims to stay away from Christian celebrations.”

In a message posted online to “Islamist ‘lone wolves’ in Europe,” the Foundation said, “Their celebrations, gatherings, clubs, markets, theaters, cinemas, malls and even their hospitals are all perfect targets for you.” Although not specifically citing vehicular attacks, the message was clear... Attack by all means possible.

However, New Year terror threats came shortly after ISIL promised to bomb Christians and their churches in the United States, Canada, France and the Netherlands, stating, “We will make your New Year mayhem with bombings and trampling attacks.”

Countermeasures by law enforcement for New Year’s Eve in New York City included extra security being added not just in New York City, but New Jersey as well. There were extra security checkpoints across the Times Square area. Over 7,000 police officers patrolled the area, and the NYC sanitation department blocked strategic intersections with 65 large garbage collection and sand

trucks to stop truck-driving attackers like those in Germany and France.

Over 100 patrol cars were also used as blocking vehicles. To limit vehicular traffic, extra public transit service was provided to and from the city until 2 a.m. New Year’s Day. NJ Transit provided extra service to and from New York City from New Year’s Eve until 6 a.m. New Year’s Day, along with extra evening and late night bus routes in and out of Port Authority Bus Terminal.

Similar countermeasures for the New Year’s Day Rose Parade in Pasadena, California followed the increased alert. These included barricades, water-filled barriers at some streets, security checkpoints and clandestine measures designed to stop terrorists from crashing cars into crowded areas.

Continuing and increasing countermeasures are planned between Friday, Jan. 20, and Monday, Jan. 23 to and from Washington, DC, for the Presidential Inauguration. These preparations cover not only the ceremony at the National Capitol, but also the many Inaugural Events within the District of Columbia during the celebration.

A vehicular attack is easy for anyone to launch with little or no planning. Active shooter tactics target crowds who are contained, vehicle ramming tactics are not hampered by this requirement. Crowds of people are ubiquitous in every city in America, regardless of holidays, special events or general workdays, and security personnel and law enforcement must be



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prepared for evolving terrorist tactics that remain unconventional but are simple and easily supported logistically.

BACKGROUND

The internet and social media provide unlimited access to motivation, tactics, techniques and procedures for planning several types of terrorist attacks, including vehicular attacks. Inspire Magazine, the English language publication of Al-Qaida in the Arabian Peninsula (AQAP), is a major media venue for several recent terrorist attacks in Europe and the United States. The magazine, which published its first edition in July of 2010, is believed to have been started by Anwar al-Awiaki, an American citizen based in Yemen, but born in the United States.

The second edition of Inspire, in October 2010, included an article titled *The Ultimate Mowing Machine* about using a vehicle as a weapon to "... mow down the enemies of Allah." It also states, "If you have access to firearms, carry them with you so that you may use them to finish off your work if your vehicle gets grounded during the attack." The article itself may have been based on Anwar al-Awiaki's knowledge of several previous incidents by individuals who did not have ready access to firearms or explosives.

Following in the footsteps of its parent Al-Qaida, ISIL has also proven effective in their use of the internet and social media. ISIL main messages have been to join the battle in Iraq and Syria, or kill westerners in the home country and encouraged "lone wolf" operations.

In September 2016, ISIL began internet publishing of *Rumiyah Magazine*, the online version of ISIL's glossy magazine Dabiq and a mirror of Al-Qaida's Inspire. However, where Inspire provided guidance and motivation, Rumiyah Issue No. 3 builds upon lessons learned from recent attacks and provides more specific tactical details for vehicular attack planning and execution.

Although not always related to terrorism,

the timeline of recent incidents indicates a growing understanding of the viability and ease of a vehicular attack:

- Dec. 19, 2016, Berlin, Germany. 12 people dead and 56 others injured. The truck's original driver, Lukasz Urban, was found shot dead in the passenger seat. The actual perpetrator was killed on Dec. 23, during a shootout with police near Milan in Italy. ISIL claimed responsibility for the attack, saying that the attacker answered its calls to target the citizens of states that are fighting against it. On Dec. 23, 2016, ISIL released a video of the suspect pledging allegiance to the terror group's leader, Abu Bakr al-Baghdadi.
- Nov. 28, 2016, Columbus, Ohio. A Somali refugee named Abdul Razak Ali Artan, driving a car, conducted a vehicular attack and mass stabbing at Ohio State University Watts Hall courtyard, injuring 13 people. He was shot and killed by a first responding OSU police officer. Artan was inspired by terrorist propaganda from ISIL and radical Muslim Cleric, Anwar al-Awlaki. ISIL released a statement claiming responsibility for the attack, though there is no evidence of direct contact between the group and Artan.
- July 14, 2016, Nice, France. 31-year-old Mohamed Lahouaiej Bouhleb was inspired to utilize a large rented truck to conduct one of the most severe active killing attacks in history. Bouhleb drove the truck into crowds of people who were celebrating Bastille Day in Nice, France, killing at least 84 adults and children on the Nice seafont.
- Dec. 22, 2015, Lakeisha Holloway intentionally drove her car repeatedly onto the sidewalk on the Las Vegas strip, killing one person and injuring 37 others.
- Oct. 24, 2015, Stillwater, Oklahoma. Adacia Chambers intentionally crashed her car into a crowd at Oklahoma State's Homecoming parade, killing four and injuring dozens more. Chambers has a history of mental illness.
- Dec. 22, 2014, Nantes, France. Sébastien Sarron ran over ten pedestrians in a white van at the Christmas market, then attempted suicide by stabbing himself. Ten people, including the suspect, suffered non-fatal injuries, and one person was pronounced clinically dead the following day. The attack was apparently inspired by a video circulated by ISIL calling on French Muslims to attack non-Muslims using vehicles.
- Dec. 21, 2014, Dijon, France. A driver shouted 'Allahu Akbar' before ramming his van into pedestrians, injuring 11 people.
- Oct. 20, 2014, Quebec, Canada. An ISIL radicalized man in a car, hit two Canadian soldiers, killing one of them before he was shot dead by police at St-Jean-sur-Richelieu in Quebec.
- May 23, 2014, Isla Vista, California. Elliot Rogers stabbed, shot, and ultimately ran down people with his vehicle in an attack combining firearms, edged weapons and a motor vehicle. Rogers first stabbed three people, then shot four others, and continued his attack by both shooting people while driving and running them down. He killed six and injured many others.
- Sept. 22, 2008, Jerusalem, Israel. Qassem Mughrabi, a Palestinian member of Hamas, drove a BMW saloon car into a group of civilians and off-duty soldiers in a terrorist ramming attack, injuring 19.
- July 2, 2008, Jerusalem, Israel. Hussam Taysir Duwait (aka Hussam Duwiat and Hossam Dawyyat) attacked several cars in a terrorist vehicle ramming using a front-end loader, killing three people and wounding at least thirty before being shot to death.
- Aug. 30, 2006, San Francisco, California. An individual from Afghanistan, named Omeed Aziz Popal, killed one person and injured 18 in a vehicle attack, saying to police that "everyone needs to be killed."
- March 3, 2006, Chapel Hill, North Carolina. A radicalized Iranian-American named Reza Taheri-azar drove a rented silver 2006 Jeep Grand Cherokee through a common courtyard area, to

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intentionally hit people on the campus of the University of North Carolina at Chapel Hill. Taheri-azar claimed that he was avenging the death of Muslims worldwide while attempting to punish the United States government. Nine people were injured during Taheri-azar's attack.

- June 4, 2004, Granby, Colorado. Marvin Heemeyer conducted a "kill-dozer" attack in Colorado, with a bulldozer hardened with steel plates to protect Heemeyer while he destroyed everything in his path.
- March 30, 2002, Lyon, France. A group of masked men rammed two cars through the courtyard gates, then rammed one of the cars into the prayer hall of a synagogue in the neighborhood of Duchere, before setting the vehicles afire, causing severe damage to the synagogue.

VEHICLE ATTACK PLANNING, TACTICS, TECHNIQUES AND PLANNING

In 2010, following the Inspire article, the Federal Bureau of Investigation (FBI) and Department of Homeland Security (DHS) advised that:

Terrorists overseas have suggested conducting vehicle ramming attacks — using modified or unmodified vehicles — against crowds, buildings, and other vehicles. Such attacks could be used to target locations where large numbers of people congregate, including sporting events, entertainment venues, or shopping centers. Vehicle ramming offers terrorists with limited access to explosives or weapons an opportunity to conduct a Homeland attack with minimal prior training or experience.

ISO 28001:2007, Security Management Systems for the Supply Chain alludes to this in a supply chain threat scenario. The threat will intrude and/or take control of an asset (including conveyances) within the supply chain. Application examples include:

- Damage or destroy the supply chain asset
- Damage or destroy an outside target using the supply chain asset or goods

- Cause civil or economic disturbance
- Take hostages or kill people

On Dec. 28, 2016, following the Berlin attack, the National Counterterrorism Center (NCTC) reported a significant shift in terrorist tactics that requires the FBI, DHS and other agencies to locate the mobile and cyber/internet smart "lone wolf" individual attacker, and not necessarily detect a complex plot.

The steady rise in the number of lone actor operations is a trend which coincides with the deepening and broadening of the digital revolution as well as the encouragement of such operations by terrorist groups because intensified [counterterrorism] operations have disrupted their ability to launch larger plots ... Lone actors now have greater capability to create and broadcast material than a decade ago, while violent extremists can contact and interact with potential recruits with greater ease.

Use of a vehicle to run down people is not dissimilar from an active shooter attack in intent and could easily kill or injure as many people as possible until stopped. Therefore, using a motor vehicle would make planning an attack much easier and it would offer a wide variety of target-rich environments. The selection of the weapon is varied, scalable and easily mastered. It is only left to the terrorist's imagination and dedication to accomplish.

The analysis identifies a shift in extremist violence to "small autonomous cells" and "individual terrorism. Increasingly, thanks in part to the digital revolution, they can rely on what Syrian terrorist Abu Musab al-Suri called "individual terrorism" and published in a training guide titled *A Call to Global Islamic Resistance*.

Indicators show that with ISIL losing territory and al-Qaida increasingly decentralized, individuals and small autonomous cells may increasingly take the initiative in both the murderous and messaging dimensions of violent extremism.

ATTACK SCENARIOS

Complicated attacks can be planned with increased time and assets. However, the more complicated the planning is, then the greater the chance of discovery and interdiction. Large vehicles and trucks have always been a concern especially from the standpoint of vehicle bombs. A decade ago, the police departments discussed a terrorism scenario in which a fuel truck would be used in an attack. A typical fuel tanker carries at least 9,000 gallons of gasoline, and they make up 90% of hazardous materials on roads. During a study for Manetta Transportation Institute, these were found to be the deadliest threat among dangerous cargoes. Modern vehicular attacks are more asymmetric and scalable to the individual "lone wolf."

As with traditional violent crime, vehicular attacks can be classified by major profiles of "organized" and "disorganized" that provide indicators of the nature of the individual(s) involved and extent of the support structure.

Organized

- Organized attacks are typically well-planned events
- Conducted by an Operational Cell or Individual more sophisticated in their approach. Members are normally well trained.
- Motivation/radicalization is well developed over time within a mutual support group/ mechanism
- Security is paramount, due to the scope of planning and coordination involved
- Requires communications, logistics and detail coordination
- Study target area, route reconnaissance, timing, possible rehearsal
- Selection of vehicle(s) must be made for reasons that are feasible to avoid suspicion
- Acquisition of vehicle(s) requires proper timing to avoid early discovery and may be stolen or carjacked immediately prior

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to an attack

- Modification of vehicle(s) may be required, depending on the target area and route, and should be accomplished in a manner to avoid early discovery. This may require additional logistical planning for a garage or maintenance facility with equipment
- Additional equipment/weapons, such as body armor and firearms are desired and may be available, but must be acquired in a manner to avoid suspicion
- Legacy material (written or recorded) announcing one's allegiance is produced at a time just prior to attack to avoid early discovery
- Early discovery is possible and will result in sufficient warning and interdiction, even with individual "lone wolf" attacks

Disorganized or Impulse

- Disorganized attacks are typically unplanned events and impulsive in nature
- Conducted by an Individual "lone wolf" who may not have a previous record of arrest or trouble making
- Psychologically or event triggered by impulse driven core beliefs of motivation/ radicalization
- Little or no planning; related to being psychologically or event triggered by impulse
- Hasty acquisition of vehicle (stolen or carjacked), impulse driven
- Known target area, route, timing
- Possible additional equipment/weapons, based on known availability
- Possible legacy material (written or recorded)
- No warning
- Hard to stop, ultimately relies on first responder direct action

AQAP's *Inspire Magazine* enabled by the mass distribution of the internet, and remains an effective groundwork for Islamic propaganda, terrorist planning, recruitment and motivation with a new focus on the "lone wolf" as an asset "to wage

their individual jihad." Based on attacks conducted since the 2010 *Inspire* article, ISIL's *Rumiyah Magazine* Issue No.3 provides more specific tactical guidance for vehicular attacks in a section titled *Just Terror Tactics*. The article provides details for suggested tactics by Jihadist in the United States, who are referred to as "stationed behind enemy lines." Taken together, *Inspire* and *Rumiyah* provide an effective and feasible operational concept for vehicular terrorism.

OBJECTIVE AND TARGET SELECTION

The guidance emphasizes the importance of defining the objective. An attack may be to achieve a large kill count; disrupting the financial stability of a specific nation; or simply be aimed at "terrorizing the enemies of Allah and depriving them of a peaceful sleep."

When deciding on the target, attention will be given to the target's accessibility by the vehicle where the target would be on a road that offers the ability to accelerate to a high speed and allows for inflicting maximum damage on those in the vehicle's path. It is not important to target gatherings restricted to government or military personnel only. Civilian (and low-security) parades and gatherings are considered more devastating to the West, especially the United States.

In general, applicable targets are any outdoor attraction that draws large crowds:

- Large outdoor conventions and celebrations
- Pedestrian-congested streets (High/Main streets)
- Outdoor markets
- Festivals
- Parades
- Political rallies

As indicated by the *Inspire* article encourages use of heavy-duty four-wheel-drive pickup trucks, modified with steel blades welded on front, designed to sever body parts. A photo of a heavy-duty

Ford pickup was included. Larger heavy vehicles or vehicles that have undergone modifications would increase casualties and make it more difficult for law enforcement to stop an attack. *Inspire* advises:

- *Raise the level of the blades as high as the headlights to make the blades strike your targets at the torso level or higher*
- *Pick your location and timing carefully. Go for the most crowded locations. Narrower spots are better because it gives less chance for the people to run away. Avoid locations where other vehicles may intercept you*
- *To achieve maximum carnage, you need to pick up as much speed as you can while still retaining good control of your vehicle to maximize your inertia and can strike as many people as possible in your first run*
- *Keep in mind that as soon as people realize what you are up to, they would scatter and run in every direction looking for cover. They would look for areas where the vehicle cannot reach them. Therefore, it is important to study your path of operation beforehand*
- *The ideal location is a place where there are a maximum number of pedestrians and the least number of vehicles. In fact, if you can get through to "pedestrian only" locations that exist in some downtown (city center) areas, that would be fabulous. There are some places that are closed for vehicles at certain times due to the swarms of people*
- *If you have access to arms, carry them with you so that you may use them to finish your work if your vehicle gets grounded during the attack*
- *After such an attack, we believe it would be very difficult to get away safely and without being recognized. Hence, it should be considered a martyrdom operation.*
- *If Allah guides your heart to such a great operation, please leave behind a note. Tell the world why you did it*

Vehicle Selection

Acquiring a vehicle is a simple task regardless of one's location. One may be purchased, rented, stolen or carjacked en-route to the target area. Depending on the region in

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the United States, the FBI estimates that a vehicle is stolen every 43.7 to 46 seconds with 25 percent of the vehicles being trucks.

However, the type of vehicle and its structural and technical specifications are extremely important factors for ensuring the success of the attack. Observing previous vehicle attacks, smaller vehicles (even light pickup trucks) are considered incapable of a high number of casualties. Similarly, off-road vehicles (SUVs and small four-wheel drive vehicles) lack the necessary attributes required for causing maximum casualties because smaller vehicles lack the weight and wheel span required for crushing many victims. Rather, the type of vehicle most appropriate for such an operation is a large load-bearing truck.

Terrorists view the ideal vehicle to generally be:

- Load-bearing truck
- Large-in-size, keeping in mind its controllability
- Reasonably fast in speed or rate of acceleration (Note: Many European countries pre-restrict larger vehicles to specified speeds)
- Heavy-in-weight, assuring the destruction of whatever it hits
- Double-wheeled, giving victims less of a chance to escape being crushed by the vehicle's tires
- Possessing a slightly raised chassis (the under frame of the vehicle) and bumper, which allow for the mounting of sidewalks and breaching of barriers if needed
- If accessible, with a metal outer frame which are usually found in older cars, as the stronger outer frame allows for more damage to be caused when the vehicle is slammed into crowds, contrary to newer cars that are usually made of plastics and other weaker materials
- In the United States, the largest truck a person without a commercial driver's license can rent is a Class 6 vehicle, which can weigh up to 11,800 kilograms (26,000

pounds). Larger vehicles require greater vetting of the driver and a commercial license. If renting, individuals following Rumiya's guidelines would likely use a Class 6 vehicle or smaller. However, an attacker could simply commandeer a vehicle, as done in Berlin

Some vehicles that ideally satisfy these requirements, however may require moderate operating experience, include:

- Heavy duty pickups, such as a Ford F-350 or Dodge Ram
- Single Unit Trucks, such as U-Haul or Ryder rental trucks
- Certain commonly found special purpose trucks (Tow Trucks, Tractor Rigs, Light Tankers)
- Buses (public, commercial, school) of length like Single Unit Trucks

Vehicles that terrorists generally avoid include:

- Small cars, including larger SUVs
- Slower vehicles that cannot exceed 60 mph (90 kph)
- Load-bearing trucks with load compartments that are not fixed to the cabin, which may cause loss of control and subsequent jack-knifing, especially if driven erratically
- Load-bearing trucks with excessively elongated trailer compartments, which can cause the driver trouble as he seeks to maneuver

PLANNING AND PREPARATION

As possible and based on individual experience, planning will be with a military mindset, possibly based on previous military training. Selection of driver(s) may be based on technical ability, however the determining factor is assessed individual motivation (radicalization.) Preparations will include:

- Assessing the vehicle for roadworthiness
- Filling the vehicle with enough fuel
- Mapping out the route of the attack
- Surveying the route for obstacles, such

as posts, signs, barriers, humps, bus stops, dumpsters, etc. which is important for sidewalk-mounted attacks, keeping in mind that more obstacles might be set up on the day of a targeted event, and doing the surveillance in an inconspicuous manner, especially if one suspects being monitored by an intelligence apparatus

- If accessible, a secondary weapon will be attained

To further casualties, it is imperative that the driver does not exit his vehicle during the attack. Rather, he should continue crushing people until the vehicle cannot proceed further. At this stage, the driver may exit the vehicle and finish his operation using a secondary weapon, such as a gun or a knife. Depending on what is obtained, the kill count can be maximized and the level of terror resulting from the attack can be raised. The driver can also remain in the vehicle targeting pedestrians, the emergency first responders or security forces who arrive until he is martyred.

Rumiya advises that an appropriate way should be determined for announcing one's allegiance to the "Khalifah of the Muslims and the goal of making Allah's word supreme," so that the motive of the attack is acknowledged. An example of such would be simply writing on dozens of sheets of paper "The Islamic State will remain!" or "I am a soldier of the Islamic State!" prior, and launching them from the vehicle's window during the execution of the attack.

VEHICLE DYNAMICS

The driving characteristics and dynamics of appropriate vehicles will vary with type and weight. The center of gravity will be related to the load capacity for each vehicle and will determine the speed and maneuverability. These are vulnerabilities that may be exploited in countering an active vehicular attack.

Generally, trucks and other linear vehicles (buses) have an increased turning radius beyond that of cars and SUVs. The increased radius requires the vehicle to swing wide around corners and obstacles. To do so,



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they must reduce speed to avoid exceeding the center of gravity and overturning or lose driving control. It is at this point that pedestrians may escape the path; interdiction vehicles may move into the path and assault personnel may engage the driver with gunfire.

Heavy Duty Pickup

- Turbodiesel V8 generates immense power and torque
- Stronger frame and suspension enable increased payload and tow ratings
- Aluminum body reduces overall weight and improves efficiency
- Substantially larger frame rails and cross members made of 95% high-strength steel
- 19.3-22.25 ft. long, 6.6-.0 ft. wide
- Top Speed approx. 97 mph (156 kph)
- Wheelbase: 155-166 inches
- Turning Radius: 23.8-29.8 feet

Single Unit Truck

- Gas or Diesel V8 generates immense power and torque
- Strong frame and suspension with 4x2 or 6x2 axle configuration for easier operation and maneuvering
- 22-36 ft. long, 7.8 ft. wide
- Top Speed approx. 97 mph (156 kph)
- Wheelbase: 240-250 inches
- Turning Radius: 36-42 feet

Buses (small public/ commercial or school)

- Gas or Diesel V8 generates immense power and torque
- Strong frame and suspension with a 4x2 or 6x2 axel configuration for easier

operation and maneuverability

- 28-40 ft. long, 7.8-8.5 ft. wide
- Top Speed approx. 97 mph (156 kph)
- Wheelbase: Up to 255-300 inches
- Turning Radius: 36-42 feet
- Although overall bus dimensions may be like a Single Unit Truck, the engineering is significantly different in the vehicle dynamics

even a typical larger school bus outer front wheel, outer front body, and inner rear wheel radii are smaller than the Single Unit Truck radii. Test templates show that the school bus can make a much smaller turn than the Single Unit Truck, even though the school bus may be larger than the Single Unit Truck.

Additionally, the larger school bus outer front wheel and outer front body radii are smaller than the typical public bus radii. The inner rear wheel radius of the school bus is larger than that of the public bus. During the transition portions of the turn, the public bus and larger school bus have very different paths. The public bus spirals slowly into the turn, whereas the larger school bus more quickly attains a circular path. The school bus has a shorter overall length than the public bus and the overall turn is much smaller.

Tractor Truck Rig

- Diesel V8 generates immense power and torque
- Strong frame and suspension with a 6x2 axle configuration for easier operation and maneuverability
- Top Speed approx. 95 mph (152 kph)
- Wheelbase: Approx. 150-258 inches
- Turning Radius: 29-35 feet

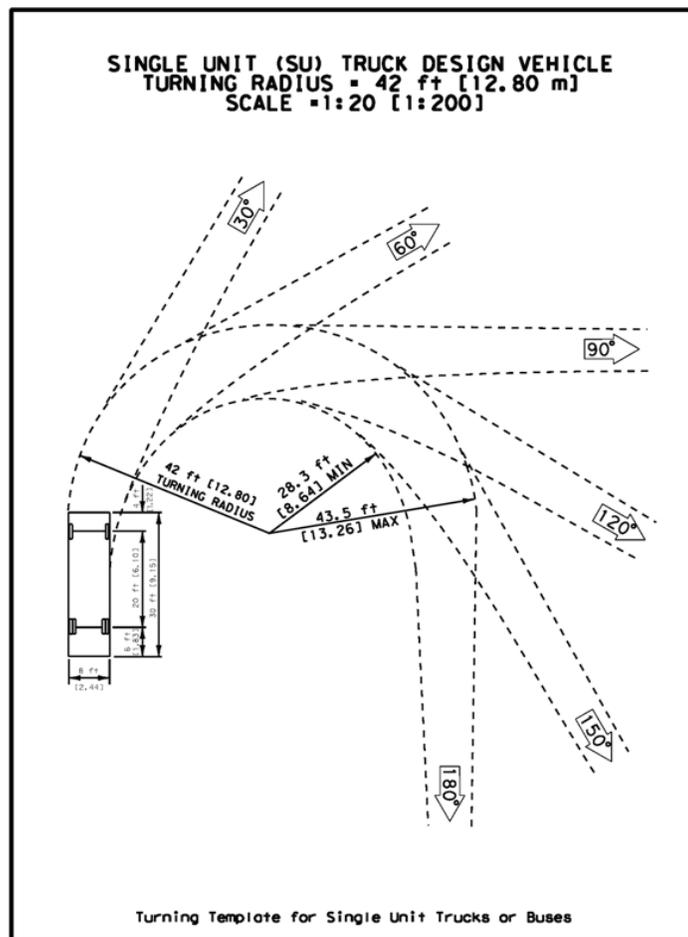
Tow Truck

- Light to medium towing vehicle

- Curb clearance will vary between public and school buses which will affect vehicle dynamics and may impact route selection

It is understandable that a small school bus will have a lesser turning radius. However,

- Diesel V8 generates immense power and torque
- Strong frame and suspension with a 4x2 or 6x2 axle configuration
- Top Speed approx. 97 mph (156 kph)



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- Wheelbase: Approx. 165-200 inches
- Turning Radius: 28.3-43.5 feet
- **Light Tanker (<3500 US gal)**
- Diesel V8 generates immense power and torque
- Strong frame and suspension with a 4x2 or 6x2 axle configuration
- Top Speed approx. 95 mph (152 kph)
- Wheelbase: Approx. 280-350 inches
- Turning Radius: 28.3-43.5 feet

COMMON SECURITY MEASURES

Stopping vehicular attacks, especially by a truck or bus, is not easy. In the wake of the December 2016 attack in Germany, the director of the Institute for Crisis Prevention (IFUS) in Essen, Germany, stated:

“If a radicalized fanatic decides to use a truck as a weapon, you don’t stand a chance, unless you know about him and his plans in advance and arrest him before he can act. It’s impossible to check all vehicles in the EU [European Union] or to seal off all Christmas markets to protect them from any danger. You’d have to close them for that. An attack like this one cannot be prevented with 100 percent certainty.”

Indicators

Although a single indicator may not be suspicious, one or more may indicate a vehicular attack is being planned. A vehicle ramming attack can be conducted with little to no warning. Examples of potential indicators are:

- Unusual modifications to commercial motor vehicles, heavy equipment, passenger cars, and sports utility vehicles (SUVs), such as homemade attempts to reinforce the front of the vehicle with metal plates.
- The purchase, rental, or theft of large or heavy-duty vehicles or equipment, such as SUVs, trucks, or commercial motor vehicles, if accompanied by typical indicators such as nervousness during the purchase, paying in cash, or lack of familiarity with the vehicle’s operations.
- Commercial motor vehicles or heavy equipment being operated erratically, at unusual times, or in unusual locations, particularly in heavy pedestrian areas.
- Attempts to infiltrate closed areas where traffic usually moves, but where crowds are gathered, such as for street festivals or farmers’ markets.
- A vehicle operator’s apparent unfamiliarity with commercial motor vehicle or heavy equipment operation (unable to back up; trouble with shifting; poor lane tracking; unfamiliarity with basic vehicle mechanics such as air brake operations, slack adjusters, fifth wheel operations, Jake brakes, engine type, or location of fire extinguishers and other emergency equipment).

Passive Measures

Vehicles

Large vehicles can be used in ways to create road closures into the parade route/event area. This is a very flexible solution, very fast to deploy, and can be redeployed/moved at very short notice. They can be easily moved to permit authorized vehicular and/or emergency access. Large vehicles such as garbage trucks, sand, and construction vehicles may be used for this purpose. Lawful positioning of heavy equipment, such as large generators, skips, cherry pickers and forklifts at temporary events will offer protection and slow down a momentum vehicle.

Barriers

The crash performance of barriers depends on the type of vehicle, speed, and other variables. Understanding these variables enables agencies to select the most appropriate type of barrier to address specific concerns. There may be several privately held anti-vehicle barrier (AVB) systems available at a cost or possibly donated for short term public service. Use of pedestrian barriers or construction

fencing may act as a slowing mechanism, but cannot be expected to stop a vehicular attack. If this is all that is available, then it should be used.

There are two essential categories of AVB systems: stationary and operable.

- Stationary barriers are equivalent but not identical to “fixed barriers” as defined in FEMA 430 and are attached to the ground or base diaphragms to block vehicle entry. These barriers shall not move or deform unless within allowable magnitude under attack.
- Operable barriers are not anchored and can be moved as necessary for authorized vehicle access. Operable barriers are beam barricades or wedge barriers. Typically, hydraulic or electrical power equipment is needed to reposition an operable barrier, making its entire design and construction (lift points) more complicated than that of stationary barriers.

Operable barriers require considerable time for construction, are expensive and require special maintenance. These characteristics make operable barriers unfeasible for many activities, periodic events and along parade routes; however, they may be used when integrated with movable and stationary barriers and blocking vehicles for those events.

The two most effective operable barriers against vehicular ramming attacks are wedges and bollards.

They may be configured in various heights, lengths and combined in patterns for optimum protection within a specific area. They are most appropriate for traffic control, defense of facilities and protection of fixed areas of constant pedestrian traffic and congregation, such as stadiums, parks and town squares which may be routinely used for large public events.

Jersey barriers

Jersey barriers (K-Rails) are the most

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common AVB for rapid or temporary security and general vehicular traffic control. They were originally developed by the New Jersey State Highway Department to divide highway lanes. A concrete Jersey barrier stands 2.6 to 3.5 feet tall with the original design intent of minimizing damage and reducing the likelihood of vehicles crossing into oncoming lanes in the event of a collision. There have been variations from the original shape including the constant slope barrier, the F-shape barrier, and the California K-rail.

The easy construction, mobility, and efficiency of the Jersey barrier make it applicable for anti-terrorism security. U.S. military forces use them extensively in Iraq to fortify roadblocks and public infrastructure with taller variants. In addition, Jersey barriers are used domestically as perimeter security barriers since the Oklahoma City bombing and the Sept. 11, 2001, terrorist attacks to enforce standoff distances from federal buildings and monuments such as the Washington Monument in Washington, DC, the Willis Tower in Chicago and the Library Tower in downtown Los Angeles.

Advantages of the Jersey barriers are their ability to:

- Stop the impacting vehicle quickly with a large mass of concrete



- Deflect vehicle collisions at angular impact
- Dissipate kinetic energy by the lifting vehicle's front and engaging its undercarriage



- Integrate easily into continuous walls or combine with other types of barriers like steel fencing
- Install in various flexible patterns for temporary or permanent protection purposes

Disadvantages of the Jersey barriers are mainly related to the original design purpose: to deflect the crashing vehicle rather than completely damage or totally stop a vehicle's forward movement. In defense against terrorist attacks, Jersey barriers normally cannot qualify for high ratings (as the DoS K12) if directly impacted by heavy trucks due to:

- Insufficient barrier height
- Relatively weak anchorage to ground
- Sloped front lower portion causes lifting of the truck bed

Shape barriers, such as Jersey barriers (K-Rails) and F-shape barriers are designed to mitigate the energy of crash impacts to the driver, and will not necessarily stop a speeding vehicle. They minimize vehicle damage in cases of incidental contact while still preventing the crossover case of a head-on collision and are designed to redirect, slow, or stop a vehicle from causing a more severe crash. F-shape barriers get their name from the research study that analyzed the performance of barrier design parameters, where barrier configurations were labeled A through F, and F was the best-performing design.

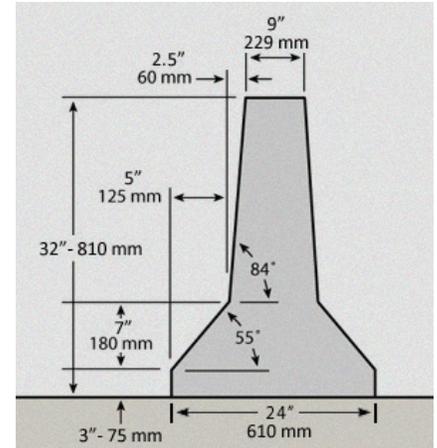
Crashworthy concrete barriers come in a variety of shapes and heights that affect crash performance. The most common are 32-

42 inches. The U.S. military nicknamed the devices "Qaddafi Blocks" after truck bomb attacks in Beirut in 1983 resulted in more widespread use in military installations.

These standard barriers begin with a 3-inch vertical face at the pavement level, then break to a sloped face, changing to a nearly vertical face at the top of the barrier. The overall height is at least 32 inches above the pavement. Jersey barriers are the original and most widely used safety shape concrete barriers.

The only difference between Jersey barriers and F-shape barriers is that the distance from the ground to the slope breakpoint is 13 inches in Jersey barriers, versus 10 inches for F-shape barriers. In high-speed impacts, there is a greater likelihood that a small car will be rolled by a Jersey barrier than by an F-shape barrier. The F-shape barrier was specifically engineered to limit the potential for small cars to rollover upon impact. The F-shape barrier begins with a 3-inch vertical face at the pavement level, then breaks to a sloped face that rises to a height of 10 inches, before changing to a nearly vertical face at the top of the barrier.

Because the Jersey-shape design requires very little modification to become an F-shape design, asphalt resurfacing can convert the Jersey-shape barrier into a more F-shape-like barrier that is safer for lighter cars. However, these increased layers of asphalt also reduce the working height of the barrier which reduces its effectiveness



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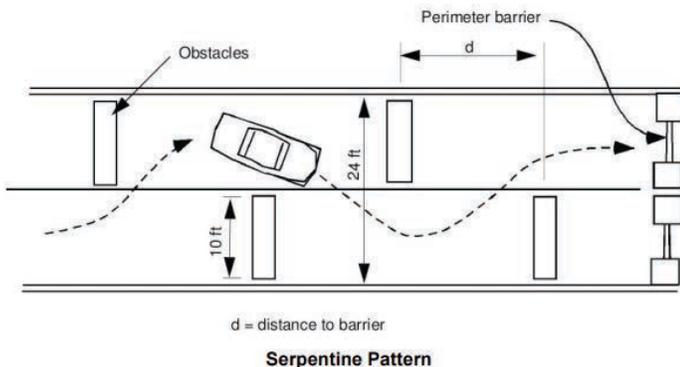
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for heavier vehicles.

Newer versions are impact resistant hollow polyethylene barriers developed for short-term applications where portability is important. These plastic barriers are normally filled with water after placement to provide a moderate level of crash protection. They are not designed to deflect vehicles, so vehicles may penetrate the barriers. These barriers can also be filled with soil, spill, or concrete to produce a heavier barrier with greater crash protection, at the cost of reduced portability.

Staggered placement of multiple Jersey



barriers at close distances in an obstacle wall will force reduced speed and increase non-penetration, however will require a greater footprint than what may be available. When deployed staggered at wide distances or in “zig-zag” they force vehicles into a “serpentine” pattern that force vehicles into 45-90 degree turns and will slow vehicular traffic. A “chicane” of 90-180-degree S-turns will further slow vehicles.

Active Measures

Technical Surveillance

Integrated with any AVB plan should be surveillance of the event area by CCTV and security video from commercial, public and law enforcement sources. Gaps in coverage should be identified well in advance to acquire additional technical assets and plan other mitigating actions. Coordination

between law enforcement, businesses, and private security should be conducted for the monitoring and handling of imagery prior to and during the actual event. Prior event surveillance is important to identify and assess indicators of surveillance, route reconnaissance, and rehearsal by threats. Following a security incident, rapid and proper review and handling of all imagery will be critical to suspect identification and case management.

Direct Action

Vehicular attacks are almost impossible to stop once they are initiated. Security personnel should plan for stopping the attacker. Security forces and law enforcement should review their existing training, tactics, and procedures for a direct-action response to an ongoing attack of this nature. Planning scenarios should include explosive ordinance disposal,

vehicle mounting from the side and above, breaching and assault of a linear target, support fire, and dynamic command and control. The driver must be considered mission-focused and psychologically prepared to die. Facing such an attacker, security forces must be psychologically prepared to immediately engage with deadly force. Additionally, the vehicle may continue to travel into pedestrians after the driver is killed or incapacitated.

Planning should integrate AVB obstacles along vehicle approach routes with sufficient numbers of reinforced barriers and large vehicles. Additional vehicles can be strategically prepositioned to further block routes that will channel an attacking vehicle away from the crowd and into a kill zone where the vehicle and driver can be engaged by law enforcement. Positions should be identified for over-watch of key routes and

general area coverage by law enforcement with trained snipers. Large caliber weapons, such as .50 BMG rifles, should be used for attack vehicle engagement. After an attack vehicle is stopped, security forces should plan for a secondary attack by the driver if he is not dead using firearms, edged weapon or explosives to maximize casualties. Further, a secondary attack could be planned especially if committed by an operational cell.

SECURITY RECOMMENDATIONS

The shape of terrorism has changed since Sept. 11, 2001. Al-Qaida and ISIL have adapted tactics from necessity and have tapped into a virtual unlimited talent pool for recruiting jihadists. Not only can they recruit fighters for the conflict areas of the Middle East and North Africa, but also expand globally to bring the war to formerly denied regions and conduct propaganda operations for psychological warfare. Within the context of global Islamic radicalism, terrorism is now becoming more individual in nature.

The new paradigm is one with few boundaries, where small cells can form wherever resources permit and circumstances allow. Technology permits active militants to become individual terror promoters who provide a motivational path to terror and instructions to others in tradecraft and tactics. Additionally, some militants have been allowed migration into Western societies for politically naïve and humanitarian reasons without means to investigate and assess their backgrounds. The modern terrorist is, therefore, hard to detect, much like the truck terrorists in Nice and Berlin in July and December 2016. He will hide in a closed community, use personal resources, strike in an unexpected way and then may try to disappear into society, but will be radicalized and motivated to the extent that he will be willing, if not desire, to die in martyrdom. This potentially puts every citizen on the frontlines of a war that has come to them.

To protect against this new paradigm the



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following basic security measures are recommended for consideration:

- Conduct background checks and social media checks of all drivers and employees who have access to heavy vehicles
- The public must have a basic understanding of the psychological mindset of a dedicated attacker. Especially with radical Islam, the attacker is prepared for or looks forward to dying
- Reassess the daily work environment based on the geographic location and developing events. See something, say something/report it
- Because a vehicle attack can be conducted at any time, with almost any readily available and public accessible vehicle, businesses and the public at large should maintain situational awareness, especially observing the movement of trucks and busses. Any sudden deviation of schedule or route should be considered suspicious
- Businesses should review emergency and security plans. Many businesses operate vehicle fleets as part of their core business to supply and deliver goods. Given the terrorist attacks in Nice and Berlin, the security of vehicles of all sizes and the safety of the vehicle operators must be considered
- Businesses should coordinate information sharing and local safety/security measures with Public Safety agencies to prepare for events and guard against criminal and suspicious activity
- Businesses should verify the identity of persons driving company vehicles and their documents and use E-verify where appropriate. Additionally, businesses should include situational awareness as a component of company safety orientation with periodic updates to all drivers
- Drivers should park vehicles in secure well-lighted areas; off the street where possible, in an authorized truck park. Vehicles and their loads should be secured when left unattended. The cab should be secured always with valuables and documents out of sight
- Conduct risk assessments and select pre-determined lowest threat routes
- Geo-fence all pre-planned routes to provide alerts at the monitoring center whenever a vehicle varies from its designated route
- Vehicles should be equipped with concealed GPS tracking equipment.
- Vehicles should be equipped with a duress signaling device
- There should be a redundant policy and plan such as GPS, communications, and capability for the monitoring center to communicate with a driver
- The GPS/Security monitoring center should have the capability to remotely activate disabling equipment
- Monitor truck parking areas, empty trucks/trailers to ensure that the vehicles cannot be misappropriated
- Companies using heavy-duty vehicles and/or trucks, including rental companies, should consider applying the following security standards, Transported Asset Protection Association (TAPA) Authorized Economic Operator (AEO) Customers Trade-Partnership Against Terrorism (C-PAT) and ISO 28000 — standards for transportation conveyances to their fleet with this threat in mind
- Provide emergency medical care, if possible

If present during a vehicular attack

- Give immediate warning to surrounding pedestrians and notify law enforcement at first opportunity
- Immediately move out of the line of movement. Run at a right angle away from the vehicle and try to put objects such as buildings, trees, lampposts, fire hydrants and garbage bins between yourself and the attacker
- Do not run with the crowd. Attacking vehicles intend to target large groups
- Seek hardened shelter until “all clear” is announced. Remember that the attacking driver may exit a disabled vehicle and attack on foot with a weapon

For more information:

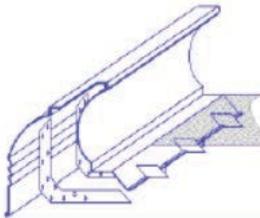
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Barrier System	Description	Use	Height and Length	Construction (Material)
<p>Permanently installed "recessed-mounted" (in ground) ramp-style vehicle barriers with chain reinforcements</p> 	<p>These ramp systems weigh between 2,500 and 12,000 lbs and are installed sub-grade and flush-mounted in the surface of the road. The ramp barrier system is raised or lowered either manually or automatically (based on access being granted) through use of computer-controlled electrical or hydraulic systems.</p>	<p>As a barrier for the perimeter boundary to stop and/or disable unauthorized vehicle penetration</p>	<p>Width: 1 to 24 ft Height: ~3 ft</p>	<p>Steel</p>
<p>Ramp-style vehicle barriers (with chain reinforcements)</p> 	<p>27° lift angle facing the opponent's direction of approach. Temporary or permanently installed; mounted at-grade. These ramp systems weigh between 2,500 to 12,000 lbs. The ramp barrier system is raised or lowered either manually or automatically (based on access being granted) through use of computer-controlled electrical or hydraulic systems.</p>	<p>As a barrier for the perimeter boundary to stop and/or to disable unauthorized vehicle penetration</p>	<p>Width: 1 to 24 ft Height: 3 ft</p>	<p>Steel</p>



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Barrier System	Description	Utilization	Typical Height and Length	Construction (Material)
Planter-styled security barriers 	Concrete "shell" backfilled with soil for added protective weight	Prevents vehicle intrusion; protects walkways, fences, guard booths, important equipment and prevents driving around other barriers; can be used to route or direct vehicle or pedestrian traffic.	Height and weight vary depending on application and vulnerability of the structure.	Steel reinforced concrete "shell"
Steel "impaler-style" barriers 	Designed to roll backward upon impact, impaling the vehicle on the underside, subsequently acting as an extreme friction anchor.	Placed wherever needed, installed slightly below grade, and backfilled in place with concrete; barriers can be interconnected for extended length.	Height: 32 to 42 in. Length: 10 to 12 in.	Steel
Concrete or metal bollards 	Vertically installed metal (preferably steel) "crash tube" with the lower base extending into the ground; in use in numerous military and commercial applications	Inhibits vehicle intrusion, protects walkways, fences, guard booths, important equipment and prevents driving around other barriers; can be used to route or direct vehicle or pedestrian traffic.	Height: 18 to 60 in. or more Diameter: Varies depending on application, typically 8 to 24 in.	Solid steel, or hollow tube filled with reinforced concrete
Permanently installed concrete, cinder/concrete block, or brick wall-type barriers 	A vertically constructed and installed reinforced concrete, cinder/concrete block, or brick wall	Installed around a security zone or high-value asset requiring protection	Height and weight vary depending on application and vulnerability of the structure.	Concrete, cinder/concrete block, or brick

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Barrier System	Description	Use	Height and Length	Construction (Material)
<p>Hydraulically deployable metal bollards</p> 	<p>Subsurface vertically installed metal "crash tube." Once deployed, part of tube is above surface with the lower part extending into the ground; in use in numerous military and commercial applications.</p>	<p>Inhibits vehicle intrusion; protects walkways, fences, guard booths, and important equipment; prevents driving around other barriers; can be used to route or direct vehicle or pedestrian traffic.</p>	<p>Height: 18 to 36 in. or more Diameter: Varies depending on application; typically 12 to 24 in.</p>	<p>Constructed of solid tubular steel, can be filled for added strength.</p>
<p>Traffic controllers ("tire teeth")</p> 	<p>Metal teeth used to cut/shred vehicle tire; metal teeth that are either spring mounted to allow safe one-way travel or retractable to allow two-way travel</p>	<p>Prevention of wrong-way traffic flow (parking applications) and deployable to flatten tires if vehicles cross security access point</p>	<p>Approximately 1 in. wide by 4 in. long teeth are used.</p>	

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