Fear of Parking

By Randy I. Atlas, CPP

Last June, 18-year-old Kelsey Smith was forcibly abducted from the public parking lot of an Overland Park, Kansas, Target store. Her body was found four days later in a Missouri park about 20 miles away. In August, in Macon, Georgia, John Fox was returning to his car in a downtown public parking deck when he was accosted by a robber who used his gun to hit Fox several times on the head, then stole Fox's wallet and keys. And on September 5, the *EastBay Express* news Web site published an article called "Lots of Trouble," that reviewed the explosion of crime the previous summer in the parking lots of San Francisco's Bay Area Transit System, reporting that "In the Bay Fair station's parking lot June 9, three teens beat a man about the face and fled with his phone and laptop…. At the Coliseum station [on June 17], six men attacked another, hurling him to the ground and demanding his money."

These are just a few examples of the plethora of crimes that take place in parking facilities. In fact, it has been estimated by an ongoing series of studies on premises security liability by Norman D. Bates, president of Liability Consultants, Inc., that as much as 40 percent of rapes and assaults take place in parking lots.

PHOTOGRAPH BY JONATHAN BARKAT

During my career, I have noted that major errors in the design and operation of parking facilities arise from the mindset that these are merely stables for vehicles and not places where human behavior occurs. Among the resulting problems from this shortsighted design approach can be an environment with numerous hiding spaces as well as poor visibility created by high walls, structural columns, and multiple levels. Even worse, subsurface or underground parking facilities often include no outside visibility.

Another typical problem is poor entrance and exit planning, with signage that does not help users move quickly or logically through the facility. Often, pedestrian access points fail to provide natural surveillance from the sidewalk through the garage door, and perimeter access by persons walking or driving is usually unsupervised.

Parking facilities also fall into the trap of applying the same access protocol across the board without factoring in staffing patterns, late evening checkouts, or other site-specific use considerations. Often, electronic security measures for surveillance and access control are inadequate or absent.

Finally, the facility is usually dirty and poorly maintained. Vandalism, graffiti, and general disrepair sends a clear signal to potential criminals and other undesired users that the site is fair game. At the same time, it makes legitimate users feel afraid. If legitimate users stay away out of fear, then no sense of territoriality will develop, and those users won't feel any involvement in keeping undesired users away.

Parking areas can avoid these problems if they use the precepts of crime prevention through environmental design (CPTED). By following CPTED principles, security can lead criminals to see parking areas as places where they will be observed and where suspicious behavior will be challenged.

CPTED incorporates five principles. The first is the use of natural surveillance. Sites are designed so that users can see farther and wider, making it harder for criminals to hide or carry out their activities. The second principle is the creation of natural access control, including spatial definition that encourages legitimate site users and discourages illegitimate ones. The third principle is the encouragement of territorial behaviors by legitimate users. The fourth principle is management and maintenance of the facilities to meet industry standards of care. The fifth principle of CPTED is legitimate activity support, and encouraging and attracting legitimate and legal users and uses.

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Vulnerability Assessment

The first step toward parking lot security through CPTED is to conduct a security vulnerability assessment. Generally, in the United States, the standard of care dictates that the assessment include a criminal history of the site, a review of landscaping, lighting, stairwells, elevators, surveillance capabilities, access control equipment, and signage, as well as an inspection of revenue collection, supervision, and restroom facilities. The policies and procedures for the operation and staffing of the parking facility should also be scrutinized.

Many "who, why, what, when, where, and how" questions should be asked, including: What type of community does this parking facility serve—shoppers, commuters, students, or employees? How many cars frequent the facility and how quickly do spaces turn over? Are there clear lines of sight? Are there obstructions by walls, columns, or ramps? What are the hours of operation and how do those hours affect the user environment? Is the lighting all or mostly natural or is it man-made? Is man-made lighting at ceiling height? If so, what is the color of the ceilings and how are the lights placed? Is there a CCTV system, and if so, what are the details of the system? Are there ground floor protection measures, such as gates, screens, and barriers?

Additional questions should address vehicle and pedestrian entrances, whether there are required paths of mobility for

planting a solid hedge, it is more effective to combine low hedges and high canopy trees. All trees and bushes must be properly maintained to provide a good field of vision and to avoid creating hiding places. Plantings that are higher than three feet should not be placed within 10 to 15 feet of entrances to prevent hiding spots. Mature trees should be pruned to 8 feet.

Traffic engineers often encourage multiple access points to increase circulation patterns. However, this may not be the best approach. The more entrances there are, the more difficult it is to control the users and uses of the facility. The CPTED recommended method is to have one means of entry and exit for all vehicles. If the volume of traffic requires more, then each subsequent access point should have an attendant booth, access gate arms, roll down shutters for after-hours closure, CCTV, and good lighting.

Pedestrians. Unfortunately, it is often forgotten that while parking garages are designed to move cars in an orderly and efficient way, these cars are providing a means for people to arrive at a destination. Pedestrian access is one of the most commonly overlooked and poorly thought-out design features of parking facilities.

For example, full handicap accessibility is a key design consideration that should include dedicated handicap spaces, ramps, railings, and floor surfaces. Parking garages must include pedestrian crossovers and dedicated pedestrian paths, as well as adequate stair design. The location and design of elevators also needs careful consideration.

A primary rule is to avoid forcing pedestrians to cross the paths of the cars whenever possible. When such encounters are unavoidable, the design should create a safe passage for persons to move along until they come to a marked crosswalk that cautions drivers to take notice. Architects can design the pedestrian paths to intersect with, or pass by, the parking attendant station to create the opportunity for surveillance and monitoring.

Approved pedestrian entrances should be clear of obstructions and distractions to encourage use. Unapproved entrances on the ground floor should be securely

STAIRWELLS CAN BE AN ATTRACTIVE location from which an assailant can attack users. To prevent this, stairwells should be visible from grade level and be constructed of clear glazing materials to allow visibility from the street.

Americans with Disabilities Act (ADA) compliance, the condition of the elevators, stairwell placement and visibility issues, and whether there is selective closing of lightly used areas.

On the Ground

At the ground level, garages need to define the perimeter and control access to deter unwanted pedestrian-level access to the facility. Controls can take the form of fencing, level changes, ground floor protection, and other architectural and environmental barriers that channel people to designated entry points and discourage others from hiding outside and inside the property or buildings.

Ground-level metal screening should

be used to prevent or deter unauthorized access, while upper floors should be open with cable strung to prevent cars from overshooting the parking spaces and toppling off. Screened, rather than walled, ground levels and open upper levels allow natural surveillance and make it more likely that calls for assistance will be heard.

Ground-level screening should not be floor to ceiling, however, as that can give a criminal a way to climb to higher floors. It's also a good idea, when space permits, to place short bushes close to the perimeter wall to discourage persons from climbing or cutting the screen.

Additional landscaping should be intermittent in size and texture. Instead of

locked in compliance with building, fire, and life-safety codes.

Toll booths. In the summer of 2006 at the City Place Mall in West Palm Beach, Florida, a parking attendant observed two men loitering suspiciously in the parking garage. She locked herself in the booth, but she did not have a radio or telephone to call for assistance. The robbers broke in with a baseball bat, beat the attendant, and took the contents of her cash drawer.

Toll attendants, such as the woman in this case, are thought of as guardians of the garage, but they are often targets of crime, because criminals believe that they hold the money. To protect these workers, attendant booths need to be situated in an area with a 360-degree field of view, be monitored and recorded by CCTV, and possess security glazing, duress alarms, and drop safes with signage advertising that the attendant cannot retrieve money.

The booths must also have adequate levels of security lighting with placement to support CCTV coverage. Lighting should be dimmable to allow a guard to see outside at night.

The attendant's restroom should be located near the attendant booth in an area open to surveillance opportunities. The bathroom should be locked and have a personal alarm inside in case of attack.

CPTED-minded designers should exclude public restrooms from their designs because they serve as a natural meeting place for victims and predators and are difficult to secure without violating privacy rights. If the inclusion of public restrooms is unavoidable, then they should be placed so that the doors are visible from the attendant's normal working position. The bathrooms should have open maze-type, "lazy S" entrances that allow cries for assistance to be heard. Panic alarms and motion-activated lighting should also be installed.

Structural Elements

If a facility is being newly built, then structural support elements should be round rather than rectangular. A round column allows for much greater visibility around the corners than a rectangular or square column. Also, the most CPTED-oriented ramp design is an exterior loop that
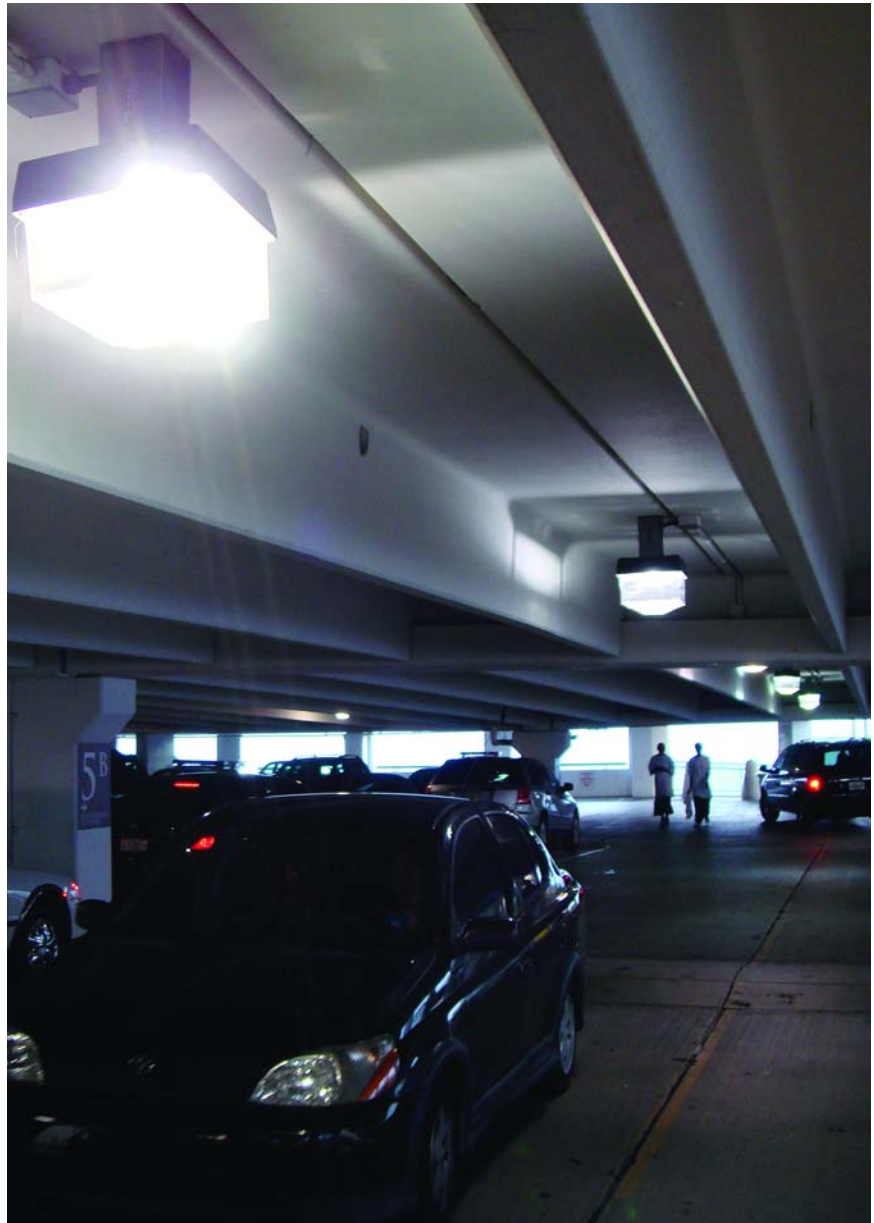
METAL HALIDE LIGHTING is most popular among CPTED practitioners because of its long life and its ability to accurately portray the true color of cars, clothes, and people.

allows floors to be level and to preserve unobstructed lines of sight. Where solid walls are needed, portholes with screening, windows, or openings wherever possible should be incorporated to create an openness that encourages and enables casual observance.

Stairwells and elevators should be located centrally and should be visible from the attendant's position. However, the sides of many parking garages are enclosed to hide the perceived unsightliness of cars. In these structures, where stair-

ways and elevators can exist in blind spots, CCTV should be placed to monitor comings and goings, and panic alarms and door position switches should be installed to alert the toll booth attendant that someone is in a stairwell.

Stairwells should be visible from grade level and be constructed of clear glazing materials to allow visibility from the street. Stairwell terminations at the lowest level should not offer accessible hiding holes. Those stairwells that exit onto the roof, if the roof itself is not also a parking

THE METAL SCREENS over the ground-floor windows at this Louisville, Kentucky, parking garage allow for natural surveillance while also preventing unauthorized access. Such screening also increases the likelihood that calls for help will be heard.

ment. Cameras should be color, rather than black and white, to make it easier to identify specific vehicles and persons, especially in the playback mode. The use of color can make a significant difference if a crime occurs and the garage operators want to recover important evidence.

Panic-button call boxes should be integrated with the video surveillance system, allowing a camera to be activated when a call box is pushed. CCTV systems can also be integrated into the access control system so that license plate numbers can be entered into a log when vehicles enter or exit the parking facility.

level, should be secured to prevent unauthorized access.

Doors to mechanic rooms on the roof level should always be locked. Both basement and rooftop doors should be wired for door-position switches, intercoms, screech alarms, and signal transmission to security or police.

Elevators, like stairwells, should incorporate as much glass and high-visibility placement as structurally possible. For example, glass-walled elevators placed along the exterior of the building provide for good natural visibility by persons on the street and within the garage. In addition, they should have intercom capability to comply with ADA accessibility guidelines, as well as audible alarms in case of a breakdown.

The stairs and elevators of high-rise or subsurface parking garages that serve offices, residences, or other mixed uses should empty into a lobby, rather than going directly to business or residential floors. Persons exiting at the lobby are then forced to use another dedicated bank of elevators or stairs that can be subject to screening, access control, and surveillance by security staff if desired.

Surveillance

CCTV cameras should be placed in areas with constant light (daylight or luminaries) to provide proper illumination for the lens. Low-light cameras can be used, but they are more expensive and represent a

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tacit admission that lighting conditions might be poor.

Cameras should be placed to achieve an unhindered view of the area. On surface parking lots, cameras should have good lines of sight and cover as much ground as possible. The cameras should be protected within dark polycarbonate domes. Cameras with this feature are less likely to be vandalized. The dark domes also help obscure where the cameras are directed.

CCTV systems in parking facilities need to be monitored in real time and digitally recorded for playback and enhance-

Lighting

Without good lighting, CCTV systems become relatively useless and natural surveillance is impaired. Lighting in garages is addressed in detail in the IESNA G-1-03 security lighting guidelines.

The guidelines generally recommend lighting levels of 5 to 6 foot-candles in gathering areas such as stairs, elevators, and ramps. Walkways around garages should be about 5 foot-candles. A minimum of 3 foot-candles should be used in open parking lots, such as in retail shopping areas, as well as in parking lots for hotels, motels, and apartment buildings.

Entrances should have 10 foot-candles of lighting or twice the level of lighting in the surrounding area to make them stand out and increase visibility. Perimeter fencing should have at least one-half foot-candle of average horizontal illumination on both sides to reduce hiding spots.

The height of the light fixtures makes a

difference in the ability of pedestrians to see past the shadows caused by the cars and other obstructions naturally occurring in parking lots. Typical light poles are 30 to 45 feet high and cast a wide swath of lighting, but they create deep shadows between cars. Lighting that is in the 12-to-14-foot range casts light that will go through the glass of cars and reflect off the cars, which can dramatically reduce shadows and dark spots. Ideally, an open parking lot should have a combination of high and low lighting to provide maximum coverage and maximum visibility, with minimum shadows and hiding opportunities.

The interior of parking garages should be painted in light colors to increase re-flectivity of the luminaries. Luminaries should use polycarbonate lenses for vandal and break resistance. Maintenance protocol should be established to ensure that damaged lights are repaired and that burned out bulbs are replaced in a timely manner; there should be a schedule for replacing existing bulbs based on their known life expectancy.

One innovative measure taken by a garage in Ft. Lauderdale, Florida, was to paint the ceiling in white circles that reflected the light from the luminaries. The ceilings of this garage were higher than most, which allowed better light distribution by reflection and refraction of light.

Guardhouses and paths to garages must be illuminated to provide clear and unobstructed mobility paths. Lighting should be approximately 3 foot-candles to allow visibility of persons from at least 30 feet away, with an average-to-minimum uniformity ratio not to exceed 4:1.

When selecting bulbs, garage owners or operators should be aware of the color rendition of the type of lighting selected. The color rendering index (CRI) is used as the measure for the light source to accurately reproduce the true color of an object.

The current lighting source of choice by most CPTED practitioners is metal halide because of a lamp life of approximately 20,000 hours and a CRI of 90 out of 100. Their bright white sparkling light accurately portrays the color of cars, clothes, and people.

Low-pressure sodium vapor (LPSV) lamps typically last about 50,000 hours and are the most energy efficient lamps, but a CRI of 0 makes everything yellow or brown. This means that LPSV lamps are less than ideal for crime scene details. LPSV lamps have been used extensively in Canada and by some cities in the United States on highways and bridges, and in airport parking lots. LPSV are also used in industrial applications for night parking. But these parking applications do not have the same crime prevention issues as the typical commercial parking facility.

Some garages do not have cameras, so they do not need to worry about color rendition for recording images. If they do want to record camera footage, however, the type of source light is an important decision. Garages and parking lots have commonly used high-pressure sodium vapor (HPSV) lamps and mercury vapor lamps because they are commercially available, used commonly on roadways and highways, and less expensive than metal halide.

Their lamp life is, however, not as long as metal halide and color rendition does not provide the full color spectrum of metal halide. When long bulb life and full color spectrum are important, HPSV and mercury vapor lamps are not as good a choice as metal halide, especially if the garage is using color CCTV, which does better with full spectrum light.

There is not one right lighting solution for all facilities. The CPTED approach al-

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» SYNOPSIS

It has been estimated that as much as 40 percent of rapes and assaults take place in parking lots. Major errors in the design and operation of parking facilities arise from the mind-set that these are merely stables for vehicles and not places where human behavior occurs.

The problems resulting from this shortsighted design approach can include an environment with numerous hiding spaces, as well as poor visibility created by high walls, structural columns, and multiple levels. Even worse, subsurface or underground parking facilities often include no outside visibility.

Parking areas can avoid these problems if they use the precepts of crime prevention through environmental design (CPTED). With CPTED, criminals can be made to see parking areas as places where they will be observed and where suspicious behavior will be challenged, making it not worth the risk and effort.

CPTED incorporates several principles. One is the use of natural surveillance. Sites are designed so that users can see further and wider, making it harder for criminals to hide or carry out their activities. Another principle is the creation of natural access control, including spatial definition that encourages legitimate site users and discourages illegitimate ones. A third principle is the encouragement of territorial behaviors by legitimate users.

The principles of CPTED can be applied to correct problems such as poor entrance and exit planning, signage that does not assist users to quickly or logically move through the facility, pedestrian access points that fail to provide natural surveillance, and perimeter access by persons walking or driving that is unsupervised.

CPTED recognizes that a tolerance for vandalism, graffiti, and general disrepair sends a clear signal to potential criminals and other undesired users that the site is fair game, just as it makes legitimate users feel afraid. If legitimate users stay away out of fear, then no sense of territoriality will develop and those people won't get involved in keeping undesired users away.

lows for diversity in lighting, based on a risk and threat assessment and a clear understanding of what experience the garage owner seeks for the user.

Signage

Parking facility signage should be well lit, with letters or symbols that are a minimum of eight inches high. Wall signage for pedestrian and vehicular traffic should be graphic whenever possible to ensure universal understanding and provide a sense of clear direction. To aid outgoing drivers, parking areas should be marked with graphics and with color-coding to help patrons easily remember the location of their cars. Walt Disney World's parking lots offer a classic example of how graphics, signage, and one-way traffic flow can allow effortless parking for several hundred thousand people a day largely without incident.

Technology is now available to easily direct drivers of incoming vehicles to a specific floor or parking space. Advanced parking systems (APS) use sensors, radio frequency, and other technologies, to obtain information about the location of available parking spaces, process it, and then present it to drivers by means of variable message signs.

APS can be used in two ways. First, APS can guide drivers in congested areas to the nearest parking facility with empty parking spaces. Second, an APS system can be used to guide drivers within parking facilities to empty spaces. Although the former function is more common, guidance systems within parking lots are becoming more popular.

The need for APS is most prominent in very dense areas, where the search for parking facilities congests and interrupts traffic flows. While European cities have shown the most interest in APS, having implemented it in the late 1970s, American cities have been testing APS in the past decade.

Illegitimate signage. Graffiti in parking environments is a form of illegitimate signage, which often means that gangs or vandals loiter there. It should be removed as quickly as possible.

The CPTED-minded architect can also take steps to discourage graffiti. Wall sur-

faces can be coated with graffiti resistant epoxy paint and lighting levels can be increased in problem areas to allow for natural surveillance. The specific steps security takes are not as important as the decision to act. Efforts to prevent graffiti tell vandals that the property is the territory of its rightful owners.

Mixed Uses

The territoriality of desired site users has also been increased by a new trend: making parking part of a mixed use development. By having legitimate users in and around the parking facility more frequently, the garage increases the number of legitimate users and casual "eyes on the street."

Many garages are adding retail storefronts, such as copying facilities, fast food eateries, or car washes to provide compatible safe activities that draw legitimate users. Additionally, parking may be reserved during the day for businesses, then the lot may become flat-fee parking at night for area nightclubs and restaurants.

When a parking facility assesses risks and threats and uses a holistic CPTED approach to improving security as discussed here, the opportunity for crime will decrease, undesired elements will search for new ground, and a safe haven will be created for legitimate users. ∎

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