Study of the Urban Environment of Kirovski District in Ekaterinburg

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Abstract. This article is concerned with the safety and comfort of living in the urban environment in the Pionerski Posyolok, which is part of the Kirovski district in the city of Ekaterinburg. It focuses on the formation of pedestrian and automobile traffic, describes the urban forms and their impact on criminality, i.e. on the potential number of street crimes. Crimes provoked by the street urban environment, its state of disorder, lack of lighting, and lack of supervision on the part of residents are taken into account. The author studies positive and negative qualities of the streets in this area and separate buildings, patterns of movement, and communication between neighboring districts. The article highlights the negative factors influencing the perception of the district as safe and comfortable for living. Recommendations are given on possible ways of reorganization of its internal structure, division of pedestrian streams and improvement of residential courtyards.

1. Introduction

Establishing a safe urban environment is a long-term process. We can provide a holistic methodology to meet the challenges of crime and vandalism with three approaches: organizational methods (people—security staff, capable guardians), mechanical methods (technology—hardware, barriers, target hardening), and natural design methods (architecture, design, and circulation flows). This study addresses the latter issues.

The article considers one district of Ekaterinburg and the negative impacts on its safety and methods of creating a safer environment. The goal of the survey is to find a common way to create a safe and comfortable built environment by means of architecture, street planning and design.

The objectives of the study are as follows:
- to overview the historical basis of creating a defensible space;
- to define typical criminal problems related to the urban environment;
- to explore Kirovski District and its specific features that affect safety;
- to identify the urban design features that can increase safety.
2. Historical overview of urban security and connection between safety and residential communities

2.1. Theoretical studies on built environment safety
Crime prevention though environment design is based on the following security principles applicable to the urban environment and particular objects:

- Access and movement: places with well defined routes, spaces and entrances that provide for convenient movement without compromising security
- Structure: places that are structured so that different uses do not cause conflict
- Surveillance: places where all publicly accessible spaces are monitored
- Ownership: places that promote a sense of ownership, respect, territorial responsibility and community
- Physical protection: places that include necessary, well-designed security features
- Activity: places where the level of human activity is appropriate to the location and creates a reduced risk of crime and a sense of safety at all times
- Management and maintenance: places that are designed with management and maintenance in mind, to discourage crime in the present and the future [4, p 13-14].

The first safety level is the level of a particular building. The traditional safety scheme with different permeability of inner filters and barriers was suggested by Christian Norberg-Schulz (he divides all architectural elements into four groups: filters, barriers, connectors and switchers) [9, p 181-188].

The second level is the scale of a whole city or its separate district. The Image of the City by Kevin Lynch, US theorist of architecture, presents research into mental maps that observers create in their mind. Lynch identifies all urban elements as Paths, Edges, Districts, Nodes, and Landmarks [7, p 47].

2.2. Practical studies on built environment safety
Practical studies of crime prevention by means of architecture and environmental design have been conducted since the 1960s, mainly based on the works of criminologists at the University of Chicago, as well as J. Jacobs' book "Death and life of large American cities". She noted three attributes of a safe city street: constant use of sidewalks by pedestrians, diversity of functions (the street should have buildings of different functional accessories), and distinction between private and public spaces [5, p 150-151].

The next important study is the Defensible space theory, introduced by O. Newman, a US architect. Newman divided spaces and levels of protection of spaces into four levels: public, semi-public, semi-private, and private. He describes problems of public housing. The grounds around the buildings are accessible to everyone and are not assigned to particular buildings. The residents, as a result, feel little association with or responsibility for the grounds and even less association with the surrounding public streets. Not only are the streets distant from the units, but no building entries face them. The grounds of the development that abut the sidewalks are also public, and, as a consequence, so are the sidewalks and streets. Street-oriented facades help to create the face of the street and to separate the semi-private and semi-public area of their residential yards from the public space of the street [8, p 19-22].

The most compelling evidence of the conceptual vagueness at the heart of the Newman’s theory is the mass of conflicting empirical findings that tests of the theory have yielded. To date, there have been very few tests of Newman’s defensible space theory in its entirety. Rather, mostly partial tests of the theory have been conducted with only one or an incomplete combination of defensible space elements being investigated. It will be argued that these fractional tests of the theory have led to only limited and unbalanced conclusions about its validity [10, p 31-32].

Clarke [2] contributed to practical situational crime prevention by developing crime prevention techniques that can generally be applied to almost any situation: increasing the effort and the risks, reducing the rewards and provocations and remove excuses.
Tim Crowe refined the ideas of Oscar Newman. He organized this multidisciplinary crime prevention methodology to match the function of the crime area, similar to Newman’s layering of space from private to public spaces [3].

3. Study of the Kirovski city district and its urban environment

3.1. Common data
The area of the study is included into Kirovsky District. It is located near the central area of Ekaterinburg. Most of this district was built in the mid-1970s and it continues growing.

This area has common and special problems related to safety. Criminal problems include street crimes provoked by the built environment (lack of street lights, lack of maintenance and surveillance, abandoned buildings and spaces, etc). These crimes are vandalism, unsafe residential court yards, street assaults, street thefts, graffiti.

The district is quite isolated. Its south-eastern border is Blucher Street, the only border that does not impede pedestrians. The south-western border of the district is Vostochnaya Street and the railway running along it, which restricts pedestrian and transport traffic. The northern side of Pionersky Posyolok is a large industrial and warehousing area.

![Figure 1. Kirovski district and where it is placed.](image1)

3.2. Safety principles and layers of defence

![Figure 2. Type of multi-family housing: it has all building entries facing the interior grounds of the development.](image2)
The placement of high-rise towers on the interior grounds has produced a system of off-street parking and access paths to the buildings with many turns and blind corners. Residents in such developments complain about the dangers of walking into the grounds to get to their buildings at night. The tendency among landscape designers to locate shrubs exactly at turns in the paths increases the hazards of these access routes.

The next problem of the district is the uniformity of the built environment, with most of the buildings erected in the 1970-1980s. The district needs diversity. Different types of buildings form in different ways their environment and affect the level of criminality. These usually take the form of houses, rowhouses, apartments, and mixed-use buildings so that younger and older people, singles and families, the poor and the wealthy may find a place to live in. The housing types are varied in size, type, and price reflecting the kind of mix found in the city. Diversity within the community allows for growth and learning, for all social and economic strata, and for all those who participate in it [1, p 250-272].

3.3. Analysis of the urban environment and its features
The third problem of the district is the desolation and marginalization of its border areas. The western and northern boundaries are perceived as obstacles.

These boundaries are industrial and warehousing areas, closed and partially abandoned, which entails desolation and scarcity of pedestrian traffic in the nearby streets. However, car traffic is rather high because of proximity to important junctions. The south-western side borders on the railway; unkempt and abandoned places attract homeless people and teenagers, and most residents perceive them as areas of high criminal activity. The south-eastern corner, where Blucher Street starts, bounds the territory of the district. The Mikhailovsky Cemetery is located here. It is mostly fenced in. Isolation and slow development are the main problems. These specific boundaries form a kind of personality, helping to perceive it as a city district of the first belt; the locals love it.

Figure 3. Analysis of links.
The housing types in the district can be divided into three categories: modern buildings tending to have closed residential courtyards. This is good because the residential courtyard belongs to the residents, and it makes a huge contribution to security.

The second category is buildings of the late Soviet period, from the 1970s to the early 1990s. They are relatively safe with low crime rates. Their courtyards are physically permeable but are more or less isolated, perceived as belonging to the inhabitants of specific apartment buildings, keeping all passers-by out and yet vulnerable to outsiders and potential criminals.

The third category is buildings of the earlier period, low-rise and mostly quite marginalized. Some low-rise buildings are maintained well; other buildings need reconstruction, and they attract potential criminals and create criminal areas.

Private residential developments, located mainly in the north-eastern part of the district, need further discussion, which is currently undertaken.

![Analysis of built environment types](image)

**Figure 4.** Analysis of the built environment.

The fifth problem of Pionersky Posyolok is the scale of the blocks. There are several very large open areas, which make it necessary to choose alternative paths, increase alienation, reduce the variety of routes and, accordingly, the number of pedestrians. Visitors experience orientation problems (only a local can remember the details of the routes through these areas).
The positive factor is the availability of centers of attraction forming a positive image of the area. They are used by residents of the area, are known to them and increase pedestrian activity, forming flows of people and increasing legal activity. These are commercial and public buildings, some schools that are considered to be the best in the area, and parks where residents like to have walks.

4. Conclusion
It is important to involve residents in the protection of the living environment.

The architectural environment should be designed so that an observer can notice or identify the border as part of his property and have a legitimate interest to intervene and prevent the crime from being committed. Increasing the flow of legitimate visitors or vehicles is a positive feature that characterizes a safe place. People living, working, playing in this place will feel responsible for the property and will try to protect it.

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