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# Fencepost

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## GUARDING THE GATES

AFA HIGH SECURITY EXPERTS WEIGH IN ON KEEPING INTRUDERS OUT

Investigating Supply Chain Volatility

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A new crash-rated gate arm creates a secure perimeter for the Herbert C. Hoover Building, headquarters of the US Dept. of Commerce in Washington, DC. When the building was completed in 1932, it was said to be the largest office building in the world, but no such defenses were thought necessary.



# Guarding the Gates

By Steven H. Miller

**I**n any secure perimeter, the greatest vulnerabilities are generally agreed to be the access points — entrances and exits. Most of the perimeter does one job all the time: it keeps people out. Access points must allow authorized people and vehicles to enter, while still being able to exclude everyone else, even preventing forced entry. To accomplish the task, several types of “active barriers” have been developed, movable or retractable obstructions that resist penetration by high speed crashes.

Secure access points are complex installations, integrating the crash-resistant product with sensors, authorization and monitoring systems, and sometimes other gate operators. Safe and secure operation depends on performance of the foundation as much as it does on the system above ground. It’s a job that demands both knowledge and skill from the contractor who performs it.

We talked to several leading high security product manufacturers and contractors to learn the ins and outs of active barriers.

## SECURITY IS IN DEMAND

After 9/11, America began to view the threat of terrorism as our problem, and subsequent terrorist attacks both foreign and domestic have solidified that perception. The demand for site defense and secure perimeters has spread to a wider range of industrial, commercial, government, and institutional facilities. “The mindset instantly changed,” recounts Evan Winston, president of AFA member company Hercules Fence and Hercules High Security. “The government already does what it can to protect its assets, and now the private industry is going to have to reevaluate its physical security and do the same.”

The creation of a high security perimeter system begins with “a threat assessment of the facility, and discussions with the end users on the sequence of

PHOTO COURTESY OF HERCULES HIGH SECURITY



operations,” explains Troy Blood, Director of Physical Security at AFA-member Perimeter Security Group. “That allows our physical security design team to generate site specific drawings and specifications for recommended perimeter security solutions.”

Perimeter security is mostly passive, such as anti-climb, anti-cut, crash-resistant fencing, and or crash-resistant barriers. Access points are the only intentional openings in the perimeter. That makes them targets. Moreover, at vehicular entrances, the approach road can form a perfect runway to build up speed for a crashed entry.

“There’s a lot that goes into site design and access point design to make it difficult to attack,” says Nick Valdez, Specifications Sales Team Manager with AFA-member HySecurity. They might reroute the entry road to a more serpentine path that forces slower approach speeds. “We want to put in chicanes or Jersey barriers or planters, so that you’re not getting a straight run at the barrier.”

### ACTIVE BARRIERS

Ultimately, though, a piece of very tough hardware needed to protect the entry. Active barriers include gate arms, movable or retractable bollards, wedge barriers, crash-rated gates, and perhaps more rarely, nets. When the system is deployed, vehicles cannot drive forward. For an authorized vehicle, the system “stands down” and allows it to pass.

Active barrier devices are integrated with other systems at the access point, including vehicle sensing (ground loops, photo eyes, cameras, etc.), authorization (key card, biometric ID reader, license plate reader, a guard checking ID’s, etc.), and an operator that tells the barrier when to open or close. In that sense, they are similar to conventional gates or gate arms. Crash-resistant versions that can stop a truck-bomb tend to be a lot heavier, however, and therefore slower-moving pieces of equipment.

Their crash-resistance is tested by crashing trucks into them. The standard, ASTM F2656, *Standard Test*



This video frame shows the moment of impact in a crash test. The front of the 15,000-lb truck moving at 30 MPH is cut apart by the barrier arm, but the bed of the truck (where the explosives would be) does not penetrate past the perimeter line.

IMAGE COURTESY OF HYSECURITY

*Method for Crash Testing of Vehicle Security Barriers*, breaks out six different classes of vehicles that can be tested, but the one most commonly built in the US is the M category, a standard 15,000-lb. flatbed truck. M30 resists the force of a 15,000-lb truck moving at 30 MPH. The M50 rating uses the same truck at 50 MPH, and that is the highest standard usually specified or built by US government and military clients.

The test also measures how far into the perimeter the truck

penetrates, rated by the P-scale. P1 is penetration 1 meter or less, measured from the leading edge of the truck’s bed (not the front of the truck). P2 is 1-7 meters, P3 is 7-30 meters. Penetration is critical in bomb attacks, since the impact of the blast decreases as a square of the distance from the explosion.

The test is the same for active and passive barriers of all types. A wedge barrier, a gate arm, and a bollard that all meet M50 P1 will be equally capable of stopping a given attack.



IMAGE COURTESY OF HYSECURITY

If you want to see what these barriers do, search on YouTube using terms like wedge crash test, bollard crash, or parking barrier crash. It's shocking. When the test truck hits it at speed, the barrier cuts into it, the front end of the truck is demolished, and the cab often detaches completely and flies over the barrier. A driver would almost certainly be killed.

### ACTIVE BARRIER OPTIONS

The selection of a type of active barrier depends on available space, frequency of operation, and budget.

#### Gate Arms

Crash-rated gate arms appear somewhat similar to conventional traffic control gate arms, hinged at one end, swinging across the entire traffic lane either vertically or horizontally. But these arms are made of tougher stuff. They are internally hardened, usually with heavy steel, and have a vertical stanchion on the opposite side of the lane to receive the free end of the arm, and both the arm-housing and the stanchion have impact engineered foundations.

The term "active barrier" brings to mind an automated system, but Markus Erbedinger, Product and Engineering Manager of AFA-member Amico Security, points out that the most affordable active barrier is a manual swing-arm. His company makes a range of crash-rated fencing and other passive and active barriers. "If you have a side gate you don't use very often, maybe once a week some big cargo comes in, then someone just walks out and swings the gate open. If you have a main gate where you have vehicles every 5 minutes, then you have an automatic system."

#### Crash-Rated Gates

Crash-rated reinforcement can be integrated into a full-size sliding gate, even an ornamental one. "That's the most fancy version," comments Erbedinger. "You have the crash arm built into the frame of the gate. Because the crash arm is doing all the heavy lifting, whatever infill you have



Crash-rated manual swing arms, seen here in the open position, are the most economical form of crash-rated active barrier.

IMAGE COURTESY OF AMICO SECURITY

on your fence, you can do the same thing on your gate, it looks exactly like your fence."

However, a crash-rated sliding gate is very heavy, and therefore they tend to be slow-moving. Both weight and speed can be problems for protecting a secure access point. A slow-moving system would not be appropriate, for example, at an entry that had frequent access.

#### Bollards

A bollard is essentially a short post that blocks a road or path. The name originally applied to the mushroom-shaped posts used to tie up ships on docks and quays. Modern bollards vary widely in style, from a concrete-filled pipe to an ornamental work of cast iron, a red concrete sphere outside Target stores that looks like the brand's logo.



Retractable bollards, protecting an ornamental slide gate and the residence inside the gates. The bollards have LEDs along the top rim to increase their visibility.

IMAGE COURTESY OF AMICO SECURITY





Retractable bollards, along with a conventional gate arm, defend the headquarters of the USDA in Washington DC. Levels of perimeter security that have been standard for decades at government and military facilities are now being adopted widely in the private sector, as well.

IMAGE COURTESY OF HERCULES HIGH SECURITY

Fixed bollards are passive barriers embedded in the ground permanently. Entrances can be defended by part-time bollards, either removable

or retractable. A removable bollard is a free post set into a matching receiver-sleeve. The sleeve is permanently installed in the ground with the

top at grade. To allow entry, the post is manually pulled out of the sleeve, then replaced after the authorized vehicles have passed.

A retractable bollard allows entry by going completely down into the ground until the top is flush with the pavement. It pops back up to defend the entry. They are operated either electrically or hydraulically.

Retractable and removable bollards can be industrial-looking, or very decorative. They can be styled identically to fixed bollards for a very uniform appearance when deployed. They can include modifications such as LEDs for better visibility.

### Wedges

Wedges are the least decorative and possibly most intimidating of the active barrier options. "When the wedge is open," comments Markus Erbelinger, "you can see they mean business." Deterrence is the first line of defense, and wedges, by their appearance, may offer the best deterrent value.

Wedges may also offer the most robust protection, according to Erbelinger, because of the way the wedge is structured. "When you hit the wedge, the force goes back into the foundation in a nice straight line. They are probably the most rigid, most secure, heavy duty barriers."

### SECURITY VS. SAFETY

Crash-rated gates present the same safety concerns as conventional gates, and should be built in compliance with UL 325. "We know if we're doing a slide gate," explains Hercules High Security's Evan Winston, "even if it's a crash-rated gate, it needs to have alarms, safety edge, photo eyes." However, safety features that prevent a gate from closing on a pedestrian may conflict with security. "Sometimes the site does not want safety devices. They don't want some bad guy to come up, stick a cone in the safety device, and then crash the entry."

At guarded entrances, this problem is solved with the inclusion of an EFO (Emergency Fast Operate) button. "EFO quickly closes the gate



A wedge barrier, seen from the business side, protects an ornamental gate entrance.

IMAGE COURTESY OF HERCULES HIGH SECURITY

The creation of a high security perimeter system begins with “a threat assessment of the facility, and discussions with the end users on the sequence of operations,” explains Troy Blood, Director of Physical Security at AFA-member company Perimeter Security Group.

when there’s an apparent threat.” explains John Allen of HySecurity. “Used in an attended scenario, when a guard hits the EFO button, the barrier will ignore all safeties and deploy immediately.” Perimeter Security Group’s Troy Blood notes, “We are seeing more unattended secure access points being constructed,” as facilities try to reduce expenses. At unattended entrances, some kind of balance must be struck in the programming between safety and security needs.

### FOUNDATIONS

All crash-rated barriers, active and passive, require strong foundations in order to perform properly. “When someone rams into it, it’s important how it’s embedded in the foundation,” explains Amico Security’s Erbelinger, “or it will all just vault.” The foundation is engineered to withstand the crash-force, and the product is tested only as part of a complete system that includes the foundation.

“It’s a specialized install,” explains Hercules’ Evan Winston, “because you have to follow the manufacturer’s crash-tested design without any deviation.”

Retractable bollards generally have the deepest and most demanding foundation requirements — three to five feet — because the entire length of the bollard must go down into it.



A wedge barrier viewed from the secure side.  
IMAGE COURTESY OF AMICO SECURITY



This crash-rated gate arm has a main barrier arm at the proper height to stop a 15,000-lb. truck, and a lower secondary arm added to prevent accidental crashes by shorter passenger vehicles, which could be fatal if the car’s windshield crashed into the truck-height barrier.  
IMAGE COURTESY OF HYSECURITY

Proper drainage is critical to the correct function of the bollard.

One area of innovation for active barrier manufacturers is systems

with shallower foundations for sites where there are utilities or other underground obstructions. Amico now offers shallow-foundation fixed





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and removable bollard systems for obstructed locations, but retractables by their nature must be deep. Shallow-foundation wedges are also available. Amico offers a 16" foundation model, and HySecurity has one as shallow as 12".

Because the foundation is such an integral part of the barrier's performance, manufacturers want to certify their installers. "We require all installers to attend product training," states John Allen. "Training programs are conducted several times a year. If someone cannot attend an in-person training, we can come out and train on-site. We also offer virtual training programs for classroom elements." Other manufacturers offer similar options, and all of our experts emphasized the importance of getting trained to install crash-rated products.

#### RELIABILITY

"Reliability is as important a factor in system design as the crash rating," asserts John Allen. "It doesn't matter if a barrier has an M50 rating if the gate is open due to malfunction."

Allen recalls a major international airport where "on a regular basis, they had to leave a gate open because of operational reliability issues. There was a situation where someone was able to break through security because a gate was open when it didn't need to be."

Wedges and bollards, with their operational machinery underground, are vulnerable to water intrusion. They are also more difficult to maintain because of limited access.

Retractable bollards, according to Corey Swickle, Vice President of Hercules High Security, are "the product that requires the most maintenance, and has proven to fail faster than any other type of crash product. Bollards require a much deeper excavation to hold the whole bollard, and drainage is a constant battle."

Another issue is weight. Heavier systems such as crash-rated gates put a big load on the machinery. In a location that sees frequent

operation, a heavy system may wear out prematurely. HySecurity is one of the companies trying to address the issue, using non-metallic arresters in their StrongArm M30/50 barrier arms models to reduce weight.

Installers can help avoid reliability problems by educating customers about preventive maintenance. Swickle emphasizes that failures are closely linked to inadequate maintenance. "Customers who don't

want to spend the money to hire preventive maintenance and don't have maintenance staff on board, if no preventive maintenance is being done, the product is going to fail faster."

Whatever method of high security barrier is required, working with knowledgeable manufacturers and installers is the best way to ensure that your message is heard and enforced: keep out. ■



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