

## Implementation of Crime Prevention Throuh Environmental Design (CPTED) in Manado oldy city center area

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| ARTICLE INFO   | ABSTRACT  |
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| <p><i>Article history:</i><br/>Received February 11, 2024<br/>Received in revised form March 20, 2024<br/>Accepted April 01, 2024<br/>Available online August 01, 2024</p> <p><i>Keywords:</i><br/>Crime<br/>CPTED<br/>Old downtown district of Manado<br/>Perception of safety</p> <p>*Corresponding author: Andy Anton Mangopa Malik<br/>Department of Architecture, Faculty of Engineering,<br/>Universitas Sam Ratulangi, Indonesia<br/>Email: <a href="mailto:andymalik@unsrat.co.id">andymalik@unsrat.co.id</a><br/>ORCID: <a href="https://orcid.org/0000-0001-7121-9809">https://orcid.org/0000-0001-7121-9809</a></p> | <p>North Sulawesi Province has the third highest crime rate in Indonesia in 2020 based on BPS data on 2021 crime statistics. This study chose locations in the old downtown area which has a high vulnerability to crime using the Crime Prevention Through Environmental Design (CPTED) approach, which is an effort to prevent crime through physical environmental design with 3 main aspects of territoriality, surveillance, access control which aims to minimize crime, especially in public spaces, through several stages of implementation, including knowing how far the CPTED concept is realized by using Pearson correlation analysis between the realization of CPTED and the level of The crime is based on visitors' security perceptions using questionnaire data and will then be implemented in the form of a design visualization of the old downtown area of Manado. The results of the research show that the surveillance aspect has the highest manifestation and the correlation between the three CPTED aspects has a relationship with visitors' security perceptions, and the strongest relationship is between surveillance and visitor's security perceptions, then the implementation of area design is more dominant in open environmental designs. Based on these results, they were then implemented in the design of the old downtown area which has a strong local image and identity in corridor areas and access in public spaces.</p> |

### Introduction

Crime can occur anytime and anywhere, in private places to city centers where there is a lot of activity. Crime can be concentrated geographically as well as demographically it can be seen that residents in urban areas are more exposed to the risk of becoming victims of crime compared to residents in rural areas (Diovani 2021). Crime represents a complex spatial interaction and a consequence of the social and physical characteristics of the existing environment (Bannister and O'Sullivan 2020; Lympelopoulou and Bannister 2022). The

chances of crime occurring are influenced by the design of urban spaces (Ceccato and Nalla 2020).

This can threaten the sense of security of the local community can even be a public health problem with personal safety risks (Chat et al. 2022) and this can be a bigger problem for individuals than the crime itself (Sundling and Ceccato 2022). In the crime statistics data by the Central Statistics Agency in 2022, it is explained that North Sulawesi is included in the top five highest crime rates (Badan Pusat Statistik 2022).

The condition of the physical environment also affects the safety felt (Navarrete-Hernandez, Vetro, and Concha 2021) also in the act of crime



where it can help the crime occur or vice versa can prevent it (Arabi, Saberi Naseri, and Jahdi 2020). Like average, street lighting seems to reduce fear of crime or can increase a sense of security (McClanahan et al. 2024; Kim, Lee, and Kim 2023; Zeng, Mao, and Wang 2021).

Likewise in the Central Business District (CBD) area in the Manado old downtown district which certainly has many public activities in it (Kojongian, Rondonuwu, and Tungka 2017) so that it can trigger crime. The old downtown district of Manado in addition to being a trade center but there is also a culture that has been attached for a long time where there is a Chinatown area in it or commonly known as Kampung Cina. Kampung Cina is famous for a series of old buildings that are mostly occupied by ethnic Chinese people where the culture is also still attached there. In this area there is also Ban Hin Kiong Temple which is the oldest temple in Manado (Parengkuan 1986).

Chinatown is also inseparable from the feng shui applied in it. Feng shui is an ancient Chinese science that is used as one of the approaches to the design and arrangement of the built environment until today (Mariana 2015). There are five elements in feng shui namely fire, metal, wood, soil, water which can then be seen in the following table for the attributes of the elements (Darmayanti and Sondang 2013).

**Table 1.** Feng shui element attributes

| Element | Direction           | Color               | Season          |
|---------|---------------------|---------------------|-----------------|
| Fire    | South               | Red                 | Hot             |
| Metal   | West/Northwest      | White, Ash          | Autumn          |
| Wood    | East/Southeast      | Green               | Spring          |
| Soil    | Southwest/Northeast | Yellow, Brown, Gold | Between seasons |
| Water   | North               | Black, Blue         | Cold            |

Source: Darmayanti and Sondang 2013

That way, the old downtown area of Manado is a strategic place and also has a great opportunity for crime. Therefore, it is necessary to handle it to create a sense of security in it. One way is through the design of Crime Prevention Through Environmental Design (CPTED). CPTED is the most widely used strategy that is increasingly updated year after year (Navarrete-Hernandez et al. 2023). Crime Prevention Through Environmental Design (CPTED) is an effort to prevent crime that occurs in the environment

where community activities occur in which it examines aspects with a design approach (Aulia and Mahwani 2020; Matzopoulos et al. 2020). CPTED is more than traditional security tools but rather CPTED focuses more on urban design factors (Zhu et al. 2023) and architectural security strategies (Badiora, Dada, and Adebara 2021). CPTED is a multi-disciplinary approach to preventing crime involving modification of the physical environment (Rajadurai et al. 2023). By changing a space, it can potentially prevent crime. (Molaei and Hashempour 2020).

CPTED was initiated by Ray Jeffery (1971) then in 1972 also appeared the theory of Defensible Space by Oscar Newman which is also known as a form of crime prevention through urban design (Atlas 2013). Through Newman's research became the basis of the first generation CPTED consisting of 4 factors by Newman (Fennelly and Perry 2018):

1. Territoriality, serves to show the clarity of spatial boundaries and identity in an area/environment
2. Natural Surveillance, is the ability of people in the area to monitor and observe the surrounding environment
3. Image, is the ability of physical design to give the impression of security.
4. Milieu, which is another environment around the area that is related to safety factors.

Furthermore, Moffat (1983) developed into 6, namely territoriality, natural surveillance, access control, image/maintenance, activity support, and target hardening. Then according to Crowe (1991) aspects of CPTED only consist of 3, namely territoriality, surveillance, and access control (Fennelly and Perry 2018; Mihinjac and Saville 2019). CPTED is now widely recognized among police and urban planners in many countries because it is usually sustainable and effective without much cost (Sereerat and Sirijintana 2020).

In previous research by Aulia and Mahwani (2020), it was still the same discussing the implementation of CPTED in public spaces, but the existing data was only processed through scoring, had not arrived at the design and used up to 6 variables with the result that areas that apply the CPTED concept well, the perception of security in it is also good (Aulia and Mahwani 2020). Navarrete-Hernandez's research focused more on her personal emotional psychology through the application of CPTED and resulted in the fact that all strategically created environments

can improve the perception of safety in public spaces (Navarrete-Hernandez and Afarin 2023). Furthermore, the research by Kubalová, Ďurica, and Skýpalová (2023) was processed qualitatively which discussed the application of CPTED with various elements in it on 4 principles of CPTED, namely natural surveillance, access control, maintenance, and territoriality. Where with effective application it can reduce crime, improve the environment visually, improve the quality of life, increase the use of public space, and others. That way the security of the community can also be maintained (Kubalová, Ďurica, and Skýpalová 2023).

Meanwhile, this study has novelty with a descriptive quantitative research approach which will discuss the realization of CPTED as well as its correlation with the perception of a sense of security and its implementation in designs that have a local approach.

## Methods

The research was conducted in the old downtown district of Manado which includes 2 urban villages in Wenang District, namely North Wenang and Pinaesaan.

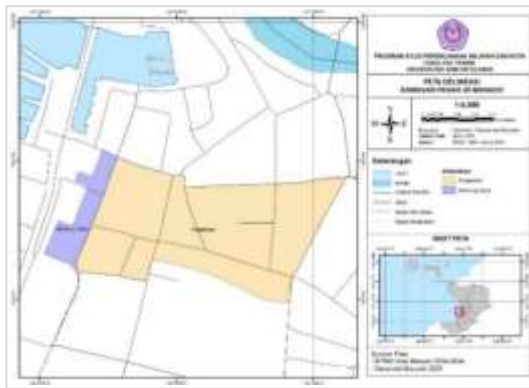


Figure 1. Map of the delineation of the study area

In collecting data, several ways were carried out, including, 1) field observation to see directly the conditions that exist in the old downtown district of Manado as well as to directly observe the realization of CPTED in the research area. 2) Interview to find out more about the data needed. 3) Questionnaire to obtain information based on the perception of visitors or traders related to the realization of CPTED and safety in the study area.

4) Visits to relevant agencies and literature studies.

Table 2. Research variables

| Variable                                      | Sub variable                                  | Indicator   |  |
|---|---|---|--|
| CPTED Concept                                 | Territoriality                                | a. Fence/wall                                     |  |
|   |   | b. Place/shop markers                             |  |
|   | Surveillance                                  | a. Security post                                  |  |
|   |   | b. Explanatory lights                             |  |
|   |   | c. Observable buildings                           |  |
|   |   | d. CCTV   |  |
|   | Access control                                | a. The entrance of Manado's old downtown district |  |
|   |   | b. Portal pay                                     |  |
|   | Crime rate                                    | Visitors' perceived security of territoriality    | a. Feel safe with a fence / wall as a territorial marker |
|   |   |   | b. Feel safe with place/shop markers                     |
| Visitor security perception of surveillance   | Visitor security perception of surveillance   | a. Feel safe with a security post                 |  |
|   |   | b. Feel safe with the light bulbs available       |  |
|   |   | c. Feel safe in an easily observable building     |  |
|   |   | d. Feel safe with CCTV                            |  |
| Visitor security perception of access control | Visitor security perception of access control | a. Feel safe with inbound and outbound access     |  |
|   |   | b. Feel safe with a portal/fence                  |  |

Source: with modified analysis of researchers (Hapsari and Susanti 2019)

The analysis method in this study uses a quantitative approach. In this study using a questionnaire with liekert scale weighting. Then a correlation analysis was carried out using *pearson* correlation in SPSS software. Further implemented in the design.

## Results and discussion

### A. Crime in Manado Old Downtown District

Based on data from the Wenang Police, in 2019-2022 crimes that often occur in the Wenang Sub-district in which there are research areas in the form of persecution, gangs, fraud, threats, rhymes, theft, destruction, and murder.

Table 3. Number of crimes in Wenang Subdistrict

| Types of Crimes    | Year |      |      |      |
|--------------------|------|------|------|------|
|                    | 2019 | 2020 | 2021 | 2022 |
| Persecution        | 47   | 54   | 41   | 21   |
| Assaulting         | 1    | 6    | 3    | 8    |
| Embezzlement/Fraud | 30   | 23   | 25   | 11   |
| Threats            | 4    | 6    | 2    | 4    |

| Types of Crimes        | Year |      |      |      |
|------------------------|------|------|------|------|
|                        | 2019 | 2020 | 2021 | 2022 |
| Weapon                 | 4    | 5    | 3    | 6    |
| Theft                  | 41   | 53   | 19   | 28   |
| Persecution by rhymes  | 0    | 3    | 6    | 16   |
| Threats with rhymes    | 1    | 5    | 7    | 1    |
| Destruction            | 9    | 11   | 3    | 1    |
| Persecution dies       | 0    | 0    | 0    | 2    |
| Violent theft          | 0    | 0    | 0    | 1    |
| Assaulting with weapon | 0    | 0    | 0    | 1    |
| Murder                 | 0    | 0    | 1    | 0    |

Source: Wenang subdistrict's police 2023

From the data above, the crime index will be searched, which is the percentage increase or decrease in crime incidence over the past year compared to a certain year. So, the crime index in Kecamatan Wenang was obtained at 72.5% which is high so that it can be said that the level of security is still low.

#### B. The implementation of CPTED in Manado Old Downtown District

Based on the results of researchers' observations of 96 respondents in the Manado Old Downtown District, it shows that for the realization of territoriality sub-indicators such as the use of fences almost all exist, while the availability of street name markers has also been quite widely used at the end of the road. Then based on the questionnaire for the level of embodiment of the territoriality sub-indicator of 48% and entered the sufficient category.

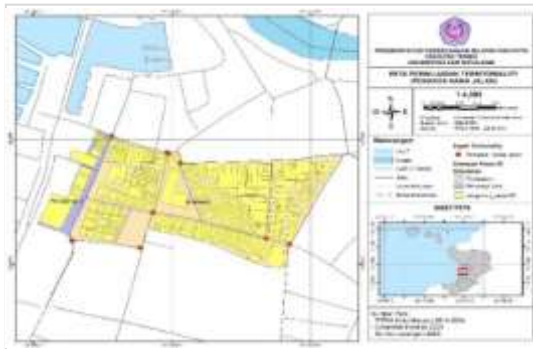


Figure 2. Map of the embodiment of territoriality

For surveillance sub-indicators based on observations in the research area, there is only the Subdistrict Wenang Police office as a security post and for other supervision by "Satpol PP" officers. For the availability of lighting on every street is widely available but there are still lights

that do not work but, in the area, have received lighting from existing buildings. As for the use of surveillance cameras or CCTV, it is quite widely used in shops, but for use on roads it is still lacking. Furthermore, the results of the questionnaire showed a surveillance realization rate of 76% with a high category.



Figure 3. Map of the embodiment of surveillance

The access control sub-indicator based on observations shows that there is no controlled entrance-exit because the old downtown area is an open area that allows visitors to enter and exit from anywhere. For restrictions on access through portals or fences, it shows the same thing that there is only a portal to enter the parking area. In addition, there are also small alleys or alleys that connect the streets in the study area so that it is more difficult to control visitors who come or leave. Then based on the results of the questionnaire also showed the same thing that the level of manifestation of *access control* was 42% with sufficient category.

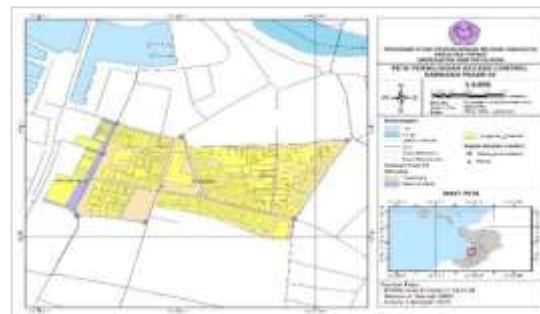


Figure 4. Siswomiharjo street corridor design

#### C. Walanda Maramis street corridor

In this Walanda Maramis corridor, there is a column design that uses transparent sheath material with the use of lighting elements in the form of neon in the column that gives the impression of life and modern at night in this downtown area. Furthermore, in the design of this

corridor, there is the placement of CCTV as an effort to supervise this downtown district. Its design is shown in the following figure 5.



Figure 5. Walanda Maramis street corridor design

#### D. Lembong street corridor

The design of the Lembong corridor uses a canopy with the analogy of a boat sail. The reason for choosing this design is because this corridor is an old ex-fish market that used to have a high level of economic activity. This corridor is also equipped with the use of CCTV so that the community in it can feel safe. Here is a drawing of the design.

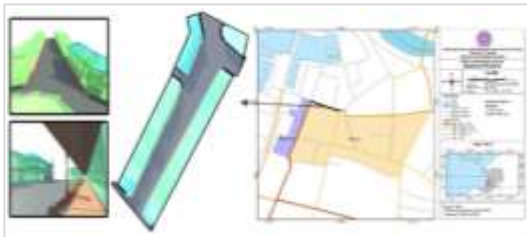


Figure 6. Lembong street corridor design

#### E. Corridor Jl. S. Parman

The corridor of S. Parman street is divided into two parts, namely the South and North. In the southern S. Parman corridor has the name "Zheque Gate" or Phoenix gate which is one of the Chinatown or Kampung Cina corridors. In the south, it is designed with a red color theme representing the dominant elements of fire and summer along this corridor. In addition, this corridor is also equipped with the use of CCTV. The following is a drawing of the design.

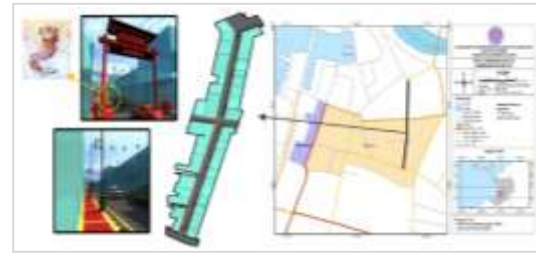


Figure 7. S. Parman (South) street corridor design

In the northern S. Parman corridor has the name "Gui Xian Gate" or black turtle gate which is one of the Chinatown corridors or Chinese Village. In the northern S. Parman corridor, it is designed with a black theme representing the dominant water element along the corridor. This corridor is also equipped with the use of CCTV. For the design of this corridor can be seen in the following figure.



Figure 8. S. Parman (North) street corridor design

#### F. D. I. Panjaitan Street corridor

The corridor of D I Panjaitan street is divided into two parts, namely the western corridor and the south eastern corridor. In corridor D I Panjaitan the west has the name "Baihu Gate" or white tiger gate which is one of the Chinatown corridors or Kampung Cina. This corridor is designed with a white color theme that represents the dominant elements of steel and autumn along this corridor. Also, in this corridor there is CCTV. Here is a drawing of the design.

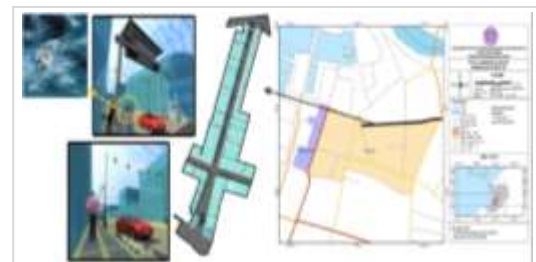


Figure 9. D. I. Panjaitan (west) street corridor design

In the corridor of D. I. Panjaitan street the south east has the name "Qinglong Gate" or dragon gate which is one of the Chinatown corridors or Kampung Cina. This corridor is designed with a green color theme representing the dominant wood and spring elements along this corridor. In this corridor, CCTV is also installed as a surveillance effort in this area. Here are the existing design drawings.



Figure 10. D. I. Panjaitan (south east) street corridor design

#### G. Sisingamangaraja street corridor

This corridor is a canal corridor from Jalan Lembong to the Pasar Bersehati complex. This corridor is deliberately not designed for canopy use because in this area in the afternoon and evening it is quite shady for pedestrians because the position of the surrounding buildings also provides sufficient *shading* for pedestrians. This corridor will be equipped with the use of road CCTV. Here's a drawing of the design.



Figure 11. Sisingamangaraja street corridor design

In each implementation of the above design is carried out by paying attention to the distinctiveness of the local community so that it is not only to maintain security but not to eliminate the cultural value of the planning area as a Chinatown area.

## Conclusions

Based on the results of the existing analysis, the crime index in Wenang District is in the high

category, so this can be interpreted as meaning that security is still low. Based on the CPTED concept in the old city center area of Manado, the surveillance aspect, the territoriality aspect, then the access control aspect has a tendency towards an open environmental security design system with the use of technological intervention and increased artificial lighting in the environmental monitoring aspect. To implement the design of these three aspects, we have a cultural design approach using local material elements to maintain the existence of the existing character and uniqueness of the Old City Center Area in Manado City.

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#### Author(s) contribution

**Andy Anton Mangopa Malik** contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

**Rieneke Lusia Evani Sela** contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

**Ingerid Lidia Moniaga** contribute to methodology, supervision, and validation.