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Wedge Barriers. How do they Work and What are the Benefits?

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Wedge Barriers are a proven barrier solution that has been in use for decades by the U.S. Military, Embassies, Corporate Campuses, and more.



Introduction

A Wedge Barrier is a type of active vehicle barrier that sits in a flush position with the surface of the pavement and upon deployment, rises to a locked position forming a wedge shape to block oncoming traffic. The wedge (or sometimes called a finger or plate) is raised and lowered actively by electric technology or a pressurized hydraulic system.

These types of active barriers can be raised in a few seconds to deny vehicle access to a Government Facility, Data Center, Sports Stadium, Nuclear Power Plant, and other critical security locations.

Wedge Barriers can be installed on the surface, underground, or portable versions can be transported for temporary or short-term barrier needs.

The unique design of the underground Wedge Barrier is effective for anti-terrorism applications and many designs can stop high-speed vehicles and large trucks in an instant. Most are crash tested and certified by the Army Corp of Engineers, Department of State, Department of Defense, and ASTM.

In contrast, surface-mounted or transportable wedge barriers are generally used in light to medium-security settings to deny regular traffic access into places like car rental facilities, parking garages, parking lots, and office buildings.



How Do Wedge Barriers Work?

There are 2 types of technology that are used to raise and lower Wedge Barriers. Electric and Hydraulic.

Electric

Electric Wedge Barriers run on electricity and are generally more expensive initially, but also come with a simpler installation, and lower maintenance costs overall. Unlike Hydraulic Wedge Barriers, the installation does not require hydraulic lines to be buried underground or HPU concrete pads poured.

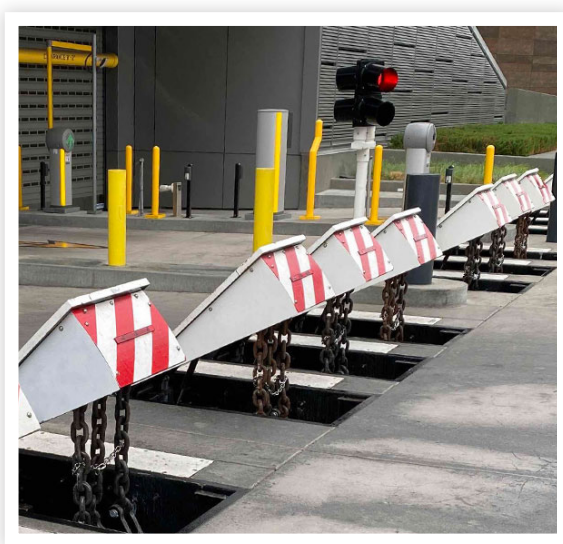
Hydraulic

Hydraulic Wedge Barriers on the other hand have been proven to be reliable for many decades in the perimeter security industry. They are generally less expensive upfront and will last many years if maintained properly. They also do require hydraulic fluid lines to be buried and require pressure in the line to rise the barrier.



What are the Different Types of Wedge Barriers?

The 3 main types of Wedge Barriers are the shallow foundation (or shallow mount), surface mount, and portable.



Shallow Foundation

Shallow foundation wedge barriers are the most used at government facilities like air force bases and embassies along with large corporate campuses, data centers, and sports stadiums. This type of shallow installation requires minimum excavation and is less likely to run into underground utilities.

Surface Mount

Surface-mounted wedge barriers are a great option for Sports Stadiums, Corporate Buildings, and parking garages/parking lots. These types of barriers need limited excavation and are often integrated with gate arms and traffic signals.

Portable

Portable wedge barriers can be transported to a location temporarily and be a security barrier at special events like parades, festivals, farmer's markets, and more. These types of barriers are versatile and simply need a flat roadway to sit on.

Are Wedge Barriers Crash-Rated?

The Department of State, Department of Defense, and ASTM certify many types of vehicle barriers, including Wedge Barriers. Certified Vehicle Barriers are "Crash-Rated," meaning they have been tested in full field crash tests using a real vehicle. The tests verify their capabilities of stopping a vehicle at a certain speed and specific vehicle weight. Crash-Rated Wedge Barriers are reviewed annually by the Army Corps of Engineers and the Department of Defense to release an up-to-date DOD Anti-Ram Vehicle Barrier List each year.

What are the Benefits of Installing Wedge Barriers?

There are many benefits of installing a Wedge Barrier to aid in protecting against sudden vehicle attacks or to restrict traffic to a designated area. The most notable benefits include:

- High performance in crash ratings (up to M50/K12)
- Emergency Fast Operation (EFO) capable (1-2 seconds)
- Can be used in all types of climates when installed and maintained properly
- Shallow foundations require less excavation than a retractable bollard
- Warning lights can be installed on the wedge barrier
- Heavy vehicles can pass over a closed wedge barrier
- Emergency deployment through battery backup, and accumulators



Key Considerations When Selecting Your Next Wedge Barrier?

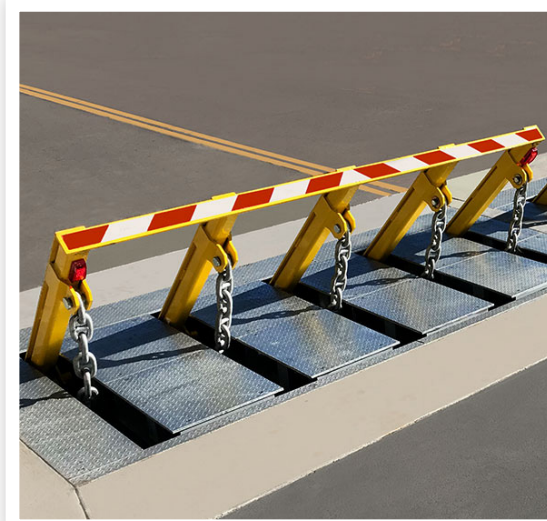
To better understand which Wedge Barrier type is best for your facility, here are several factors to consider.

Location and Underground Utilities

Hydraulic wedge barriers use pumping units (HPU) connected with hoses and other underground piping. Power is needed from a local single source or a 3-phase source. The hoses are buried and there is a motor that is above ground protected by a metal enclosure. Electric wedge barriers typically are a better solution for unique locations that won't accommodate the use of a hydraulic pumping unit (HPU). Adequate drainage is needed on both installations to improve performance and reduce the risk of equipment failure.

Performance and Reliability

Hydraulic Wedge Barrier's power units generate a significant amount of pressure and are quick to deploy. HPUs have been proven to be reliable technology. Many hydraulic controllers can run off different vegetable oils. In contrast, Electrical Wedge Barriers can be deployed at variable speeds. The variable speed allows you to raise the ramp quickly but set it down more slowly, which will lead to less wear and tear on the system.



Climate and Temperature

Colder temperatures can cause problems in hydraulic power units (HPUs). Properly installing a heating unit can help maintain a consistent temperature for oil viscosity to occur. Unlike a Hydraulic Wedge Barrier, an Electric Wedge Barrier is not impacted by the colder temperatures.

Preventative Maintenance

Although Electronic Wedge Barriers may be slightly easier to maintain overall, Hydraulic Wedge Barriers can be equally reliable over the long term when a preventative maintenance

schedule is adhered to. Proper installation upfront can make maintenance easier to perform regardless of which type of barrier you choose. It is recommended to use a certified installer to perform installation and ongoing maintenance.

Conclusion

Wedge Barriers are a proven barrier solution that has been in use for decades by the U.S. Military, Embassies, Sports Stadiums, Corporate Campuses, and more. The unique ability to have a shallow foundation, fast operation, and some of the highest crash ratings make Wedge Barriers an effective solution for high-security facilities.

Surface mount and portable options offer additional flexibility for temporary or lighter security options like parking garages/parking lots and office buildings. Additionally, Hydraulic and Electric options each offer their own benefits and it is wise to consider the factors outlined above before choosing which suits your site and needs best.

As always, it is wise to consult with an experienced physical security designer early in the decision process. Sloan Security Group has security planners and engineers that will assist in the selection process and a technical team to help integrate with barrier controls. It is becoming more common for architects, engineers, and construction companies to partner with Sloan Security Group to assist during the design phase and perform the installation and preventative maintenance to ensure a successful security outcome.

If you have questions about Wedge Barriers, design assistance, or questions, please contact us.



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