

## Design proposal through CPTED case analysis

Hyun-Suk Han

Associate Professor, Department of Industrial Design, Dong-A University

# CPTED 사례 분석을 통한 디자인 제안

한현석

동아대학교 산업디자인학과 부교수

**Abstract** In the modern society, people live in an environment while sharing a space with each other and secure their own space for the safety. As interest in “Crime Prevention Through Environmental Design (CPTED)” securing the safety of citizens from crime through environmental design is increasing, this research studies the public space design realized in public environments which is explored through the understanding of the concept of public design. Through the various case studies conducted with the concept and cases of public design, a standard for proceeding with crime prevention design has been established. The research analyzes the results of successful cases with ten extracted keywords, and finally three design solutions for crime prevention were proposed through extracted keywords. Each design solution was evaluated by 25 CPTED researchers who participated in this project with Likert’s 5-point scale. Based on final evaluation results, the research will further investigate better and safe approaches and solutions for CPTED.

**Key Words** : CPTED, Public design, Crime prevention, Environmental design, Space design

**요약** 현대 사회에서 사람들은 서로의 공간을 공유하면서 환경 속에서 살아가며 안전을 위해 각자의 공간을 확보하고 있다. 본 연구는 환경디자인을 통해 범죄로부터 시민의 안전을 확보하는 CPTED(Crime Prevention Through Environmental Design)에 대한 관심이 높아짐에 따라 공공 디자인의 개념에 대한 이해를 통해 탐색이 가능한 공공 공간 디자인을 연구한다. 본 연구를 통해 공공 디자인의 개념과 사례에 대한 다양한 사례 연구를 통하여 CPTED의 진행 기준을 정립하였다. 본 연구는 최종 추출된 키워드로 각 성공 사례의 결과를 분석하고, 최종 10개의 키워드 도출을 통해 범죄 예방을 위한 세 가지 디자인 솔루션을 제안하였다. 각 설계 솔루션은 본 프로젝트에 참여한 25명의 CPTED 연구자가 리커트의 5점 척도로 평가 하였으며, 평가의 결과에 따라 향후 보다 안전하고 완성된 형태의 CPTED를 활용한 디자인 결과물을 제안하고자 한다.

**주제어** : CPTED, 공공디자인, 범죄 예방, 환경디자인, 공간디자인

\*This work was supported by the Dong-A University research fund.

\*Corresponding Author : Hyun-Suk Han(hyunsuk@dau.ac.kr)

Received August 25, 2021

Accepted November 20, 2021

Revised September 13, 2021

Published November 28, 2021

## 1. Introduction

### 1.1 Background and purpose of the research

In the modern society, people live in an environment while sharing a space with each other and secure their own space for the safe and stable living environment. Design acts as a tool to stabilize the mind of users and to prevent crime from unavoidable conflicts between users in shared environment. Numerous local communities are creating efforts to consistently lower the crime rate through crime prevention design. So far, the focus has been focused on strengthening the police administration as of a direct way to prevent crime, but interest in “Crime Prevention Through Environmental Design (CPTED)” securing the safety of citizens from crime through environmental design is gradually increasing[1]. CPTED strategies fundamentally emphasize territorial reinforcement, natural surveillance, and natural access control. In modified CPTED, activity support, image/space management, and target reinforcement were added[2].

If the factors influencing the psychological state of crime are limited to the element of space and the method of controlling user's behavior within spatial element, it is possible to prevent crimes by including the user and the environment from a broader perspective. and condition.

### 1.2 Boundary and method of the research

In this research, the space design realized in public is explored through the understanding of the concept of public design. Through the various case studies conducted with the concept and cases of public design, a standard for proceeding with crime prevention design has been established. Through the analysis of the environment in which crime occurs and the psychological state of committing crime, methods to prevent the occurrence of crime

were considered, and examples of the outcome were presented through the study of environment and design that can offset the psychology of crime. The research analyzes the results of successful cases with extracted keyword, and finally three design solutions for crime prevention were proposed through keyword. Each design solution was evaluated by CPTED researchers who participated in this project with Likert 5-point scale.

## 2. Factor analysis for crime prevention

### 2.1 Psychological state analysis for crime prevention

Situational crime prevention theory synthesizes and systematizes the theory of crime prevention, and changes the design and management method of the environment to reduce the chance of crime, and aims to block potential criminal intentions. The basic principles of situational crime prevention can be summarized as in Table 1[3].

Table 1. Basic principles of situational crime prevention

Subject	Content
Purpose of crime prevention	Reducing the chance of crime
Crimes to be prevented	Specific types of crime
Crime prevention law	It refers to the direct management, design and manipulation of environments in which crimes may occur, not the rehabilitation of criminals or general improvement of the environment.
The focus of crime prevention	Decreases the benefits of a crime by increasing the effort and risk of committing the crime

In the “broken window” theory of Wilson and Kelling (1982), the more chaotic environments or regions are left, the higher the likelihood of crime. In order to fundamentally block criminal psychology, awareness of the environment is more important[4].

## 2.2 Defining design for crime prevention

Since public space is shared by a number of users, it is impossible to avoid friction between users within the space. Therefore, the design for crime prevention will have a more important meaning in a space with a public character used by an unspecified number of people rather than being used in a private space. The meaning of CPTED changes continuously as time and socio-environmental attributes change. CPTED has been a concept of a product or service that restricts the behavior of unspecified users by simply using physical factors. In the past, CPTED emphasized the prevention of machine or man-made crimes, but the modern CPTED emphasizes comprehensive and balanced harmony while supporting natural surveillance, natural access control, and community territorial activities[5].

CPTED is divided into six types, including natural monitoring, territorial reinforcement, access control, clarity enhancement, activity activation, and maintenance. Each type overlaps and complements each other[6]. The fundamental purpose of CPTED is to restrain potential criminal psychology by controlling the built environment[7]. As CPTED indicates crime prevention through environmental design, and it refers to designing socially, culturally, and defensively against crime by using architectural design or urban planning elements[8].

## 2.3 Case analysis for CPTED





Design examples for prevention of various crimes can be analyzed both domestically and abroad. In addition, the design for crime prevention is being completed through a project carried out by an institution or its own organization. The Seoul Metropolitan Government is carrying out various activities through the “Seoul City Crime Prevention Design Project”, which is the first pilot project to be

carried out with an administrative organization. Through the crime prevention design pilot project, the Ministry of Education directly participates in school teachers and provides customized strategies for each school through expert consulting. Shinjuku, Japan, introduced an environmental design method that monitors through CCTV and secures openness using glasses, while Roppongi Hills increases the mobility of the population by placing entertainment facilities in the center of offices and residences.

As shown in Table 2, major successful cases of CPTED in South Korea were investigated and analyzed.

Table 2. Case analysis for CPTED

Image/Name	Content/Keyword
 Mi-dam Gil, Myeonmok-dong, Seoul[9]	<ul style="list-style-type: none"> <li>- The location of the market is marked in each section of the market in bright colors for easy and clear visibility at night.</li> <li>- Prevention of crimes by installing women's safety guard houses, etc.</li> </ul> <p>bright colors, guard house, clear visibility</p>
 Salt road construction project in Yeomni-dong, Seoul[10]	<ul style="list-style-type: none"> <li>- Designated 1.7km of salt road</li> <li>- Designating “paths of contemplation” or “healing points” and setting up sports facilities in various places, vitality is given to the streets.</li> <li>- Strengthening the natural surveillance of ordinary citizens</li> <li>- Accurately notifying the current location through emergency bells from 1 to 69</li> </ul> <p>vibrant space, natural surveillance, emergency bells, lights, cameras</p>
 Busan Crime Prevention Environment Design Project[11]	<ul style="list-style-type: none"> <li>- Crime prevention by reinforcing crime prevention facilities.</li> <li>- Keeping it bright and healthy by applying paint, murals, or environmental design</li> <li>- Lighting installation that doubles as a signboard and a gallery to guide the creation of the safe road</li> </ul> <p>bright environment, lighting, murals</p>
 Haengun-gil in Haengun-dong, Gwanak-gu, Seoul[12]	<ul style="list-style-type: none"> <li>- Development and application of integrated method module for LED security lights, reflectors, emergency bells, and warning lights</li> <li>- Surveillance of outsiders through front door mirror seat               <ul style="list-style-type: none"> <li>- Yellow painted fence</li> </ul> </li> </ul> <p>High saturation colors, bright lighting, warning lights, emergency bells, LED security lights, natural surveillance</p>

	<ul style="list-style-type: none"> <li>- Security of CCTV for crime prevention</li> <li>- Reflector installation, gas pipe cover installation, alley fence painting, flowerpot installation, information sign installation</li> </ul>
Sammal Park, Gongneung 1-dong, Nowon-gu, Seoul[13]	CCTV, reflectors, alley fence painting, flowerpot, information sign
	<ul style="list-style-type: none"> <li>- High proportion of the socially disadvantaged</li> <li>- Securing a sense of psychological openness by painting the walls of the alleyway</li> <li>- Information on complex alleyways through information boards</li> </ul>
Dalmoe Village, Wolsan-dong, Nam-gu, Gwangju-si[14]	CCTV, emergency bell, security light, road reflector installation
	<ul style="list-style-type: none"> <li>- Select a theme for each section on the wall and draw a mural with a bright design</li> <li>- Security emergency shelter installation</li> <li>- Implementation of crime prevention education program</li> </ul>
Sunrise Village, Cheonghak 1-dong, Yeongdo-gu, Busan[15]	- CCTV, safety emergency bell, road reflector installation
	<ul style="list-style-type: none"> <li>- Citizen-led method with direct participation of local residents from design to construction</li> <li>- Installation of alleyway safety design wall, emergency bell box, healing mural, lighting fence, shadow lighting, etc.</li> </ul>
Wonmaru-gil, Sejong[16]	Safety mural, landscape lighting, emergency bell box

### 3. Design proposals and evaluations for crime prevention

#### 3.1 Design direction for crime prevention

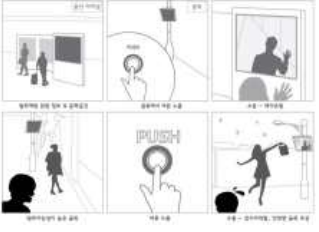
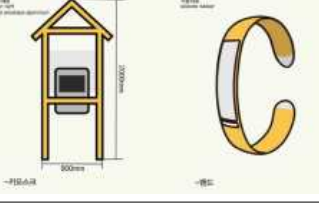
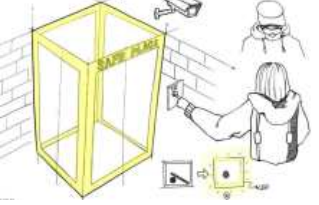
10 design directions were set by grouping the derived keywords, and various ideas and scenarios were developed based on the design direction.

Finally three design ideas and user scenarios are extracted with the concept of “CPTED media board”, “CPTED kiosk and self-defense band”, and “Crime prevention smart booth”. And the process for idea development and user scenario is following on Table 4.

Table 3. Keyword extraction for design direction

Top keyword	Sub keyword	Reference image
Durability	Safe and durable structure of the system which can acts as long-lasting public design	
	Safe and comfortable, safe alleyways, social distancing, round design, durable structure	
Openness	It requires open and wide space where visibility of the user is guaranteed.	
	Wide space, relaxed space, rest area, blind spot-free, fenceless environment	
Visibility	It shows the structure itself and needs to be clearly shown using clear and high saturated environment	
	Clear visibility, high saturation colors, brighter environment	
Brightness	Bright and vibrant space is needed for safe environment.	
	Bright colors, vibrant space, bright environment, bright surroundings	
Lighting	Improved visibility and brighter space can be created.	
	Lights, bright lighting, landscape lighting, spot lighting	
Surveillance	Space should be monitored by public using CCTV and etc.	
	Cameras, CCTV, natural surveillance, monitored spaces	
Mural	Environment with high saturated and brighter paintings on the wall or public space.	
	Safety mural, alley fence painting	
Warning	Environment should warn users regarding dangerous situation	
	Warning lights, emergency bells, LED security lights	
Naturalness	Environment should include natural elements such as plants, flowers, and etc.	
	Flowerpot, pleasant environment, guard house	
Informative-ness	Space should provide sufficient amount of information to users.	
	Information sign, safety signs, reflectors, road reflector installation, maps	

Table 4. Idea development & user scenario

Title	Idea development & user scenario
A CPTED Media Board (Hyeryun Lee & Minhee Lee)	
B CPTED Kiosk and Self-defense Band (Hyunjung Na & Namgyung Ha)	
C Crime Prevention Smart Booth (Yeongsung Sung & Hyeri Seo)	




### 3.2 Proposal of design examples for crime prevention

Based on the design keyword, a total of 3 crime prevention designs were derived. A is a media board to block criminal psychology which can be installed in allies or public spaces and can be used as advertisement board. B is a small booth where users can borrow and return self-defense products using a kiosk, and rescue request can be transmitted to the nearest police station. Finally, C is a independent safety booth where a user can protect him or herself from outside threats and overall status of the user can be transmitted to police and other related facilities.

### 3.3 Evaluation of design practices for crime prevention

Derived designs were evaluated by 25 CPTED researchers in six evaluation criteria of natural monitoring (NM), territoriality reinforcement (TR), access control (AC), clarity reinforcement

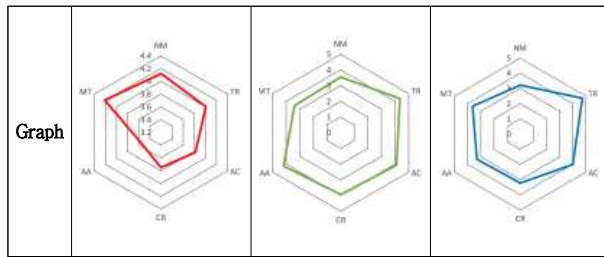
Table 5. Final design ideas

	Image	Analysis	
A		Summary	<ul style="list-style-type: none"> <li>- Media board to block criminal psychology</li> <li>- In normal use, it is used as advertisements and content that draws users' interest</li> </ul>
		Features	<ul style="list-style-type: none"> <li>- Users can communicate location and ask for help</li> <li>- The effect of blocking criminal psychology in advance with the role of a watcher through the media board</li> </ul>
B		Summary	<ul style="list-style-type: none"> <li>- Products that can borrow and return self-defense products through kiosks, an unmanned rental system located at places.</li> <li>- The band rented from the kiosk is connected to the nearest police station, a rescue request is immediately received by pressing the button.</li> </ul>
		Features	<ul style="list-style-type: none"> <li>- Built-in GPS for more accurate location</li> <li>- Users can deliver location information through the smart phone app</li> </ul>
C		Summary	<ul style="list-style-type: none"> <li>- Quick door opening &amp; closing</li> <li>- Recognizable from a distance &amp; criminals not allowed</li> <li>- Use of tempered glass and invisible mirror material</li> </ul>
		Features	<ul style="list-style-type: none"> <li>- Convenience/safety of use, Ease of access</li> <li>- Weather protection</li> <li>- Available at night (lit)</li> <li>- Use of tempered glass</li> <li>- Pager installation, visibility</li> </ul>

(CR), activity activation (AA), and maintenance (MT). Likert 5-point scale for each item was used for the evaluation, and final average pont came out to be 3.91(A), 3.93(B), and 3.67(C).

Table 6. Evaluation of design practices for crime prevention

	A	B	C
NM	4.12	3.55	3.21
TR	4.01	4.35	4.73
AC	3.82	4.11	4.01
CR	3.75	3.93	3.22
AA	3.55	4.22	3.31
MT	4.21	3.42	3.64
AVG.	3.91	3.93	3.67
Rank	2	1	3



#### 4. Conclusion

This research developed the public space design realized in public spaces which are explored through the understanding of the concept of public design. Various case studies were conducted with the concept and cases of public design, and standard elements for proceeding with crime prevention design has been established. The research analyzes the results of successful cases with extracted keyword, and finally three design solutions for crime prevention were proposed through final ten keywords. Based on the design evaluation results, the study will perform further research for creating better and safe solution for CPTED.

#### REFERENCES

- [1] S. Y. Kang. (2014). A Study on Crime Prevention Through Environmental Design for Making Safe Residential Environment, Graduate School of In-je University, 17.
- [2] Y. S. Kim & J. G. Kim. (2015). The Influences of CPTED on Fear of Crime, Journal of Korean Association of Police Science, 17(1), 9.
- [3] J. J. Joo. (2010). A Study on the CPTED(Crime Prevention Through Environmental Design, Journal of Korea Association of Criminal Psychology, 6(2), 206.
- [4] Y. J. Park & W. S. Yoon. (2014). Analyzing the Effects of CPTED on Females Risk of Victimization and Fear of Crime, Korean Journal of Public Safety and Criminal Justice, 23(3), 84.
- [5] H. S. Choi & J. S. Park. (2009). A study on apartment residents perception on CPTED design, Korean Journal of Public Safety and Criminal Justice, 18(4), 554.

- [6] W. C. Choi. (2018). Research on Crime Prevention Design Element in Multiple-Household Residential Street, Journal of Korean Institute of Spatial Design, 13(3), 121.
- [7] H. S. Choi & J. S. Park. (2009). A study on apartment residents perception on CPTED design, Korean Journal of Public Safety and Criminal Justice, 18(4), 555.
- [8] E. M. Jin & J. S. Kim & Y. N. Yoo. (2016). A Study on the Problem Analysis of Environmental Facilities on the Crime Prevention Through Environmental Design(CPTED), Journal of Korean Society of Basic Design & Art, 17(3), 541.
- [9] Design to prevent crime in the neighborhood. <https://www.mk.co.kr/news/society/view/2017/08/571660/>
- [10] Designing an alley lowers the crime rate. <https://www.asiae.co.kr/article/2018091322560088953>
- [11] CPTED in 2 dark alleys in Busan. <https://www.yna.co.kr/view/AKR20180116062600051>
- [12] Gwanak-gu, the reason why it was reliable at night. <https://www.korea.kr/news/policyNewsView.do?newsId=148820260>
- [13] Improving the environment will reduce crime. <https://www.lawtimes.co.kr/Legal-News/Legal-News-View?serial=92539>
- [14] Dalmo Village is transforming. [https://www.culture.go.kr/mov/culturePdView.do?idx=6667&cPage=3&order=idx&sWord=%EB%9D%BC&service\\_Wordid=02](https://www.culture.go.kr/mov/culturePdView.do?idx=6667&cPage=3&order=idx&sWord=%EB%9D%BC&service_Wordid=02)
- [15] Sunrise Village. [http://busan.grandculture.net/Contents?local=busan&dataType=01&contents\\_id=GC04209081](http://busan.grandculture.net/Contents?local=busan&dataType=01&contents_id=GC04209081)
- [16] Establishment of a 'criminal safety zone' in a densely populated area of Korea University's Sejong Campus. <http://www.sjsori.com/news/articleView.html?idxno=40990>

한 현 석(Hyun-Suk Han)

[정회원]



- 2001년 12월 : University of Bridgeport, Industrial Design(BS)
- 2004년 8월 : 서울대학교 대학원 디자인학부(디자인학 석사)
- 2013년 ~ 현재 : 동아대학교 산업디자인학과 부교수
- 관심분야 : 프리패브, 도시재생, 재난을 위한 디자인, 창의력, 공간 디자인, 놀이 공간 디자인
- E-Mail : hyunsuk@dau.ac.kr