
Hard Security

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magazine_article_issue: [July 2009](#) : [Jim Fetzer](#) Live Date: Jul 24 2009 Subtitle: Perimeter security from barriers and bollards to turnstiles and door hardware Article Body:

After all the CCTV systems, access control systems and various other security systems are specified and installed, it comes down to what will really prohibit a determined adversary from breaching the perimeter. Barriers and bollards fill that need.

Before we begin to explore the topic, we must note that a risk assessment must be completed before we will know what we are protecting at our facility and its assets. Who is the adversary? What are their capabilities? Have they done this before? Can they do it again?

The American Heritage Dictionary defines a barrier as “a fence, wall, or other structure built to prevent passage.” By definition, we can conceivably discuss human beings, animals and motor vehicles. I will eliminate animals as not intrinsic to our discussion.

Defining the Perimeter

Bollards are a multi-function item. For nautical purposes, they are “a thick wooden post on a ship or wharf, used for securing ropes and hawsers (cable). Our discussion will focus on the “thick post” portion of the definition.

In physical security, we see barriers for pedestrians and vehicles as fences, gates, walls, doors, locks, windows, roofs and sometimes vaults.

There are several types of fences. Property lines and boundaries can be fenced with many types of

materials — from galvanized wire and steel wire to even walls. Property-line fences are a marker to show the property limits of the facility. Trespass signs are placed on these barriers to give notice to those who are unauthorized to be on the property. Although it is the first barrier seen by a potential trespasser/adversary, it is not considered an effective physical barrier to a determined person(s).

Temporary fences are commonly used at places where construction is happening to give both a trespass and safety warning to persons in the area of the property. Depending on the security requirements for the property, these must not be overlooked. They must be equal to the resistance requirements of the permanent fence construction and structure.

Perimeter fences are used to prohibit access to a particular area or a facility or can be used at the property boundary as well. These fences are of a very substantial design and construction. Most feature 11-gauge, chain-link mesh wired to the outside of the posts and the top and bottom rails. They are usually 8 feet high, with outriggers facing outward at a 45-degree angle on the top, where barbed, concertina or razor wire can be mounted depending on the circumstances and the facility being protected. Perimeter fences are designed for strength by concreting the posts, and using bracing at gates, corners and other places where physical terrain requires it.

There are cases where the barbed, concertina, and razor wire mentioned above are used as an enhancement to the fence by mounting it on the fence fabric, attaching it to the outside below the top outriggers, and/or along the ground in single or multiple layers to delay an adversary from penetrating the perimeter fence and the area until a response is able to arrive at the area.

Vehicle Barriers

Vehicle barriers are available in multiple forms — from stationary, to moveable, to mobile. The most common forms of vehicle barriers are concrete walls, either permanent or mobile. The concrete highway median is the most common form of barrier used. The design allows for them to be interlocked to provide a long, stationary vehicle barrier, or as individual pieces arranged in a serpentine formation to prohibit a vehicle from gaining velocity by traveling in a straight line toward a gate or barrier in an attempt to crash through it. Vehicle barriers have been used to provide a barrier at seldom-used gates as well.

Vehicle barriers can be made of plastic and can be filled with water or sand and emptied for mobility. Both add considerable weight to the vehicle barriers.

Bollards have been evolving for years. Recently, we have begun to develop sophisticated versions. Presently, bollards with stopping weight ratings are manufactured as stationary, some with locking capability for temporary removal. Hydraulic bollards, which will raise and lower by switch activation, allow for rapid passing and re-securing of vehicular paths. Vehicle traps, which also raise and lower to allow the passage of vehicles, are used in higher security applications.

When the topography and operational requirements for land use allow it, trenches or vehicle traps can be developed outside a perimeter fence to mitigate the possibility of vehicles ramming fence sections to gain access to a facility. Concrete triangle, rectangle and cylindrical shaped blocks at a minimum of 4 feet high used individually — and more effective in combinations of configurations — provide additional mitigating barriers for the adversary vehicle to negotiate in an attempt to breach a perimeter fence. The rectangular, triangular, and cylindrical shapes can provide a pleasing cosmetic barrier, yet prove effective against vehicular penetration attempts.

Not cosmetically pleasing but effective are simple barriers which can be used as delay pieces or prohibitive penetration devices. Old truck or heavy equipment tires buried half in the ground and half out of the ground filled with reinforced concrete make a formidable barrier to delay vehicular access. Flower beds have been used to make deploying old tires more pleasing to the eye.

Common guard rails, guard cables and steel beams in multiple configurations mounted on I beams driven into the ground and surrounded with several feet of deep reinforced concrete to ground level are very effective against vehicle-mounted assaults.

Cabling mounted to fence posts and tied to a “dead man” (massive reinforced concrete blocks buried in the ground to which the ends of the cable is attached) aid considerably in the effectiveness of fence and vehicle gates to delay or stop vehicle penetrations.

Vehicle gates can come in as many architectural cosmetic designs and styles as the security

requirements, physical limitations, and staffing dictate. Gates can be swing, slide, raised overhead or simple single swing barriers. I have seen vehicle traps, hydraulic bollards, electric bollards as gate supplements too.

I have also seen the gate operation devices on the unsecured side of the gate because of faulty designs by folks not thinking of the application for which the gate is being installed. Remember, keep all the electronics and operational components — power cabling, breaker boxes, everything — on the secure side of the fence and barriers.

Pedestrian Control

Turnstiles are a common barrier for pedestrian traffic. Designs range in height from waist-high, pleasant-looking single-pass units to 7-foot single-passage units with anti-passback shields to prevent two people from using the same credential to gain access. They are usually integrated with another barrier, such as a wall or fence.

Swing gates come in two basic models; single or double gates. Most double gates are designed with the option to open individually or together. Depending on the application, gates can open into the controlled area or to a sally port with a second set of gates. A sally port gives the opportunity to search people and vehicles in a controlled environment away from the operator. It allows for a close inspection of the chassis, passenger/operator compartments and areas where materials are carried prior to granting access into a facility.

Note that the second set of gates must be equal to the perimeter gates to maintain effective perimeter control. Operational controls for gates must always be in a controlled area away from persons operating vehicles or attempting pedestrian access to a facility.

Protection of gate controls is important for swing, sliding, lift, vehicle or pedestrian or any other gate or turnstile. Providing for security-type hinge designs is important to eliminate the removal of the gates' pins and hinges to gain access.

Walls and Doors

Walls can be designed to provide deterrence and delay to a protected area. There are many types of walls. Unless you are a member of the building design team, in most cases you are left with the walls designed for the original building purpose. Walls are commonly made of concrete, reinforced concrete or concrete block, while some older buildings still have cinder blocks, metal, wood, and composite materials. Walls are a barrier but, the type of construction can require enhancements to secure the assets or materials being protected. A general rule is the thickness and material of the wall construction will determine the resistance to penetration. Always consider the walls in the collective information gathered when evaluating the security of a facility.

Doors are the gateway to your assets. Skimping on the design, framing and material quality determines the effectiveness of your doors. Doors are designed to allow passage of vehicles and pedestrians.

Selection of the correct door is important. In most cases, the adversary evaluates the doors to a facility over walls or roof access. Most industrial applications receive steel doors and frames for the durability and effectiveness of the product in that type of rough and constant-use environment.

There is an ongoing discussion between those who seek to install a cosmetically pleasing door and those who see the door as an easy location for a security breach. In the case of an explosion, glass doors provide many shards of glass moving through the air with great velocity and add considerably to the potential for serious injury. Obviously, a corporate office building cannot be designed with steel and steel-framed front doors; however, ensuring an adequate standoff distance from glass doors adds to mitigation efforts of a possible explosion.

Doors also create challenges of egress when the door designed to slow unauthorized entry is a fire exit door and must be able to be opened at any time when necessary as an emergency exit. The necessary alarm issues, authorized delay mechanisms and re-closure are issues for another discussion but are worth mentioning so as to not overlook their applications.

Areas to consider when specifying doors are security pins to prohibit an adversary from lifting the door off the hinges. Split-spindle locks allow the door to always be locked on the unprotected side, and to be opened with a key and relock automatically. They allow exit from the protected side, and have a heavy closer to ensure the door is latched when closed.

The common doors for vehicle building entry are corrugated steel roll up doors. These doors provide little deterrence to a determined adversary, but are a good barrier to the opportunist taking advantage of an unclosed or secured door to enter a loading/unloading dock area to see what of interest may be found. The best policy to ensure protection is to enact a policy that doors are only open when there is a truck or trailer backed up to the door for loading/unloading and always closed when there is no one present from the business, such as break times, lunch times and at the end of the day or completion of service to the truck or trailer.

Door Hardware and Windows

Locks are as important as the barriers themselves. Without the proper locking system, all the effort to develop, install and maintain the barriers surrounding it are wasted. The variety of physical and electronic locks is quite varied.

Look for minimum requirements for the application you are dealing with. Go above those minimums in your research for the best locks or system for your needs. Accept the fact that very rarely will one type of lock be applicable to every opening in the facility you are securing.

Windows are another discussion item between security practitioners and design people. Design the facility without first floor windows — it is a great statement if you can get away with it. Normally, that is not going to happen, so how do we attempt to mitigate the openings windows make in securing a facility?

Windows provide a challenge because they are normally glass. Laminating the glass can help a blast from sending shards flying from the window. Wire glass can slow down, but not stop someone determined to make entry. Tempered glass breaks into small pieces. However, no single solution is

going to provide the secure window openings we desire.

That does not prevent us from using combinations of materials and additional items to slow down the entry process. Grills or steel mesh can be installed over laminated windows. Screens of galvanized or stainless steel can add to the resistance of the barrier. By sufficiently anchoring the window frame, it will provide additional resistance to entry. Always research codes prior to determining what type of materials to use. Just by looking at windows with security enhancement, the potential adversary may decide to look elsewhere for their next victim.

The Roof

In most cases, roof entries are invited. By that I mean there is an entry portal on the roof, accessed by a permanent ladder mounted on the side of the building. The roof entry has some legitimate functional support for operations and is necessary.

The security challenge is to block easy access to the point of entry. Ladders must be screened off by a locked metal mesh cover to prohibit easy use. Some ladders are raised above ground level and require a ladder from the ground to access the bottom rung. Do not be careless and leave a ladder conveniently placed for use. Mount a locked metal mesh screen over all the ladders at the facility.

Vaults

Vaults provide the highest level of access control to assets. Most are of such construction that they are a separate, standalone structure which must be installed during the very early stages of building construction. The doors — made to withstand severe attack — are still the vulnerable point. Protecting vault contents involves all the materials and items mentioned, along with a sophisticated intrusion detection system.

The technologies discussed are not standalone items for protection. When used together and with electronic equipment, they can provide us with the protective qualities we desire or are required. The wise practitioner is constantly reviewing manufacturer's literature, attending trade shows for hands-on evaluation and dialogue with manufacturer's representatives, and networking with colleagues to stay current on the best equipment and materials for their specific applications.

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Outdoor Microwave Intrusion Detection

Southwest Microwave has unveiled the Model 310B-33456 Explosionproof Outdoor Microwave Intrusion Link for intrusion detection in the presence of flammable, combustible and easily ignitable materials. The sensor, which features a 328 foot (100 meter) detection range, is designed to operate at oil refineries, chemical and petrochemical plants, petroleum or chemical storage facilities and other sites where hazardous materials are handled, processed or stored. Transmitter and receiver components are housed in weatherproof, explosion proof enclosures that meet ratings required for hazardous areas. The unit will alarm on a 77 lb (35 kg) target walking, running, jumping, rolling or crawling through the detection pattern.

Fence System

Omega II Fence Systems has introduced Harmony, a newly designed fence system. The fence's curvaceous form gives an appealing touch to your landscape without sacrificing safety or security. Panels are made from high-strength welded steel wires, 4 Ga horizontal and 6 Ga vertical, with reinforcing bends and mesh openings of 1.75x7.75 inches. It is available in 4- and 6-foot heights and available in black (standard color) as well as many other colors on request.

HD License Plate Recognition

Avigilon's High Definition (HD) License Plate Recognition (LPR) system is a fully integrated optical character recognition module for the supplier's Control Center HD surveillance software. The system delivers single and multi-lane license plate recognition from a single camera with HD accuracy. It includes flexible post-incident search capabilities and on-screen and e-mail alerts from imported watch lists. It provides added security in parking lots and at border crossing checkpoints, and facilitates access control in secured parking facilities and gated communities for greater overall protection.

Fiber Optic Perimeter Protection System

Future Fibre Technologies has launched Secure Zone, a zone-based perimeter protection system. The system is a mid-range derivative of the supplier's flagship product, Secure Fence. The system is equipped with the supplier's ARaD technology, which uses signature recognition and advanced learning algorithms to "know" the difference between an environmental nuisance alarm and an attempted intrusion. The system also has the ability to interface and activate CCTV systems, lighting, gates, e-mail, plus a range of external devices and systems. The fiber optic sensor cable is easily attached to a fence to detect intrusion attempts, and the system can be configured so that if the cable is cut in one zone, the remaining 15 zones continue to operate normally.

Glass Barrier Optical Turnstile

Designed Security Inc.'s Invisigate Glass Barrier Optical Turnstile delivers tight access control while complementing the aesthetics of today's building lobbies. The units enable high-speed throughput, while the glass barriers indicate to pedestrians that authorization is required to enter the secured area. The barrier starts 4 inches from the floor and can be configured to be as high as 6 feet, 8 inches — providing a full-height lockable barrier. The turnstile is field-configurable for card-in/card-out or card-in/free-exit operation with no additional programming.

Optical Turnstile

Boon Edam has introduced the Trilock 900, which provides an effective means of controlling

pedestrian access. The unit features a reliable mechanism, stylish design and space-efficiency cabinet. A custom finish and modular concept enables the units to fit easily into most surroundings. Access through the turnstile is granted when authorization is accepted via an access control system or external control panel. Upon authorization, the mechanism unlocks and the armset is pushed for a rotation of 120 degrees.

License Plate Bollard Cameras

Vista has released a new range of ANPR (automatic number plate recognition) bollard cameras, designed to capture number plates for situations where entry/exit barriers are already in use. The cameras can be used as standalone units or in conjunction with the supplier's VNPR software. The use of IR LED illumination means that there is no need for regular bulb changes. It also ensures that reliable images can be collected day or night.

License Plate Recognition Integration

Genetec and iView Systems have partnered to integrate Genetec's license plate recognition technology into iView's iTrak Incident Reporting and Risk Management Platform. The Intelligent License Plate Recognition Software employs Genetec's AutoVu Sharp IP-based license plate recognition camera, delivering advanced digital video processing and plate matching against registered license plates, vehicles and subjects within the iTrak reporting platform.

Glass Barrier Turnstile

Gunnebo Entrance Control Inc. has released the OptiStile 720 entrance control product, which incorporates customizable aesthetics to accent any entrance design. Features include variable glass shapes, style and color along with lid designs and custom finishes. The unit offers three distinct modes of operation (normally open; normally closed and optical only) which can be tailored to specific work flow, peak entry/exit hours and required level of security.

Heavy Duty Slide Gate Operator

Chamberlain Professional Products has introduced the LiftMaster Variable Speed Heavy Duty Slide Gate Operator (Model VSL 595). The unit is an ideal gate operator for commercial applications where securing an opening quickly and efficiently is vital to the location, such as airports and manufacturing plants. The unit is equipped with a high-starting torque, continuous-duty industrial DC motor and supports gate lengths up to 70 feet and 1,700 pounds. Other features include manual disconnect, an integrated three-button control station and an external reset button.