Crime Prevention Through Environmental Design

What is Crime Prevention through Environmental Design (CPTED)?

Crime Prevention Through Environmental Design (CPTED) is a multi-disciplinary approach to deterring criminal behavior by implementing specific environmental design strategies. CPTED strategies focus on the design of the built, social, and administrative environment to influence potential offenders before the decision to engage in a criminal act.¹

How to Incorporate CPTED

An integrated design approach that engages a multidisciplinary project team from the outset is essential to effectively incorporating CPTED (see Integrated Design Process strategy).

The primary principles of CPTED include:²

- **Natural Surveillance** – Allows and encourages people engaged in their normal activity to observe the space around them; eliminates hiding places, creates a sense of risk for people considering criminal activity

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Example: Install good lighting at all exterior doors, hallways and common areas.

- **Access Control** – Decreases criminal accessibility
  - Example: Clearly define entrances with architectural elements, lighting, paving and/or signage

- **Territorial Reinforcement** – Defines property lines and delineates private spaces; communicates expectations of the appropriate use of the space; builds a sense of community responsibility by intended users
  - Example: Differentiate private areas from public areas.

- **Maintenance** – Care and maintenance allow for the continued use of a space for its intended purpose while lack of maintenance indicates less concern and control by the intended user
  - Example: Keep all exterior areas clean and neat.

For an example of specific commercial design recommendations for each these principles see the City of Virginia Beach CPTED Guidelines.

Positive Relationships Between CPTED and High Performance Buildings

The goals of security and high performance design in new buildings can sometimes be in conflict, yet are at the top of the list of priorities in the post-9-11 world. This is particularly true in governmental and institutional structures. For example, bright lights in a parking lot enable security cameras to effectively monitor activity at night, but this same lighting can waste energy and cause light pollution. Large trees in a parking lot may cool the entire area but block cameras and create hiding places for criminals. Early collaboration between stakeholders, as with most sustainability initiatives, can integrate the needs of security and sustainability.

The conflict between cameras and more environmentally conscious parking lots can be overcome through strategic placement of lighting and the use of variable intensity lighting systems along, intelligent lighting control, and video analytics. Video analytics systems track only specific activity and can warn security when it takes place. Further,

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these systems can be used to control lighting as needed to maximize security and energy efficiency.\(^6\)

There are many other examples of how CPTED strategies can work with high performance goals. Below is a list of a few examples:

- **Lighting**: Green building strategies often call for natural light and use of windows, while security-minded design might seek to minimize windows and utilize artificial lighting. Smart controls can schedule lighting intensity and sensors can raise or lower lighting levels based on activity in a room. Smart controls can identify security guards for example, keep lighting minimum during route patrols as they are constantly on the move, and not call-out the presence of security to potential intruders.\(^7\) Daylit spaces can be evacuated more quickly in the daytime if power is interrupted.\(^8\)

- **Ventilation**: Sealed windows can prevent air contamination and break-ins, but natural ventilation needs operable windows. Occupancy sensors can automatically shut windows in unoccupied rooms, and HVAC systems can be turned on and off based on activity in a room.\(^9\) Tighter building envelopes can have two benefits – reducing energy loss from infiltration while helping to pressurize a building as well as limiting the entry of airborne hazards. Particle air filtration protects occupants from biological agent attack, protects occupant health, and reduces HVAC coil fouling to improve heat exchange efficiency. Ultraviolet lights in air handling systems can control mold growth and offer protection against some bacteria and other biological agents.\(^10\)

- **Landscaping**: Secure building landscape can also blend into the natural environment and minimize alterations to the earth. Blast mitigation can be achieved through variable grading – a building’s structure can fit into the natural contours of the land. Hills can act as natural shields to blasts and also prevent vehicles from ramming buildings.\(^11\) Smart site planning can provide a wide buffer

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\(^7\) Daniel O’Neill.


\(^9\) Daniel O’Neill.

\(^10\) Jeffrey Harris, William Tschudi, Beverly Dyer.

zone to keep vehicles away from the building.\textsuperscript{12} Retention ponds and berms can control erosion, manage stormwater, and reduce heat islands while acting as physical barriers to a building.\textsuperscript{13}

- Windows: Window replacements or add-on films to improve blast-resistance in existing buildings can also improve thermal performance of windows.\textsuperscript{14}
- Power: On-site power systems can keep buildings operating when there are utility system outages (see \textit{Passive Survivability} strategy).\textsuperscript{15}
- Fire Safety: Dry fire hydrants can save water and ensure fire safety. Dry hydrants are non-pressurized suction pipe systems that are permanently installed in ponds or lakes that use untreated water, rather than municipal water, to fight fires. These systems can supply water during natural disasters and when the power grid is down.\textsuperscript{16}

**Trade-Offs Between CPTED and High Performance Building**

Some conflicts persist between CPTED and high performance building. Overly secure “fortress” designs for safety may minimize daylighting and passive solar gain. Sealed building envelopes can preclude the ability to open windows in temperate climates. High performance air filtration systems may increase energy use by the use of air-handler fans and security systems and lighting may increase energy use.\textsuperscript{17} Separating bicycle parking, and other transportation options from the building for security reasons may discourage the use of non-polluting sources of transportation.\textsuperscript{18} In all cases, early planning is necessary to avoid as many trade-offs as possible.

\textsuperscript{14} Jeffrey Harris, William Tschudi, Beverly Dyer.
\textsuperscript{15} Jeffrey Harris, William Tschudi, Beverly Dyer.
\textsuperscript{17} Jeffrey Harris, William Tschudi, Beverly Dyer.
\textsuperscript{18} Richard Paradis and Bambi Tran, Steve Winter Associates, Inc.
Example

Rowan Boulevard, Glassboro, NJ

The Rowan Boulevard project connects Rowan’s campus to Glassboro’s central business district. Concerns about safety are addressed by incorporating the principles of CPTED into the project.19

http://www.njfuture.org/index.cfm?ctn=9t45e1o30v9g&emn=5u92y86g2h42&fuseaction=user.item&ThisItem=936

Wayne L. Morse United States Courthouse, Portland OR

This project successfully integrated high-level security measures with high performance goals. The courthouse was named one of the American Institute of Architects top ten green projects in 2007.


Benefits

- Improves safety and security
- Provides potential to optimize energy efficiency: increased sensing and control capabilities needed to manage emergency systems in buildings can provide increased efficiency to systems that meet day-to-day needs

Costs

Investing in security systems can mean replacements or new construction – this can be an opportunity to invest also in energy efficient systems that will pay for themselves in the long run.20

19 NJ Future. http://www.njfuture.org/index.cfm?ctn=9t45e1o30v9g&emn=5u92y86g2h42&fuseaction=user.item&ThisItem=936 (accessed April 23, 2011).
Resources

School of Criminal Justice at Rutgers University - CPTED
http://crimeprevention.rutgers.edu/case_studies/cpted/cpted_intro.htm

The International CPTED Association
http://www.cpted.net/

Whole Building Design Guide - Balancing Security / Safety and Sustainability Objectives
http://www.wbdg.org/resources/balancing_objectives.php?r=secure_safe

US DOE - Securing Buildings and Saving Energy: Opportunities in the Federal Sector

The CPTED Page
http://www.thecptedpage.wsu.edu/Intro.html

National Crime Prevention Institute – CPTED Assessment
http://louisville.edu/ncpi/training-assessments/security-assessments

Designing for Security: Using Art and Design to Improve Security
Guidelines from the Art Commission of the City of New York
http://www.designtrust.org/publications/publication_97security.html