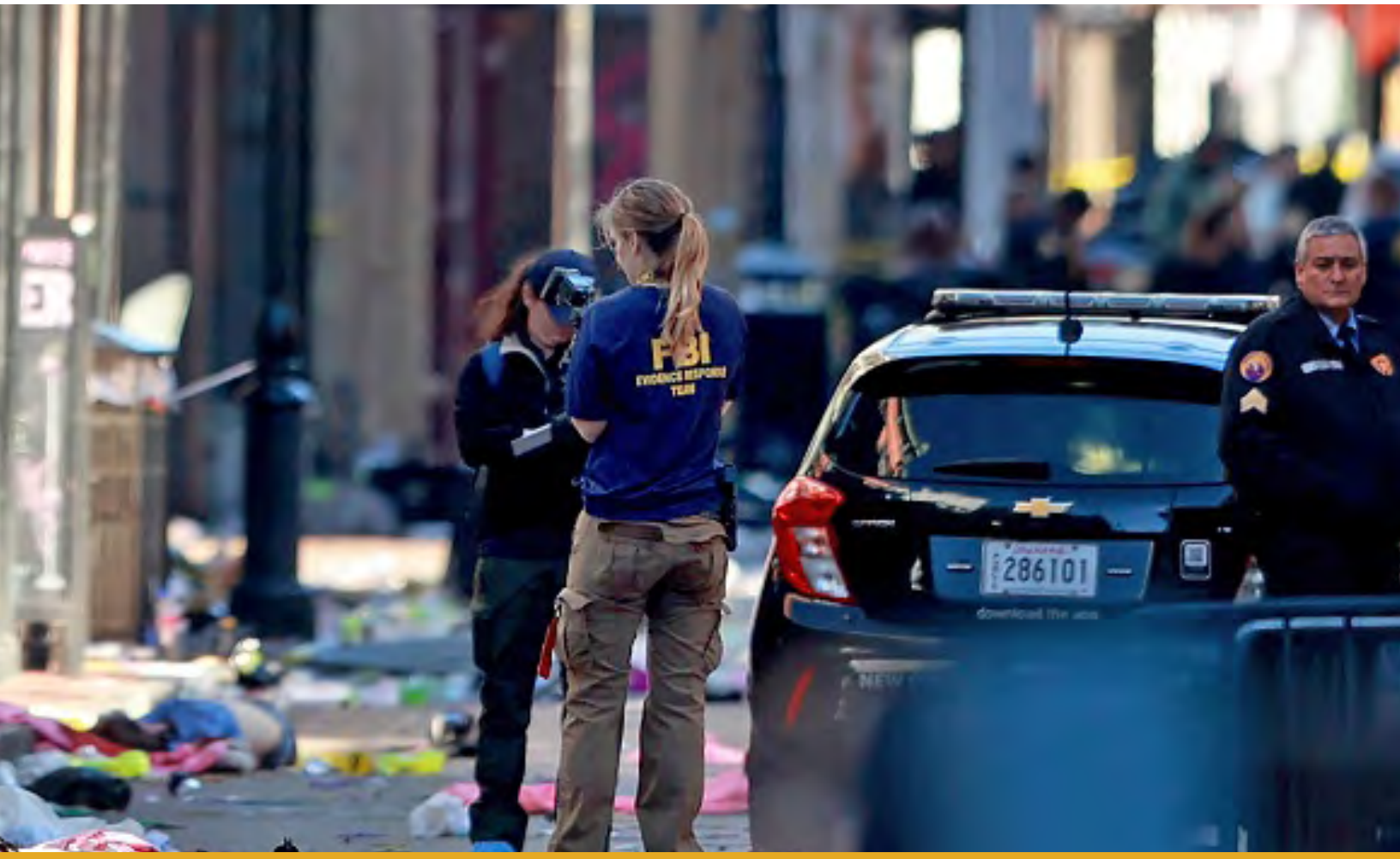
SJSU SAN JOSÉ STATE UNIVERSITY

MTI MINETA TRANSPORTATION INSTITUTE

Update on Vehicle Rammings: Attackers, Frequency, Lethality, and Mitigation Measures

Brian Michael Jenkins
Bruce R. Butterworth



SJSU SAN JOSÉ STATE UNIVERSITY

MTI MINETA TRANSPORTATION INSTITUTE

Update on Vehicle Rammings: Attackers, Frequency, Lethality, and Mitigation Measures

Brian Michael Jenkins and Bruce R. Butterworth

Project 2557
September 2025

The seven-month period beginning November 1, 2024 and ending May 31, 2025, saw a surge in the number of vehicle ramming attacks—27 attacks were recorded worldwide, including four in the United States. This Update on Vehicle Rammings examines the rise of vehicle ramming incidents, identifies common patterns and motivations, and explores strategies for mitigating risk. Findings show that since 2012, the vast majority of these attacks have occurred in the economically more advanced countries (including the U.S. and UK; these countries are referred to as Group 1 countries in the text). During this period, the United States has experienced the most attacks (83), followed by Israel and the Palestinian Territories (68), China (20), United Kingdom (14), and France (12), with these five countries accounting for nearly 75 percent of the total number of attacks in the world. Significantly, the volume of vehicle ramming attacks is gradually increasing over time in Group 1 countries—and specifically in the United States. The number of fatalities related to these attacks is also increasing in the U.S., and the research indicates the attacks occur in clusters. By examining recent trends and case studies, this work supports considerations for transportation planning, street design, and event security in adapting to the growing threat of vehicle rammings.

Note: *The Mineta Transportation Institute's National Transportation Security Center began its work tracking terrorist and violent criminal attacks against public surface transportation worldwide in the 1990s. This proprietary database, which catalogs incidents since January 1970, contained 8,440 attacks as of its final March 2025 update. This project continues the team's previous work with the Departments of Transportation, Homeland Security, and public transportation system operators. The report was completed with support from MTI staff and the Allied Telesis National Transportation Security Center endowment.*

Summary of Key Points

- The nine-month period beginning November 1, 2024 and ending July 31, 2025, saw a surge in the number of vehicle ramming attacks—27 attacks were recorded worldwide.
- Since 2012, the vast majority of these attacks have occurred in the economically more advanced countries referred to as Group 1 countries in the text.
- Since 2012, the United States has experienced the most attacks (85), followed by Israel and the Palestinian Territories (70), China (20), United Kingdom (14), and France (12).
- These five countries account for roughly 75 percent of the total number of attacks in the world.
- China has suffered the most fatalities (163), followed by France (88), the United States (56), and Germany (32); with 27 fatalities each, Canada and Israel and the Palestinian Territories tie for fifth place.
- The volume of vehicle ramming attacks is gradually increasing over time in Group 1 countries and specifically in the United States.

- The number of fatalities is also increasing slightly in Group 1 countries. However, it would be declining if the distorting effects of the 2016 attacks in France (Nice) and Germany (Berlin Christmas Market)—which together killed 98—were included in the trend line.

- Nevertheless, another catastrophic attack such as that which occurred in Nice, France in 2016 could still take place.

- The number of fatalities is gradually increasing in the United States.

- Non-ideological or terrorist-motivated vehicle ramming attacks appear to be increasing in Group 1 countries and in the United States. Ideological or terrorist-motivated attacks appear to be steady in Group 1 countries but are increasing in the United States.

- The occurrence of the attacks shows a contagion effect—they occur in clusters. However, the number of attacks are not replicating the dramatic increase in airline hijackings seen during the late 1960s and early 1970s. That may be due to the greater risk of death or capture and prosecution in vehicle ramming attacks compared to airline hijackings in the late 1960s.

- Including only the Group 1 countries, the greatest number of deaths is achieved by attacks in pedestrianized streets, followed closely by attacks in public gatherings—parades, street markets, rallies.

Introduction

On May 26, 2025, a man driving a Ford minivan plowed through a crowd of people celebrating Liverpool Football Club winning England's Premier League. Streets around the planned celebration had been blocked and armed police were deployed to protect the participants, but it is thought that the vehicle followed an ambulance entering the restricted area. A video of the incident shows the halted vehicle surrounded by an angry crowd. It then backs up and accelerates forward. More than 50 people were injured, almost half of them requiring hospital attention.

The scene in the video recalls some of the encounters between vehicles and crowds during the 2020 Black Lives Matter protests. While many of those cases were clearly malevolent and apparently aimed at intimidating protesters—only a few were later identified as premeditated homicide. Other incidents, however, involved drivers who inadvertently found themselves in the middle of a crowd of angry protestors who in turn were reacting to reports of malicious rammings on social media and cell phones—leading to panic and attempts to escape the wrath of the crowd.

Police in Liverpool have charged the driver with seven offences, including "dangerous driving and causing grievous bodily harm with intent." Authorities were quick to describe the driver as a "53-year-old white British man" in order to avoid a repeat of the widespread disturbances and violent attacks following a 2024 fatal stabbing attack on a children's dance class and the erroneous (or deliberate) misidentification of the assailant as an Afghan asylum seeker. Soon after the Liverpool incident, authorities added that the driver was a former Royal Marine with three children and that terrorism was not a motive. This did not prevent online agitators from asserting without evidence that the man arrested was not the actual driver and that this was a government coverup. Although

the criminal charges brought against the driver could result in life imprisonment, others on the internet denounced them as evidence of what they saw as preferential treatment for a white man.

Motives

While ruling out terrorism, authorities have yet to indicate a motive for the Liverpool attack. Discerning motivation in vehicle ramming attacks is often difficult. Ideologically motivated attacks often involve claims by the perpetrator himself that he carried out the attack on behalf of a particular group or cause. However, in North America and Europe, where the bulk of the attacks have occurred, these individuals are self-radicalized and recruited volunteers, with little or no known direct contact beyond internet websites with the organizations they claim to represent. Not infrequently, they are troubled individuals with personal problems including, in many cases, a history of mental health problems.

For example, in 2018 a Somali man attempted to run down two Jewish worshippers who had just left a synagogue in Los Angeles, California. He shouted anti-Semitic slurs at them, then made a sharp U-turn to drive toward them at high speed. The two men protected themselves by taking cover behind a light pole. The driver then crashed into another car while attempting to escape. Police who arrested him at the scene found a large hunting knife, which had apparently slid between the passenger seat and the door when he made the U-turn, a copy of a Koran, and a cell phone with a record of Google searches about celebrations of 9/11. A search of his home in Seattle, Washington found anti-Semitic literature. However, the driver also had a history of serious mental health problems. He was charged with two counts of assault with a deadly weapon as a hate crime. The judge in a non-jury trial found him guilty, but also ruled that he was insane at the time of attack and sent him to a state mental health facility. Our previous research found that mental instability was a common category of motivation.

A Recent Surge

In the nine months from November 1, 2024 to July 31, 2025, 27 vehicle ramming attacks and one ramming plot were reported worldwide. These resulted in 76 fatalities—about twice the number of fatalities per average commercial airliner crash in 2024. Slightly more than half of these fatalities occurred in one attack in Guangdong, China when a man, upset over the financial settlement of a recent divorce, drove his car into a group of people exercising at a sports stadium. The second deadliest attack occurred in New Orleans. Eight of these most recent attacks were ideologically motivated; mental health issues were reported in eight cases.

On January 1, 2025, an American-born army veteran who claimed allegiance to ISIS drove his rented truck into a group celebrating New Years on Bourbon Street in New Orleans, causing 14 fatalities and 57 injuries. It was the deadliest vehicle ramming attack in the United States. In most cases, there is little evidence of direct communications between homegrown jihadists and the group they claim to represent. They were inspired, not directed.

The New Orleans attack had been preceded by a vehicle ramming attack in Magdeburg, Germany that took place around noon on December 20, 2024. The motive remains clouded. The perpetrator, himself from Saudi Arabia, repeatedly had stated his opposition to Germany's acceptance of immigrants. The attack killed six and wounded close to 300 others. The New Orleans tragedy was

followed by several more deliberate rammings with tragic outcomes. On February 13, 2025, a young Afghan asylum seeker drove a car into crowd in Munich, Germany, injuring 37 people, two of whom later died. On March 3, 2025, a German man drove his car into a crowd in Mannheim, Germany, killing two and injuring 14 others. He then shot himself, although he survived. The driver in Mannheim had a history of mental illness, but police are also investigating possible ties to a neo-Nazi group. The sequence of attacks in Magdeburg, Munich, and Mannheim, Germany, exemplify the clusters often seen in this tactic, but these clusters extend across national borders.

On April 26, 2025, an individual with a history of mental illness rammed a street celebration honoring a legendary Filipino hero in Vancouver, British Colombia, killing 11 and injuring 32. Shortly after, on May 1, 2025, a driver in Osaka, Japan—distraught about his life—deliberately plowed his vehicle into a group of elementary school children, swerving his vehicle to run over as many as possible, injuring seven. Mental disturbance (a description based upon reporting, not our diagnosis) accounts for most of the attacks and most of the fatalities.

Finally, at around 2 am on Saturday, July 19, 2025, according to eye witnesses, a 29-year-old man (who was later found to have a criminal record and a troubled past), drove his Nissan Versa into a crowd outside a Hollywood nightclub in Los Angeles, California, He reportedly had been removed from another entertainment establishment and apparently was angry. Ramming his car at considerable speed, he injured at least 37 people, many of whom were standing near a food truck. Eight of the injuries were serious, and some observers suggested it was only “a miracle” no one was killed. He was later charged with 74 counts, including 34 counts of attempted murder.

During this same time, there were other, lesser known attacks, with few if any fatalities and injuries, of which six took place in Israel and the Palestinian Territories, others in Malaysia, Argentina, Nepal, Serbia and Morocco, and China, and four more lesser known ones in the U.S. (Idaho, Indiana, Utah, New Jersey and Pennsylvania—in the last attack, construction equipment was used). Only one of these attacks was carried out by an individual with a possible terrorist or ideological motive. The exception involved a deliberate vehicle attack on an anti-Tesla protester in Idaho. Many rammings do not generate a great deal of press coverage.

These attacks have understandably raised public and official concerns about vehicle rammings. This summary is designed to assemble information on the latest cases and explore trends in this phenomenon.

Clusters Versus a Trend

A vehicle is the weapon most available to most people in “developed” countries, especially when there are strict controls on firearms. Used maliciously, especially when it is large and moving at speed, a vehicle can kill and injure many. On July 16, 2016, at a Bastille Day celebration in Nice, France, a large truck moving at about 55 mph killed 86 and wounded at least 450. Then, on December 16 of the same year, the large truck captured in the image below rammed the Berlin Christmas market at about 40 mph, killing 12 and wounding over 50. But if vehicle rammings are easy to do and offer terrorist perpetrators lucrative targets as they did in Nice, France and Berlin, Germany, with a potential of achieving high body counts, why aren’t there more such attacks?

Figure 1. The Truck Used in the December 19, 2016 Berlin Christmas Market Attack

Source: "Terror attack on Christmas market in berlin," Picture Alliance via Getty Images.

Research shows that there appears to be a contagion effect. One incident inspires another. Vehicle ramming attacks occur in clusters, but thus far, they do not constitute a dramatic rise or a sustained trend, although that may come. Airline hijackings dramatically proliferated in the late 1960s and early 1970s. We were able to identify 28 airline hijackings worldwide in 1968, 84 in 1969, 77 in 1970, 56 in in 1971, and 58 in 1972, a total of 303 hijackings around the world, with 123 of them in the United States. Why are vehicle rammings attacks not replicating this trend?

While by no means as easy to access as motor vehicles because of controls focused on passenger safety (not security), commercial airliners were more easily accessible in the late 1960s before increasingly strict *security* measures were imposed. One could simply buy a ticket and board a plane with no scrutiny—100 percent passenger screening was introduced in the U.S. in January,1973. Many other countries adopted the procedure later.

Our own database of crimes aboard airliners enabled us to calculate hijacker fatalities in the 303 hijackings during this five-year period. Twenty (or 6.6 percent) of the hijackings resulted in 30 hijacker fatalities. From a hijacker's perspective, the risk of being killed during this period was approximately 10 percent.

However, circumstances changed during the five-year period. Faced with an intolerable situation—in 1969, hijackings were occurring on average every five or six days—airlines implemented countermeasures. Undercover armed marshals flew on some flights. Cockpit and cabin crew were instructed to comply with the hijackers' demands in order to get the plane and its passengers safely on the ground.

The 1972 Hijacking of Flight 49

When on the ground, jurisdiction over a hijacked airliner in the U.S. transferred from the Federal Bureau of Investigation to the Federal Aviation Administration when aircraft doors were closed on the ground, as well as when the aircraft is in the air. Safety of the passengers remained paramount, but how to approach that could be interpreted in different ways. The pivot came with the hijacking on November 10, 1972 of Southern Airways Flight 49 by three fugitive criminals who demanded $10 million ransom and asylum in Cuba. While negotiations continued, the hijackers armed with hand guns and hand grenades ordered the plane flown to various airports in the U.S. and Canada.

While flying over Tennessee, the hijackers threatened to crash the plane into a nuclear facility in Oak Ridge—the embryo of an idea that would culminate in the 9/11 attacks. After several more stops for refueling and to pick up the ransom, the hijackers flew to Havana, and departed for the U.S. landing in Florida where the hijackers demanded to speak to President Nixon. In an attempt to prevent the plane from taking off again, the FBI shot out two of the four tires. The hijackers threatened to execute the pilot but he pushed the gun away and was only wounded. Despite the flat tires, the hijackers ordered the plane to take off anyway, a dangerous action that could have easily ended in a crash killing all on board, and the plane flew to Havana for a second time. The episode ended there with the arrest of the three who were convicted and sentenced to prison in Cuba, followed by extradition to the U.S. and the imposition of further long sentences. The episode, along with those that preceded it, led to 100 percent passenger screening at U.S. airports.

Airline hijackings had clearly become more dangerous to the passengers and crew, but also to the hijackers. None of the 225 hijackers were killed in the 112 hijackings that occurred in 1968 and 1969 (a number of hijackings involved more than one hijacker). Five of the 170 hijackers (or about 3 percent) were killed in 1970; 4 of the 90 hijackers (or about 4 percent) were killed in 1971. But 21 of 120 hijackers (or approximately 18 percent) were killed in 1972. The possibility that one or more hijackers would die during a hijacking increased from zero to 40 percent in 1972. Hijackings declined steeply thereafter, a reflection of both improved airport security and increased risk to the hijackers.

How does this compare with the risks to the driver in a vehicle ramming attack? The total number of all vehicle ramming attacks in our database, including the most recent attacks in Liverpool and Los Angeles, is 324. A number of the attacks involved additional people in the vehicle who fired weapons or threw bombs out the car during the attack or exited the vehicle to shoot or stab people when the vehicle stopped. Including them brings the total number of perpetrators to 350. A total of 96 perpetrators were killed, putting the risk of dying in the attack at 27.1 percent. This is a significant risk, close to the odds of death faced by a British infantryman in the trenches in World War I (29 percent), a high bar for attackers capable of making rational calculations.

Also, whereas a hijacker in the late 1960s often was granted asylum and walked free or was soon quietly released, a driver in a vehicle ramming attack must anticipate that the episode will end with guns drawn and possibly death, or at least a long prison sentence for murder or attempted murder.

Past Research and Publications

Since 2017, we have been studying vehicle ramming used intentionally to kill and injure members of the public, either for ideological or terrorist reasons or for unknown motives. The graphs, data, and general conclusions that follow have been updated to include the recent attacks.

Our research started more than 8 years ago, and the data collected are comprehensive and unique. This work was credited within the last year as a main source on vehicle rammings by the DHS's Cyber and Infrastructure Security Agency (CISA) in its April 2024 Vehicle Incident Prevention and Mitigation Security Guide.

We started looking at vehicle rammings after the surge of jihadist ramming attacks between 2016 and 2018 in Europe. The worst of these occurred on July 14, 2016 (Bastille Day) in Nice, France, when a driver inspired by the terrorist group the Islamic State plowed through a crowd gathered to watch a fireworks display; 86 were killed and over 400 injured. At first, we limited our review to ramming attacks against public surface transport targets such as bus stops and train stations, and in September 2017 released this report: Terrorist Vehicle Attacks on Public Surface Transportation Targets.

In May 2018, we published An Analysis of Vehicle Ramming as a Terrorist Threat, which examined 78 attacks against all public targets. In November 2019, we published a more thorough analysis 0f 184 attacks, reaching back to the first ramming we were able to find, which took place in 1964. "Smashing into Crowds" — An Analysis of Vehicle Ramming Attacks, asked whether the 2016-18 surge in Europe would continue there or elsewhere and found that despite jihadist admonitions, it had not yet continued, at least at the same level.

Finally, we took a special look at vehicle rammings into the Black Lives Matter protests and other demonstrations in the United States during the summer of 2020, and published a report entitled Metal Against Marchers: An Analysis of Recent Incidents Involving Vehicle Assaults at U.S. Political Protests and Rallies. The report explored a number of details, and probed which of the rammings were clearly or probably malicious. It concluded that the more than 100 ramming attacks reported in the news media were a different phenomenon from the other ramming attacks.

Of the 52 incidents we were able identify and examine, nine were clearly accidental encounters as the marching protesters spilled into adjacent streets. Of the remaining 43 incidents, we concluded that 19 were clearly malicious in intent, that is, the driver intended to drive into the protesters, and another 16 were possibly malicious. However, in almost all of the incidents, the drivers, although hostile to the protests, did not try to kill the marchers, but sought to intimidate them by pushing their vehicles at less than full speed into the crowd. There was only one fatality in all of the attacks, and that one resulted from a driver, claiming to have acted in self-defense shot and killed an armed protester. There was one other case involving the death of a protester, but that was on a street away from the main protest and may have been an accident.

If the current political protests in the United States proliferate, we could see another increase in the volume of vehicle "ramming" attacks, but again involving slow speeds and few casualties. Hopefully, these would match the slower speeds and few casualties of the previous vehicle attacks on protests. But the potential clearly exists for more lethal events—such as in Nice France and Berlin, Germany.

The Data: Scope, Geography, Years, Trendlines

There are four important boundaries we have set in developing the data that will follow in a table and several graphs.

Scope: Only rammings that are instruments of terror against the general public, whether planned or spontaneous, are included. Therefore, while there are always judgment calls, we do not include rammings against (1) persons known to the attacker, (2) civilian or military government persons or institutions, or (3) rammings against vehicles (which are usually instances of road rage). Also, we have not included the rammings against the Black Lives Matter demonstrations in the summer of 2020, which reflect unique circumstances and are unlike the other ramming attacks.

Geography is limited: The data is limited to those countries we refer to as "Group 1" countries, that is, those countries that are member-states of the Organization for Economic Cooperation and Development (OECD) except for Turkey and Colombia, which have ongoing insurgencies.[1] Rammings in Group 1 countries are more relevant to what we might confront in the United States. (We do include some comparisons with rammings in Group 3—Israel and the Palestinian Territories.)

This focus on Group 1 countries doesn't reflect a lack of concern for what happens elsewhere. From the standpoint of terrorism, it is also appropriate. Leaving aside Group 3 in which the dynamics and tactics are quite different, since 1964 there have 59 rammings in Group 2 countries with close to 300 fatalities; however, 82% were by drivers who had unknown motives or appeared mentally disturbed. They account for 75% of the fatalities.

There were far more rammings in Group 1 countries—185 since 1964. The percentage of attackers who had unknown motives or were possibly mentally disturbed was somewhat lower (77%). More important, they account for only 37% of the fatalities. In short, thus far Group 1 rammings are far more likely to be ideological or terrorist, and those attacks account for a higher percentage of the fatalities.

Time Period Limited: We have also limited the data *in this summary* to attacks beginning in 2013, roughly three years before the Jihadist campaign in Europe began in earnest. We regularly refresh our data every two weeks.

Trends: Because there are relatively few events with widely different fatalities, the linear trend lines displayed in the graphs can be changed dramatically by adding (or deleting) one attack with high fatalities. However, some broad trends are discernible.

1 All other countries are considered in Group 2, with the exception of Israel and the Palestinian Territories, which are placed in Group 3 because of the unique circumstances of the conflict there.

General Observations

Some of our most relevant conclusions from the data are:

Attacks involving larger vehicles moving at higher speeds in a narrow or crowded space where people cannot easily protect themselves or escape result in far more deaths and injuries. The 2016 Nice ramming is a case in point. The same situation is apparent in the January 2025 New Year's Eve attack in New Orleans, and the May 26, 2024 Vancouver attack. ***Preventing vehicle access to areas where large numbers of people are gathered, particularly in a well-publicized event—a protest, march, or celebration—is effective.***

Attacks involving rented or stolen vehicles, particularly large ones, are more lethal. Notable examples include Nice in 2016 (86 dead), New Orleans in 2025 (15 dead), Las Ramblas Barcelona in 2017 (14 dead), the Berlin Christmas Market in 2016 (12 dead), and the New York City ramming in 2017 (8 dead). ***Checks on who rents large vehicles can contribute to security, but are difficult.***

Rammings where firearms or knives are used while the attacker is in the vehicle or after it stops are more lethal. The use of firearms in the 2016 Nice attack and the use of knives in the 2017 Westminster Bridge Borough Market Attack are examples.

High lethality is not confined to terrorist attacks. In April 2018, an individual drove a rented white van through Toronto, Canada, killing 10 and injuring 15. He was a frustrated member of the "incel" movement and was inspired by a previous and well-known May 2014 ramming and shooting attack in Isla Vista, California, which killed 6 and wounded 13. Their anger was based on the bizarre notion of being forcibly kept celibate by women. More recently, the Vancouver and Osaka City rammings show how deadly rammings could have been had the attacks been less spontaneous, better planned, and more deliberate.

The Data

Frequency and Lethality by Country

Tables 1 and 2 show the Group 1 countries where vehicle ramming attacks have occurred since 2013, ranked by the number of attacks. The yellow cell "shading" highlights where lethality—measured by Fatalities Per Attack (FPA) or Injuries Per Attack (IPA) —is above the overall average shown in the last row.

As we can see from Table 1, the United States, United Kingdom, France, and Germany together account for close to 80 percent of all attacks. We then look at lethality in countries where there have been at least 10 attacks since 2013 (which happen to be these same countries) to see where lethality is above the overall average of 1.6 fatalities per attack and 12.0 injuries per attack. The FPA is highest in France, owing to the single 2016 attack in Nice, and then followed by Germany. The IPA is highest in Germany and then in France, followed by the United Kingdom.

Table 1. Attacks and Lethality in Group 1 Countries Ranked by Attacks, 2013-2025

All Group 1 Countries (2013-2025)	# Attacks	% Attacks	Cml. % Attacks	# Fatalities	% Fatalities	# Injuries	% Injuries	FPA	IPA
United States	85	54.5%	54.5%	56	22.3%	407	21.9%	0.7	4.8
United Kingdom	14	9.0%	63.5%	17	6.8%	243	13.1%	1.2	17.4
Germany	12	7.7%	71.2%	32	12.7%	623	33.5%	2.7	51.9
France	12	7.7%	78.8%	88	35.1%	250	13.4%	7.3	20.8
Canada	8	5.1%	84.0%	27	10.8%	71	3.8%	3.4	8.9
Australia	7	4.5%	88.5%	5	2.0%	29	1.6%	0.7	4.1
Spain	3	1.9%	90.4%	15	6.0%	111	6.0%	5.0	37.0
Poland	2	1.3%	91.7%	0	0.0%	42	2.3%	0.0	21.0
Austria	2	1.3%	92.9%	3	1.2%	34	1.8%	1.5	17.0
Sweden	2	1.3%	94.2%	5	2.0%	15	0.8%	2.5	7.5
Japan	2	1.3%	95.5%	0	0.0%	15	0.8%	0.0	7.5
Italy	2	1.3%	96.8%	1	0.4%	2	0.1%	0.5	1.0
New Zealand	1	0.6%	97.4%	0	0.0%	6	0.3%	0.0	6.0
Norway	1	0.6%	98.1%	0	0.0%	5	0.3%	0.0	5.0
Finland	1	0.6%	98.7%	1	0.4%	4	0.2%	1.0	4.0
Netherlands	1	0.6%	99.4%	1	0.4%	3	0.2%	1.0	3.0
Belgium	1	0.6%	100.0%	0	0.0%	0	0.0%	0.0	0.0
Totals/Percentages/ Averages	**156**	**100.0%**	**100.0%**	**251**	**100.0%**	**1860**	**100.0%**	**1.6**	**12.0**

Note: The yellow cell "shading" highlights where lethality—measured by Fatalities Per Attack (FPA) or Injuries Per Attack (IPA) — is above the overall average shown in the last row.

Table 2. Attacks and Lethality in All Countries, Ranked by Attacks, 2013-2025

All Countries (2013-2025)	# Attacks	% Attacks	Cml. % Attacks	# Fatalities	% Fatalities	# Injuries	% Injuries	FPA	IPA
United States	85	31.5%	31.5%	56	11.7%	407	14.8%	0.7	4.8
Israel and the Palestinian Territories	70	25.9%	57.4%	27	5.6%	285	10.3%	0.4	4.1
China	20	7.4%	64.8%	163	34.0%	459	16.6%	8.2	23.0
United Kingdom	14	5.2%	70.0%	17	3.5%	243	8.8%	1.2	17.4
France	12	4.4%	74.4%	88	18.3%	250	9.1%	7.3	20.8
Germany	12	4.4%	78.9%	32	6.7%	623	22.6%	2.7	51.9
Canada	8	3.0%	81.9%	27	5.6%	71	2.6%	3.4	8.9
Australia	7	2.6%	84.4%	5	1.0%	29	1.1%	0.7	4.1
29 other Countires (3 or Fewer Attacks	42	15.6%	100.0%	65	13.5%	390	14.1%	1.5	9.3
Totals/Percentages/ Averages	**270**	**100.0%**	**100.0%**	**480**	**100.0%**	**2757**	**100.0%**	**1.8**	**10.2**

Note: The yellow cell "shading" highlights where lethality—measured by Fatalities Per Attack (FPA) or Injuries Per Attack (IPA) — is above the overall average shown in the last row.

Table 2 shows that the United States has the highest number of vehicle ramming attacks, not only in Group 1 countries, but in all countries. It is followed by the Palestinian Territories and Israel (which we label Group 3), and, in turn, then by China, the United Kingdom, France, Germany, Canada, and finally Australia. All of the other 29 countries have three or fewer attacks—many of them have experienced only one attack with few fatalities or injuries. The lethality of rammings in terms of fatalities per attack is highest in China, followed by France (again because of the 2016 Nice attack).

Targets in Group 1 and Group 3 Countries

Table 3 examines the distribution of ramming attacks in Group 1 since 2013 in terms of target categories (noting that in some cases, the categories selected are a judgment call). Nearly 38 percent of the attacks take place on ordinary vehicular-accessible streets. Another 27 percent occur outside public buildings (such as buildings that house educational and religious institutions, particularly Jewish ones, and those that house retail institutions); another 21 percent are attacks against public gatherings, including religious celebrations and demonstrations, and finally 9 percent on streets that have been pedestrianized—either permanently or temporarily. Public surface transport, almost exclusively bus stops or light rail stops where the target is on the same level as a vehiclar street, is rarely targeted.

Table 3. Attacks in Group 1 Countries by Target Category

Group 1 Target Categories (2013-2025)	# Attacks	% Attacks	Cml. % Attacks	# Fatalities	% Fatalities	# Injuries	% Injuries	FPA	IPA
Public Streets - Vehicular	59	37.8%	37.8%	50	19.9%	298	16.0%	0.8	5.1
Public Buildings	42	26.9%	64.7%	4	1.6%	77	4.1%	0.1	1.8
Public Gathering	32	20.5%	85.3%	129	51.4%	1054	56.7%	4.0	32.9
Public Streets - Pedestrianized	14	9.0%	94.2%	64	25.5%	376	20.2%	4.6	28.9
Public Surface Transport	6	3.8%	98.1%	4	1.6%	44	2.4%	0.7	7.3
Air Transportation	3	1.9%	100.0%	0	0.0%	11	0.6%	0.0	3.7
Totals/ Percentages/ Averages	**156**	**100.0%**	**100.0%**	**251**	**100.0%**	**1860**	**100.0%**	**1.6**	**12.0**

Note: The blue cell “shading” highlights were the Public Surface Trasport target category.

Table 4 shows the locations for the same years of vehicle ramming attacks in Israel and the Palestinian Territories. The largest percentage of attacks (over 42 percent) is against public surface transportation, especially bus stops and, to a lesser degree, light rail stops. Israel is unique among developed countries in that it relies heavily on bus transportation, and not just for transportation in urban settings.

Table 4. Attacks in Group 3 Countries Countries by Target Category

Group 3 Target Categorties (2013-2025)	# Attacks	% Attacks	Cml. % Attacks	# Fatalities	% Fatalities	# Injuries	% Injuries	FPA	IPA
Public Surface Transport	30	42.3%	42.3%	17	56.7%	169	59.1%	0.6	5.6
Group 3 Only: Outside Public Areas with Streets/Roads/Highways	21	29.6%	71.8%	5	16.7%	61	21.3%	0.2	2.9
Public Streets - Vehicular	8	11.3%	83.1%	5	16.7%	38	13.3%	0.6	4.8
Group 3 Only: Military or Police Forces	4	5.6%	88.7%	0	0.0%	3	1.0%	0.0	0.8
Group 3 Only: Police or Military Checkpoint	4	5.6%	94.4%	1	3.3%	7	2.4%	0.3	1.8
Public Gathering	3	4.2%	98.6%	0	0.0%	6	2.1%	0.0	2.0
Group 3 Only: Junction (Tapaudh, Bush Etzion, etc)	1	1.4%	100.0%	2	6.7%	2	0.7%	2.0	2.0
Totals/Percentages/ Averages	**71**	**100.0%**	**100.0%**	**30**	**100.0%**	**286**	**100.0%**	**0.4**	**4.0**

Note: The blue cell "shading" highlights were the Public Surface Trasport target category.

Trends in Attacks and Fatalities

The two sets (3 figures each) that follow represent all attacks in Group 1 countries (Figures 2-4) since January 1, 2013, and then for the United States (Figures 5-7). Each set shows:

- All ramming attacks and fatalities (Figures 2 and 5);
- A comparison of all ideological/terrorist-motivated attacks with non-ideological/terrorist motivated attacks (Figures 3 and 6); and
- A comparison of all ideological caused fatalities with fatalities caused by non-ideological/ terrorist attacks. (Figures 4 and 7).

For the Group 1 countries, the frequency of attacks is increasing slightly as is the trend for fatalities; were the 2016 attacks in Nice and Berlin added in with their combined total of 98 fatalities, the trend for fatalities would be downward. But they are statistical outliers, followed by a lack of similar high-fatality attacks afterwards.

Comparing the number of non-ideological/terrorist attacks with ideological/terrorist attacks, we see that the trend for ideological/terrorist attacks is flat, while there is a slight increase in non-ideological/terrorist attacks. Comparing the fatalities in the two types of attacks shows that most of the increase comes non-ideological/terrorist attacks while most of the decrease in fatalities comes from ideological/terrorist attacks. But, once again, the Nice attack distorts the trend in fatalities for the latter set.

The trends in the United States, depicted in the second set of graphs, are somewhat different. The volume of attacks are increasing. So are the numbers of fatalities. The increase in the volume of attacks comes mainly from non-ideological/terrorist attacks while the increase in fatalities is due mainly to ideological/terrorist attacks.

Set 1: All Group 1 Countries

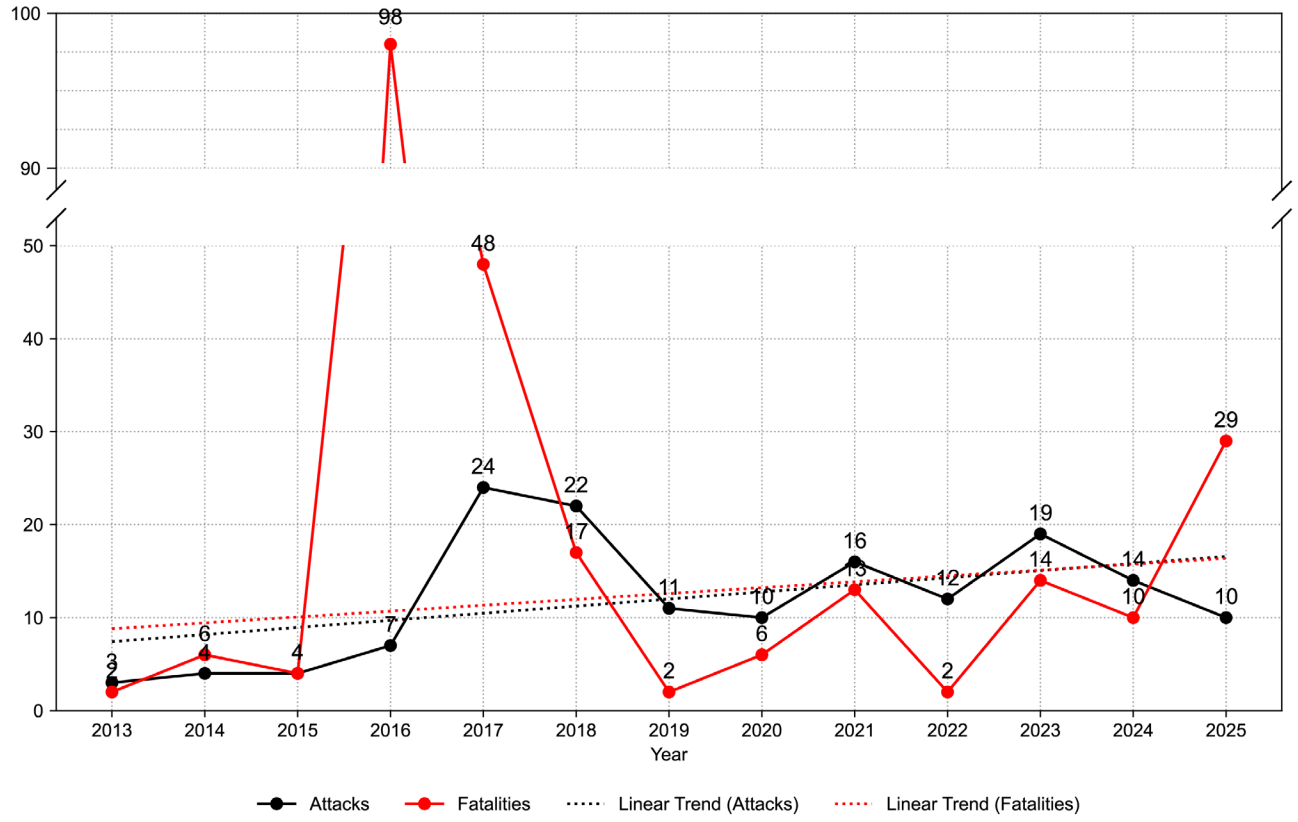


Figure 2. All Ramming Attacks and Fatalities: Group 1 - 2013-2025

Note: The 98 count outlier in 2016 is excluded from the trend lines.

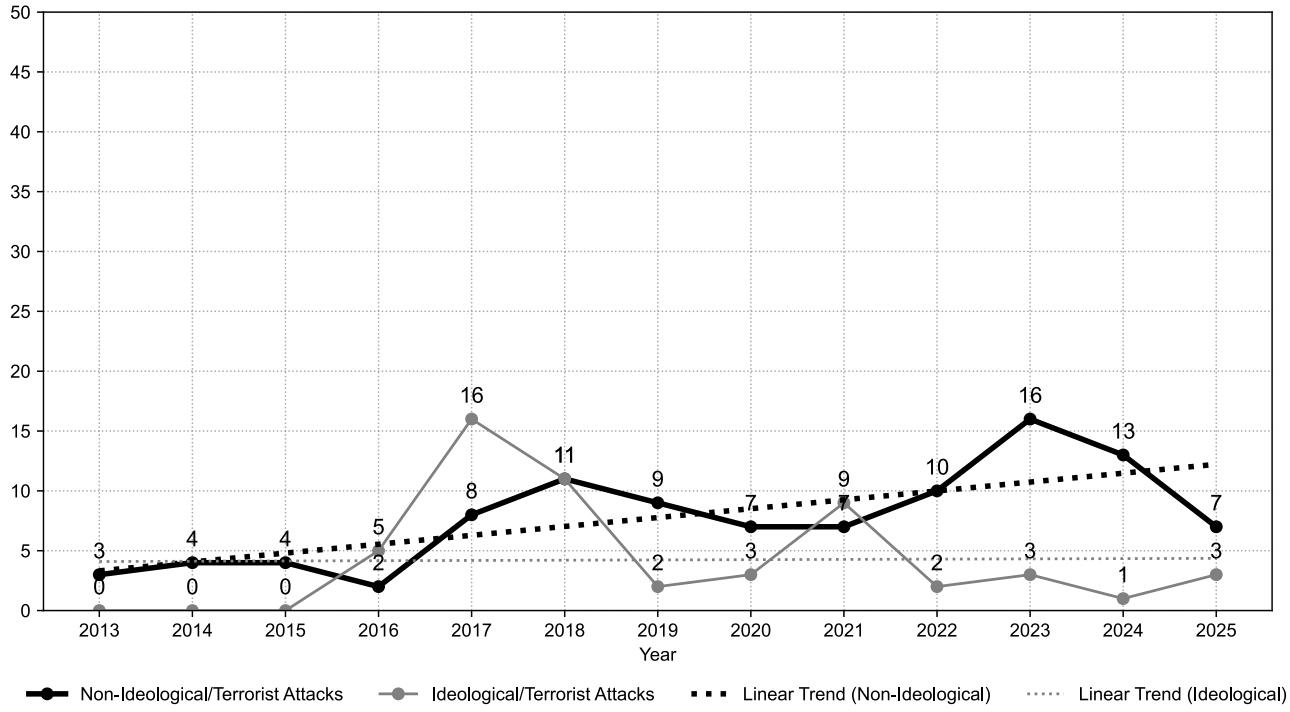


Figure 3. Group 1 Vehicle Ramming Attacks: Ideological/Terrorist VS Non-Ideological/ Terrorist 2013-2025

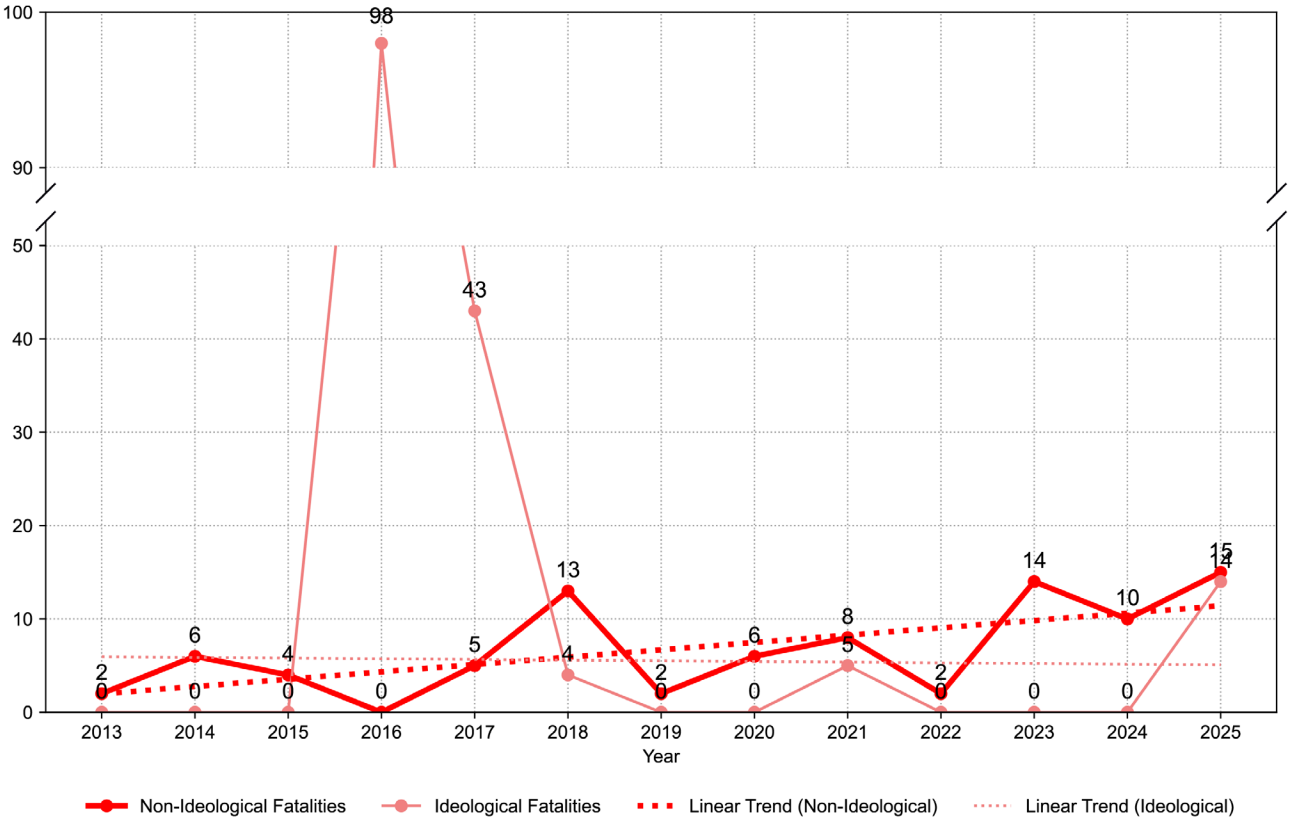


Figure 4. Group 1 Vehicle Ramming Fatalities: Ideological/Terrorist VS. Non-Ideological/ Terrorist 2013-2025

Note: The 98 count outlier in 2016 is excluded from the trend lines.

Set 2: United States

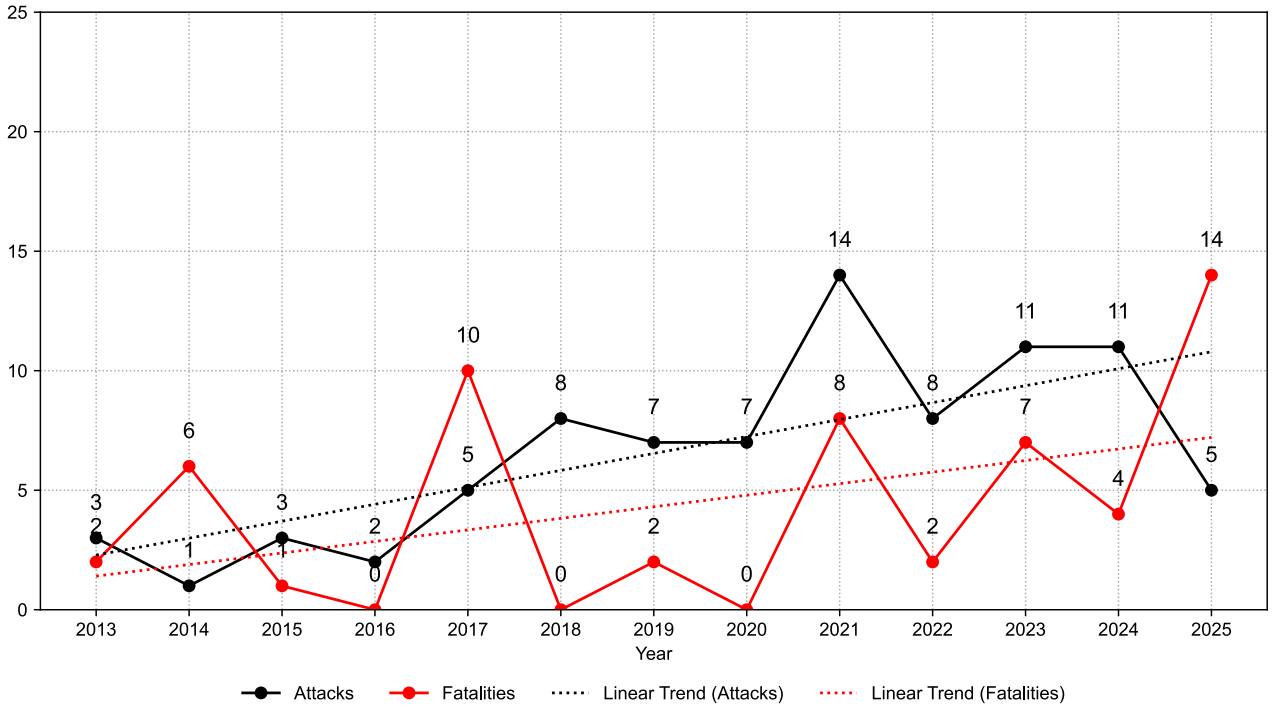


Figure 5. All Vehicle Ramming Attacks and Fatalities: U.S. - 2013-2025

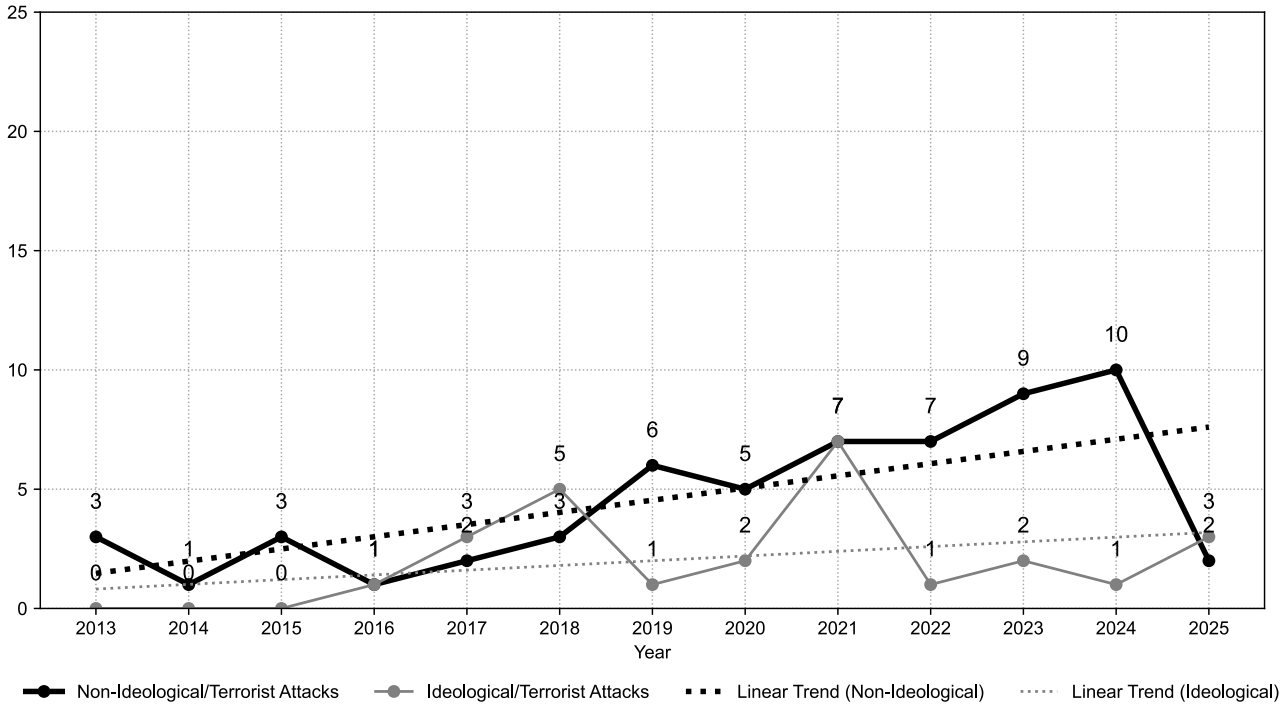


Figure 6. US Vehicle Ramming Attacks: Ideological/Terrorist VS Non-Ideologicial/ Terrorist 2013-2025

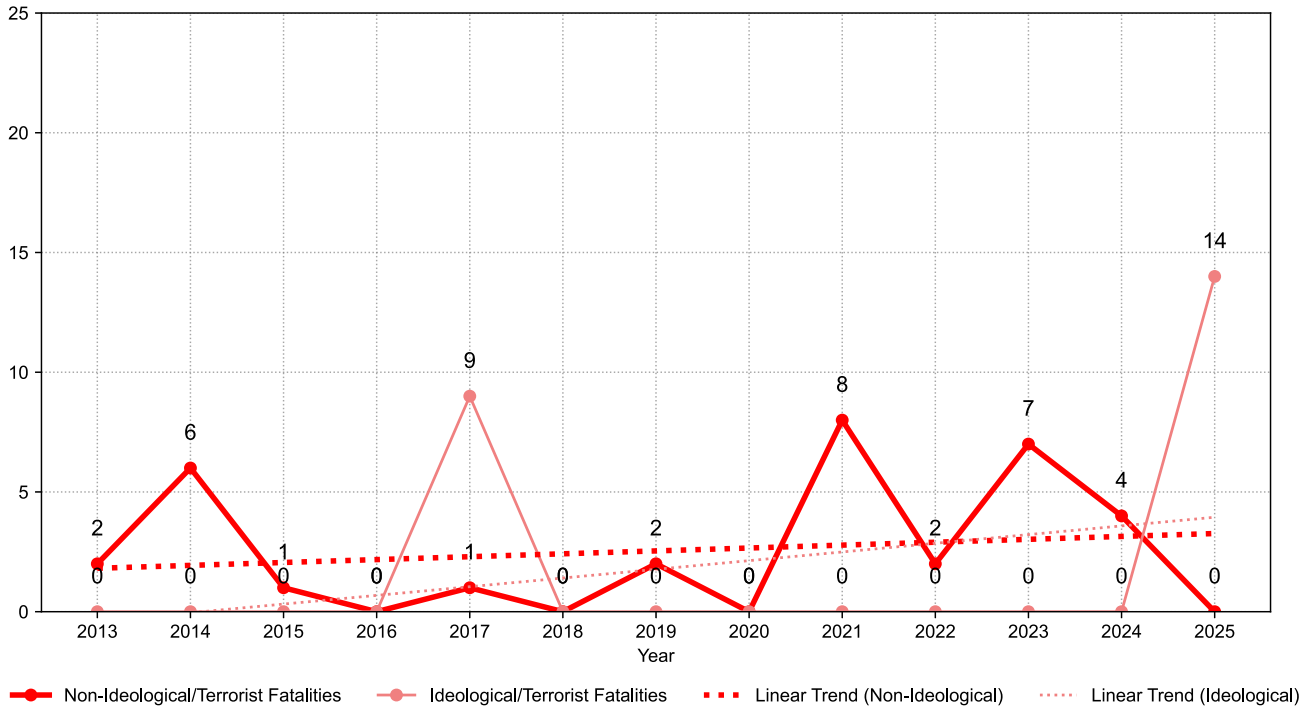


Figure 7. U.S. Vehicle Ramming Fatalities: Ideological/Terrorist VS Non-Ideological/ Terrorist 2013-2025

A Final Note From the Authors

The Mineta Transportation Institute's National Transportation Security Center began monitoring terrorist and violent criminal attacks against public surface transportation worldwide in the 1990s. Its proprietary database, which catalogs incidents as far back as January 1970, remains the most comprehensive resource of its kind and contained 8,440 attacks as of the final March 2025 update.

Throughout this work, the Center has provided timely analysis to help prevent attacks and mitigate their consequences by identifying evolving tactics and vulnerabilities in the United States and abroad. The research team continues this commitment, with the most recent update completed independently by the researchers with support from MTI staff and the Allied Telesis National Transportation Security Center endowment.

Acknowledgement

The authors thanks Lisa Rose for editorial services, as well as MTI staff Project Assistant Cameron Simons and Graphic Designer Katerina Earnest.

About the Authors

Brian Michael Jenkins is the director of the Mineta Transportation Institute's Allied Telesis National Transportation Security Center and, since 1997, has directed the Institute's continuing research on protecting surface transportation against terrorism and other serious forms of crime.

Bruce R. Butterworth is a Senior Transportation Security Researcher at MTI and former Director of Aviation Security Operations at the Federal Aviation Administration. Bruce has taken a leading role in creating MTI's unique database of attacks on public surface transportation.

This report can be accessed at transweb.sjsu.edu/research/2557

The Mineta Transportation Institute (MTI) is a university transportation center located within the Lucas Graduate School of Business at San José State University. MTI supports the advancement of safe, efficient, and innovative surface transportation through research, education, workforce development, and technology transfer.