

Review of environmental paradigms in residential complexes: A case study in Ekbatan Complex

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Abstract

The impact of built environment on human being behavior is inevitable. Built environment can prevent human being from doing something or encourage going further. Considering undeniable role of environment in creating behavior and negative norms, environmental possibilities has become more important. CPTED is an approach related to crime prevention that is based on the reduction the possibility of committing a crime in physical environment. This article with survey methodology (Observation, interview and multiple choice questions) and reviewing the existing theories with library and documentary research is regarded as the main components in CPTED approach. Relying on this approach, this research aims to analyze physical factors that may cause an increase in crime and hot spots and also risky places and times in residents' point of view.

Keywords: Crime, CPTED, Environmental design, residential complexes, safety

Introduction

One of the main problems, caused by increasing population and building residential complexes is an increasing crime rate and it can result in reducing safety and quality of life. In fact, crime is part of our daily life (Brantingham, 1993, p. 22). In Maslow's hierarchy of needs, safety comes in second after physiological needs, therefore, researchers in any field spend effort on reducing the chances of committing crimes.

Given the solutions for preventing crimes such as monitoring by police (Dantzker and Robinson, 2002), social (Bennet, Holloway, and Farrington, 2006), and criminals (Cozens, Saville, and Hillier, 2005), it seems that environmental approach has priority on fear of crime (Nasar & Fisher, 1993). The majority of criminals chose place where can provide for them with possibility of committing crimes. Some places create opportunities for committing a crime whereas some others can prevent it (Heydari and Hamkaran, 2011, p.12). Rostam Tabrizi and Madanipour (2006) proved that physical arrangement of space, housing typology and landscapes are focal points for committing a crime. A famous criminologist George Pica mentions that after temperament and the impacts of environment, the exterior and interior shapes of houses are the third reason of misdemeanor (Hedayat Nejad, 1995). Spending effort to eliminate these opportunities can reduce crime rates.

There are four theories among crime preventions in physical environment that are used by researchers, including eyes on the street (Jacobs, 1961), defensible space theory by (Newman, 1972) and crime prevention by environmental design by CPETD (Jeffery, 1974) , situation crime prevention by Ronald V. Clark in 1980's decade and broken windows (Wilson and Kelling, 1982). Each of these theories has its own unique components but defensible space or CPTED are used more common by scholars (Marzbali, et al, 2012; Abdul Mohit and Elsayahli Hanna,2010). This theory , used widely in built environment has become more important in residential places and shows that these spaces acts as heart for society and is where residents feels safe (Hedayati, 2012, p.85)

CPTED approach is applied to prevent crime in physical environment and is based on increasing chances of committing crime by physical environment and reducing it by proper solutions

(CPTED, P6). This approach cannot uproot crime but as supplementary solutions along with other ways can be used.

Ekbatan as an old and populated area is reviewed. Considering Ekbatan specific characteristics, environmental paradigms on residents' will be analyzed. In this article with CPTED approach, environmental elements that may increase the chances of committing crime are closely reviewed and additionally, proper urban spaces in order to monitor the area naturally can help reduce the chances of committing crimes.

Literature review

The study of the impacts of environment on human being dates back a long time ago but the role of built environment on preventing the crime is presented as a branch of science in recent decades. The idea has been formed in 1931 and after publishing "The *Death and Life of Great American Cities* by *Jane Jacobs*. She believes the possibility of preventing crime by reducing the loneliness and anonymous and also added urban planning, in this period, is an obstacle to unofficial social monitoring and self-monitoring and till neighbors do not understand each other mutually, crime exists. In 1971, CPTED was used by *C. Ray Jeffery* that opened new perspective to criminologists. He supported the idea of *Oscar Newman*, based on defensible spaces and preventing crime in urban design by physical territories and natural monitoring. Newman recommends structure of city changes in a way that society is controlled not by police but residents themselves.

In Iran, regarding the urban growth and the age of residential complexes, dates back less than half a century, attention toward crime prevention by environmental design began two decades ago. Recently, a book named *Crime Prevention through Architecture and Urbanism* by *Mohamad Reza Rahmati* reviews the physical and social factors, caused committing crime in residential places has been published.

CPTED is an abbreviation form "Crime Prevention through Environmental Design" and is based on a simple theory that crime is the consequences of physical environment that increase committing a crime (Clark, 2002). Criminal that commits a crime need an environment that provide for them with the minimum effort and risk in order to enter the for crime prevention through environmental design or CPTED is spending effort to reduce the chances for criminal space (CPTED guideline, p.9).

As it is evident from figure 1, this approach has four principles:

- Natural monitoring: Eliminating the possibility of committing crime through see and be seen
- Natural Access Control: Restricting the criminal situations through access control and the exact determination the public and private spaces
- Territorial Reinforcement: Increasing the sense of ownership to properties
- Maintenance: Good quality, maintain the environment and natural surveillance on them (CPTED guideline, 2012)

Theories related to CPTED

After appearing the consequences of building high-rise residential complexes on people's behavior, specialists and scholars spend time on discovering the anomalies related to these complexes.

Determinants of human being behavior: Alice Coleman in her book called "utopia on trial" has conducted some researches on high-rising building and duplex and also studied on some common problems such as throwing litter, violence, sexual issues, and vulgar graffiti. He worked on some variables that intensify the problems. Some of them have been mentioned below.

- Size: included residential houses in each building, the number of floors, and type of housing. This variable deals with numbers of residents.. Increasing the number of residents make it difficult for each resident to identify his neighbor and residents prefer to remain anonymous.
- Rotation: including upper walls, connected exits, elevators and stairs and the number of units in each corridor. A good circulation can reduce crime while exiting ways and deep spots can increase crime.
- Entrance: variables related to entrance are included the position of entrances, doors, parking and facilities (Rahmat, 2011, p.128)

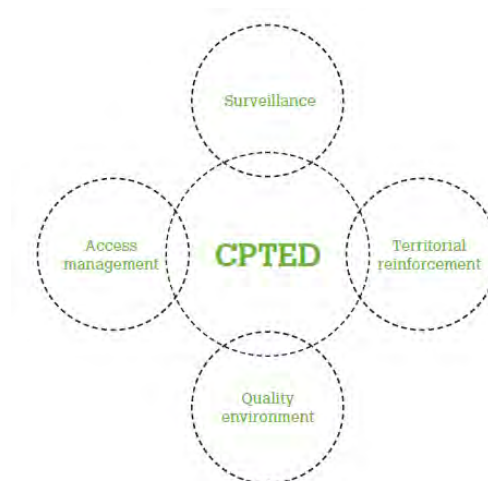


Figure 1. Four principles (CPTED guideline, 2012, p 9)

Theory of improving the panorama: Grandland believes that designing should develop based on traditional forms. He mentioned that well-organized exterior spaces having better view can prevent crime.

The combination of spaces: Hillier concludes that different shapes and types in housing have specific characteristics related to crime happening in silent place with less connection. Crime is increasing in places that has no difference between public and private spaces and not fully monitored, (Rahmat: 2011, 133)

The relationship between crime and environment: Crimes usually are taking place where criminals feel safe and secure. They decide to commit a crime in a specific place if it has the following features:

- easy access to the environment prone to crime
- the rate of access, availability and seeable criminal actions in environment
- the probability of not to be seen
- the residents ' reactions in case of seeing crime
- easy and fast access for leaving the crime scene after committing (Teylor, 1996,p3)

Most of the crimes occur when the opportunity is provided by one or some factors such as access to cozy spots, absence of residents, lack of landscape and light, filled with trees and plants (Rahmat, 2011, p.117). The lack of proper designing guidelines may cause increasing violence (Ameri siahoui, 2000, pp.4-16). In other words, some spaces are prone to crime and lacks defensible spaces. In figure 2, it is clear that when indefensible spaces are in intersection with circulation, crime occurs.

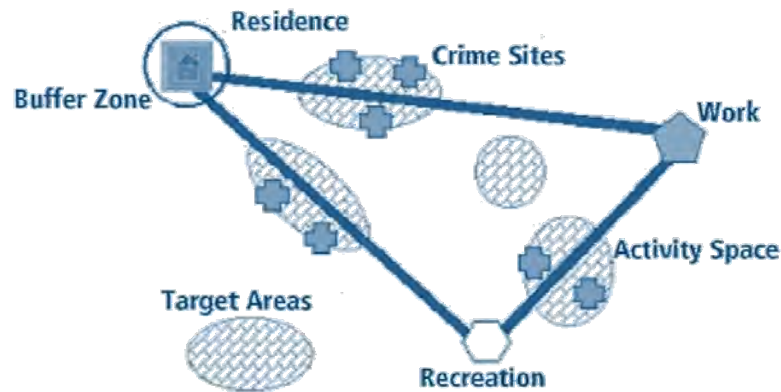


Figure 2. The intersection between circulation with crime-prone – areas (Ronald Clarke and John Eck, 2009)

High-rising building in new cities impacts on increasing crime rate. Oscar Newman believes that the lowest crime rate occurs in three-storey building while this statistic is very high in 6 floors building and residential complexes with more than 1000 units.

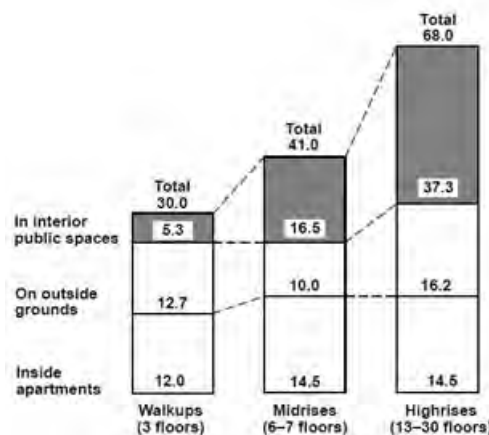


Figure 3: The relationship between increasing of floors and crimes (Newman,1996,p.13)

Methodology

In this research, documentary and survey methods were applied and data were collected in library, books, articles, maps, internets. Also, some data were extracted through field research and random interviews from some residents. Information was analyzed by analytic method for quantity data and descriptive method for quality data.

Reviewing Ekbatan residential complexes

Ekbatan is one of the biggest and most populated areas in middle east that is located in west of Tehran, district 5. This town is restricted to Bime avenue in east and Apadana town, Tehran-Karaj highway from north, aviation industry from west and Tehran-Karaj road from south. This complex was built in 1353 and the first blocks of phase one (a1 and c2) was operated in 1356 and other blocks were used gradually after Islamic revolution. This residential complex is about 230 hectare, 3 phase, 33 blocks and 14755 units. 40 percent of this area is for green spaces and the population is more than 44000.

This residential complexes (phase 2) have some blocks with long corridors and many units in one floor. But neighbors do not know each other very well and as it was explained before it could be

one of the main reasons of social anomaly. Apart from this, there are some spaces left unused for several months and due to improper view and lack of monitoring and surveillance, they have become crime-prone area. In order to ensure this claim is valid, a questionnaire was provided to gather information from residents. The target group is some residents of Ekbatan residential complex.

For determining the numbers of target group, Cochran formula $\frac{NZ^2pq}{Nd^2+Z^2pq}$ was used. In this formula:

n = sample size

Z = standard normal variable, which is 1.96 times the 95% confidence level

P is the proportion of the trait in the population considered 0/5, in this situation variance reaches its maximum. Q is percentage of people who are lacking the trait in the population ($q = 1-p$) and D is allowable error that calculated, therefore the sample size is 960 participants. Given 110 questionnaires in the area randomly in different hours and finally 94 questionnaires were used as samples. The participants were 120 men and 82 women and the average age was 50 years. The reason for involving women in this research is their vulnerability of them. The average education was above high school and their residency time in the area among 68 people was more than one year.



Figure 4. Ekbatan residential complex, Phase 2

Survey

In question 1, participants were supposed to tell how much they know their neighbors. 10 percent of them did not know their neighbors at the same floor and 40 percent did not know upper or lower neighbors. As it was discussed before, the lack of familiarity can cause many whereas in old neighbors knew each other well (Figure 5).

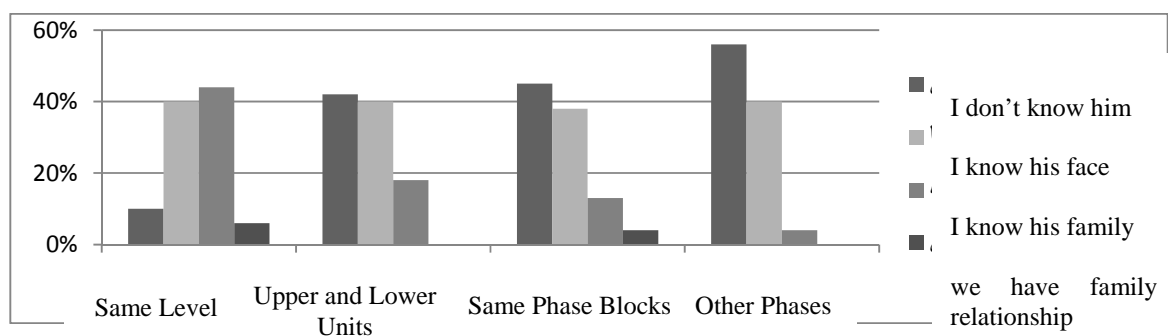


Figure 5. Percentage of familiarity with neighbours

In next question, participants were asked how they react in case of seeing a stranger. 35 percent answers they will ignore and 25 percent respond they may think a stranger is one of the neighbors (Figure 6).

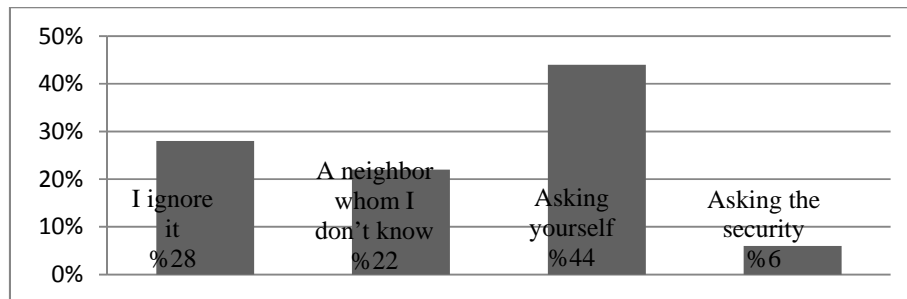


Figure 6. Neighbours reaction in case of seeing a stranger

Figure 7 shows the data analysis related to the rate of using indefensible spaces

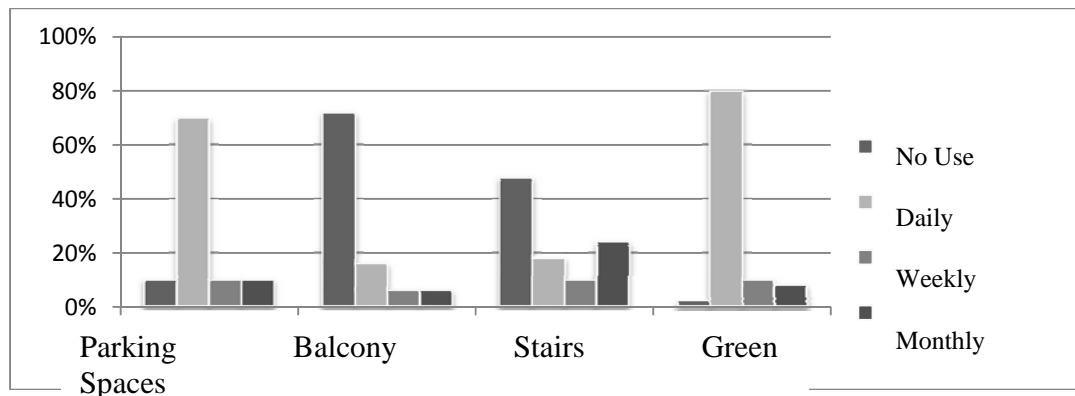


Figure 7. Presence and attendance of people in indefensible spaces

In this questionnaire, the main purpose is to identify indefensible spaces and asked participants to cross those spaces that they have seen social anomalies. It was concluded by 50 percent that stairs and emergency stairs are indefensible spaces. Additionally, there are severe problems in green spaces, under blocks and area. These spaces are included parking and elevator. As it is clear from figure 8, these spaces are located in blind spots or due to not using frequently were prone to social anomaly and crime.

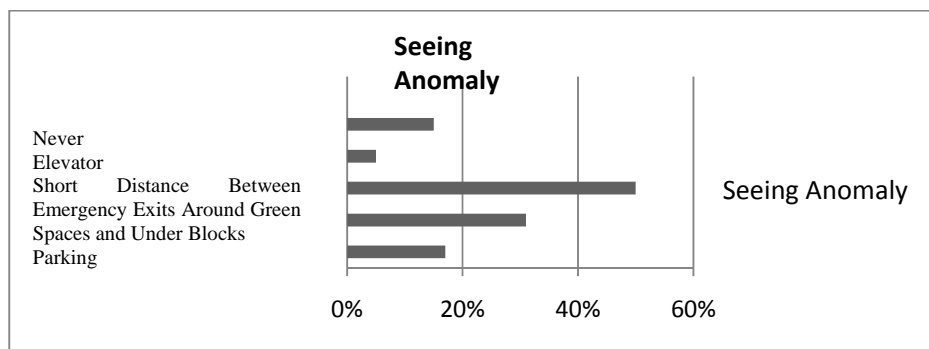


Figure 8. The rate of anomaly, seen in indefensible spaces



Figure 10. Stairs



Figure 9. Green spaces

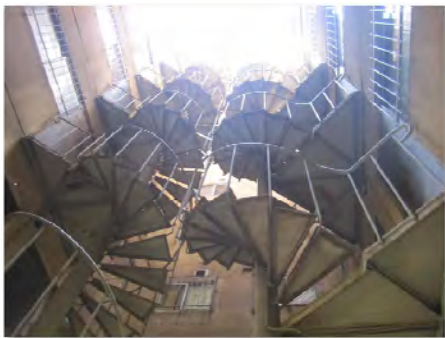


Figure 11. Emergency exits



Figure 12. Long corridor

Majority of residents did not feel safe for commuting after 22 P.M and due to lack of proper lighting and blind spots and reducing commuters preferred not to be at risky places.

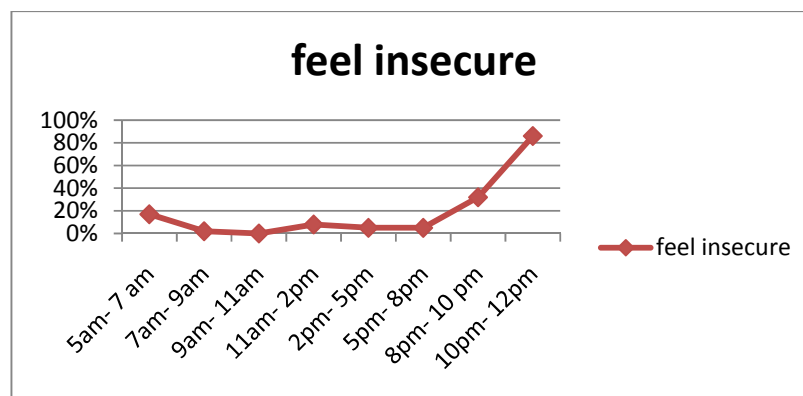


Figure 13. The percentage of people , feeling un safe in different hours

The lack of view and adequate monitoring of common spaces such as stairs and parking may cause social anomaly. Table 1 indicates the kind and rate of crimes which have been seen by residents.

Table 1. Crime in Ekbatan complex and its causes

Percentage of crime occurrence	CPTED principles that not exist					Causes	Social anomaly	Place
	Maintenance	Activity support	Territoriality reinforcement	Access control	Natural surveillance			
%5				✓	✓	<ul style="list-style-type: none"> Blind spots 	<ul style="list-style-type: none"> Using drugs and unethical relationship 	Elevator
%50				✓	✓	<ul style="list-style-type: none"> Blind spots, easy entrance and exit from crime scene, the lack of presence of people 	<ul style="list-style-type: none"> Using and dealing drugs, unethical relationship and poor hygiene around shooting 	Close to emergency stair or stair
%31		✓	✓		✓	<ul style="list-style-type: none"> Easy access to misdemeanor scene Not knowing other neighbors Blind spots Type of reaction for seeing a stranger 	<ul style="list-style-type: none"> Using and dealing drugs, unethical relationship and drinking alcohol and Purse snatching 	Green spaces and blocks
%17		✓		✓	✓	<ul style="list-style-type: none"> The lack of regulated presence of residents The type of reaction for seeing a stranger 	<ul style="list-style-type: none"> Theft Dealing and using drugs 	Parking

Conclusion

Men take urban growth and crime for granted but this acceptance does not mean giving up. According to theory mentioned in this research, the relationship between built environment and crime is inevitable. Some spaces have encouraging factors as others may prevent that eliminating the improper factors and improving the quality of spaces leave a great influence on reducing crime and increasing the sense of safety among residents.

Improper physical environment in Ekbatan residential complex such as uncontrolled vegetation, stairs, emergency stairs due to the lack presence of residents and sometimes their ignorance toward their destiny cause easy access to these place and make them indefensible and increase the crime rate while based on conducted researchers by some scholars paying attention to CPTED in designing and improving the quality of area can significantly reduce the crime rate.

It is necessary to know that nowhere in residential complexes should be left and unused for months because they can easily turn into prone-crime areas.

On the other hand creating places that residents can have interactive relationship can enhance companionship and it may help identify strangers and reduce criminals' entrance to the complex. In fact environmental design should be done in a way that residents feel safe and criminals feel unsafe. In order to provide lighting at nights as an important factor for reducing crimes and they can eliminate blind spots.

This research was conducted in Ekbatan. For further researchers, it could be wise to consider other residential complexes and among different genders. As in this article, the target group financially and culturally was above average class, changing the target groups may result differently.

Recommendations of the study

Considering the results of this study, the following recommendations can be raised:

- Using lighting as an CPTED elements in green spaces at nights can increase natural monitoring
- Creating night activities and usages in some spaces such as parking for attending the residents.
- Setting CCTV (unnatural monitoring in some spaces such as elevator
- Setting emergency stairs in seeable spaces, proper lighting and using CCTV

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