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## TOOLS FOR THE SUSTAINABLE DEVELOPMENT OF PUBLIC URBAN SPACE

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***Abstract.** The middle of the 20th century it was observed sprawl cities to cause by the quick population growth, the development of the automotive industry and housing policies that were aimed at the spread to private home ownership. In such conditions, it was impossible to predict what type of building development would be, so it was need for looking for new ways to solve this problem. In the same way, there was a need for revise existing zoning documents and a new tool was needed to regulating building development.*

*The Form Based Code principles are universal, and these principles adaptation will be allowed to save and to improve the urban environment in the modern cities. In an urban environment that is required renovation or it is had the ability to accommodate new buildings and structures, Form Based Code will be significantly speeded up the development process and project approval. In Europe countries have long developed clear and yet invisible rules that is created a comfortable and non-aggressive environment.*

*In Ukrainian cities, building regulation is happened according to functional zoning, while a set of parameters is used that it isn't allowed to get understandable and predictable buildings development what will be been to dissonance. The parameters are set to solve the characteristics in the urban environment, to solve problem that was identified at the stage of analysis, or vice versa, to save the valuable characteristics in the urban environment. Today attempts are being made to create a comfortable urban environment for city residents in Ukraine. The Design Codes have been developed in Zhitomir, in Kiev. Despite Ukraine's lag behind developed countries in understanding the values of the urban environment, it need to use this approach to solve specific problem for the development regulation in the city.*

*In article opportunities to improve the aesthetic appearance of the urban environment have been presented to base on Form Based Code which a completely different level of relationship is provided in the urban space. It has been shown comparative characteristic principles coding in comparison between traditional zoning. The main vector regulation of public spaces has been determined by the example of Kharkov in Ukraine.*

*Keywords: Form Based Code, conventional zoning, tools, residential area, industrial area recreational area, development, urban planning, open space, streets, volumetric parameters.*

## INTRODUCTION

Comparison between Conventional zoning and Form-Based Codes The urban environment is the place of life and interaction between various groups of the population, the sphere functioning a lot of economic, political, social, and cultural processes on society, and, finally, the place is the formation of a certain emotional and figurative person's representation.

The city is perceived as a complex space that needs a streamlining system and solving problems of the functional purpose one or another part. Divide into areas in the city by the nature use, that is, by the type of functional purpose, is carried out using DBN B.1.1-22: 2017. Composition and content of the territory zoning [1].

In a market economy, many people and organizations are own land, and for everyone needs to set up general rules that would allow the building some kinds of houses and forbid the building another objects, depending on the location in the city.

Development of tools by regulation space use in Ukraine cities, primarily, have been happened due to the create dynamic and promising environment, an increase in efficiency public space use in the city, an increase in economic, social, and industrial potential, a create incentives for investment and new jobs, the orderliness of urban development, and the satisfaction from interest's state, business, population and an improve in the quality life.

Today in Ukraine, the main tool for regulating public space and improving urban development is functional zoning, which has been currently to consider as a bureaucratic tool, as not a mean [1]. Therefore, the modern components in the urban environment haven't interacted with each other, is created "chaos" and a lot of "visual garbage" (billboards, signs, shop windows), that significantly is worsened the appearance of the city by visually changing the space that city is lose historical identity [2].

Thus, the updated urban planning norms haven't solved the problem of the aesthetic appearance in the urban public space, in particular the urban environment.

## ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

The middle of the 20th century it was observed sprawl cites to cause by the quick population growth, the development of the automotive industry and housing policies that were aimed at the spread to private home ownership. In such conditions, it was impossible to predict what type of building development would be, so it was need for looking for new ways to solve this problem. So, there was a need for revise existing zoning documents and a new tool was needed to regulating building development.

Form Based Code was in 1960s last century when planners, architects and people city began to realize that the traditional (conventional) zoning which dominated during the twentieth century that had resulted to impairment quality in the urban environment [4]. First attempt to create Form Based Code had done in 1982 to regulate the development of the Seaside, Florida, Andres Duany and Elizabeth Plater-Zyberk [5], according to height of buildings, indent the building from the red line, number parking lots, also possible indents from the established parameters were regulated.

In a lot of US cities Form Based Code were considered as an additional tool or as a replacement conventional zoning that it has traditionally focused on dividing into land use, for example, separating residential areas from industrial or commercial uses to reduce any negative impact on the city's habitat, health and welfare using various quantitative indicators.

The study of problem to regulating building development researched such foreign scientists as Gehl J. [7], Ben-Joseph E. [8], Carmona M. [9], Talen E. [10] and another. In Ukraine problems to regulating building development

were considered by native researchers such as Pandas A. [11], Isachenko N. [12], Kuznetsov S. and another [13], through the prism of tradition (conventional) zoning. So, answer to question to regulating building development by use principles Form Based Code remains opening.

The problem of effective regulation use and balanced development in urban space is solved by studying the spatial characteristics of cities and using functional zoning.

Firstly, there is divide area into from functional zones, where a certain mode of urban development is assigned to each allocated zone, that is, a list of all permissible types, conditions, and restrictions for development and other land plots use within the boundaries of these zones, and the preferred direction of economic use have been had for a fairly distant future.

Secondly, it is the inextricable connection between zoning and planning and development areas in the city. Zoning has been promoted by streamlining to create the process and operating real estate objects as an interconnected complex of buildings, structures, and land where they are located.

Thirdly, land zoning is carried out within settlements. This feature is fixed normatively in part 1 of Article 180 on the Land Code in Ukraine and it is imperative. So far as, residential and public buildings, industrial and communal areas are located only within the settlement that zoning is applied only to lands of this category.

Fourthly, the land zoning is reflected in the local building regulations which are approved by the relevant local government.

The experience zoning in our country was formed in the former Soviet Union, where land law was based only on land categories, while concepts such as land or territorial planning weren't had much significance.

Zoning isn't determined the placement of specific objects on a land plot and the volume of construction, but it set up the types of land plot use, conditions, and restrictions within certain zones. Lack of competent zoning pull a number of problems such as extensive urban space use; lack of scientific distribution, taking into account state, public, private interests; lack of complexity in building; the availability of large industrial zones and objects in the central districts city; in the "sleeping areas" the set of places to employment is limited; aggravation by environmental problems what are associated with the chaotic location industrial concerns in the city [14, 15].

Today, the functional organization in urban space on the basis on conventional zoning

is been a clear remnant of the old times. The existing practice regulation spatial potential use in the city has been shown that the practical process of the city's life hasn't been fitted into the framework by "work – housing – rest".

Therefore, in order to create a promising city, effectively public space use, landscaping urban building development, to improve the quality life of the population need have been looked for new tools by regulating public space. Such tool is been Form Based Code (Urban Design Code) to principles that is been multifunctional, compactness of urban areas, lack of rigid functional zoning in the city, focus on pedestrians that is allowed to form a harmonious and balanced appearance in the modern city that is shown in Figure 1.

Form Based Code is a regulatory legal act by local significance, similar from levels zoning, but unlike one, it can be set up both full city, as individual district and individual fragments (streets, small squares, squares, etc.) to according to the principles of their local community with taking into account historical, socio and cultural, volumetric and other characteristics that is allowed to form a comfortable and non-aggressive environment in a modern city.

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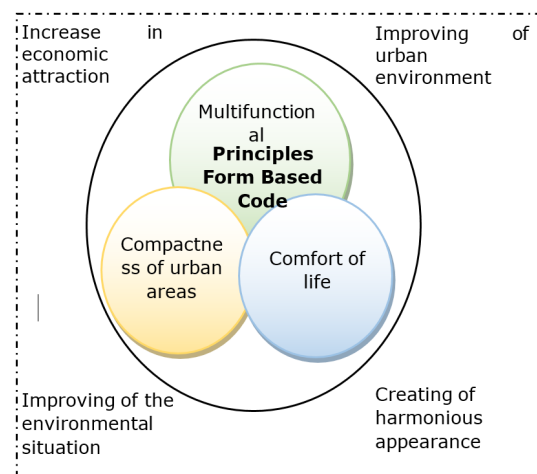


Fig. 1. Main principles Form Based Code

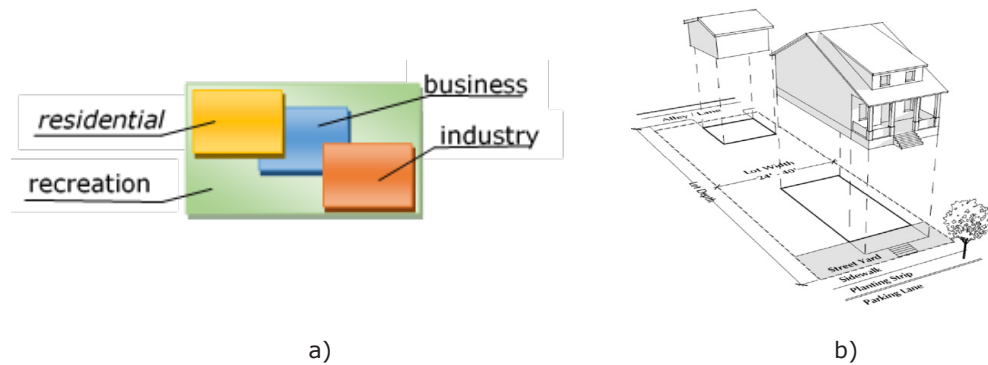


Fig. 2. Formation of traditional zoning elements and Form Based Code:  
a) Conventional zoning; b) Form Based Code [3]

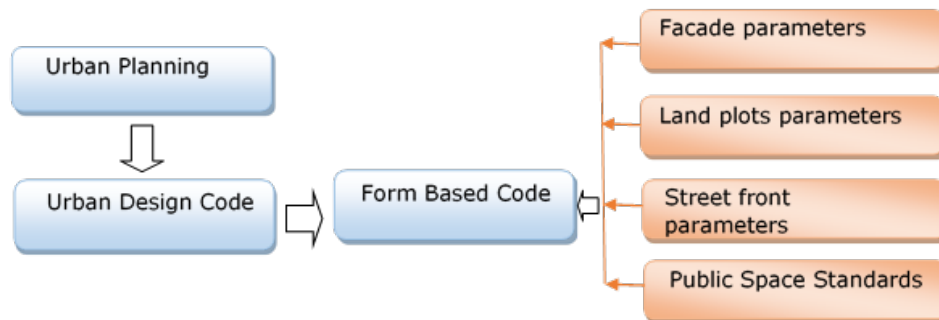


Fig. 3. Hierarchy of Urban planning documentation

The Form Based Code is represented a system rules of building development and land use to is expressed through the cross-section of streets and a sketchy volumetric solution by typical plots that take into account the specifics of the landscape, historical context, placement object in the city, habitual forms and typology of buildings in a given place, dimensions and proportions of streets at intersections and profiles, elements of decor and architectural specifics (canopies, cornices, awnings, fences, color of facades, etc.) that it is expressed in the standard tables and usable elements.

The Form Based Code, in contrast of the conventional zoning areas in the city, is based on the fact that the separate and regulation areas city is carried out in according to the morphology and volumetric and spatial building development parameters, that is, in conventional zoning, regulation is made from the function of the plot, when Form Based Code is used from the building development forms that is shown in Figure 2.

In the urban planning documentation hierarchy, Form Based Code takes up a special place that is shown in Figure 3. The Form-Based Code has been connected together all the commonly regulated building development

parameters, streets parameters, lighting and insulation, sidewalks, parking lot with the landscape parameters in different areas in the city. Furthermore, it is regulated the volumetric and spatial buildings characteristics, the nature of connection between open public spaces and neighboring buildings. The Form Based Code is supposed priority by regulating the physical parameters in the urban environment and reducing control over functional composition. In addition, it is regulated the kinds of permitted land plots use, but it isn't being the basis on zoning.

Form Based Code tools, due to the detailed parameters regulation, are allowed to predict future development in cities and to create in high quality public space, while settable parameters by its are mandatory, not advisory, without their observance it will be impossible to carry out any construction.

Form Based Code documents are introduced into the regulatory system in several ways. The first way is the approval Form Based Code as a separate document for regulating the selected district in the city. The second way is the approval of Form Based Code as a parallel document as an addition to the existing zoning document. The third way is the Form Based Code development for complex Planned Area

Development projects, that is, the development an already existing areas.

Form Based Code has been paid great attention to building parameters and public spaces in the urban environment [16].

These parameters are the most important because of form the basis on the Form Based Code and regulate the relationship between buildings and public spaces. There are building parameters include both volumetric parameters, such as height, width, depth of the building and main elements one, and regulated parameters that it is determined the buildings placement within the boundaries in the streets.

## PURPOSE

Form Based Code is a derivative new urbanism and is defined as a method or new urban design tool that is suggested the most high-quality model the city and its constituents that it is included volumetric building parameters, land parameters, facade parameters, street types parameters, open spaces parameters and landscaping parameters to improve the quality of the urban environment through the creation more open spaces, harmony the urban image in accordance to a long-term perspective.

Therefore, the purpose of the study is used principles Form Based Code as tool by the formation urban space and grounding the need for use ones to improve the aesthetic view the urban environment.

## RESULTS AND DISCUSSIONS

In Ukrainian cities, building regulation is happened according to functional zoning, while a set of parameters is used that it isn't allowed to get understandable and predictable buildings development what will be been to dissonance. The parameters are set to solve the characteristics in the urban environment, to solve problem that was identified at the stage of analysis, or vice versa, to save the valuable characteristics in the urban environment. In order to save the existing building on a large scale for a person in the historical part of the city need to regulate basic parameters such as the height building of being placed, the building offset from the red lines, the glazing percentage, the entrance width, the proportions parameters by the facades, and other elements.

Today in Ukraine, attempts are being made to create a comfortable urban environment for city residents. For this purpose, the Design codes in Zhitomir, in Kiev, in Kharkov have been developed, but they only are considered the

building parameters, in particular the signs that is shown in Figure 4. But, in addition to the uniformity and harmony by the external appearance in the city, it need to form a comfortable public space, while has been saved both the historical character downtown and the full city as a whole. Therefore, there is need for to be guided by the Form Based Code principles that are allowed to make the city accessible, user-friendly and safe.

Form Based Code zoning is been progress on the basis zoning by the type of urban environment or Transect Based Code, which is characterized by features of development and lifestyle: from the suburban area (T6) to the central urban core (T1) with the Special District (SD) represent from natural zone to urban core zone.

In Kharkov zoning is done accordingly to the normative documents in Ukraine [1, 16, 17], where it is shown residential, industrial and landscape-recreational areas.

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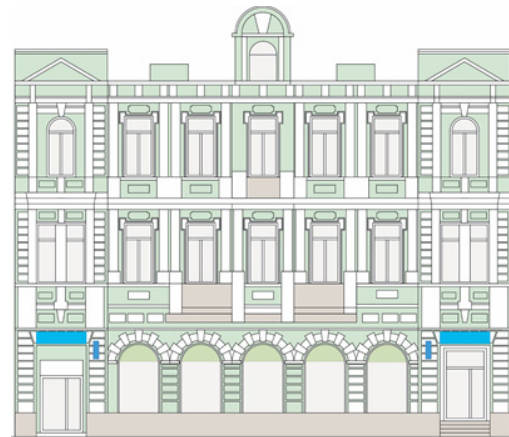
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Conventional zoning is being distributed land plots in the city in according to their functional purpose and legal relations regulation, which it is had a limited ability to influence changes in the city. Form-Based Codes is shown how to improve the comfort on an urban environment as a result owns components such as building parameters, land plots parameters, open spaces, architectural standards and more [4] that is shown in Table. 1.

Use the Transect Based Code principles, the areas in Kharkov can be divided into zones: the core of the city or the historical center (T6), the center of the city (T5) and the periphery (T4). For each zone, it need to write down parameters that would take into account history, characteristic features, such as building style, floor area ratio, number of buildings per 1 m<sup>2</sup>, finishing materials, placement relatively red



a) Incorrect advertising signs



b) Project of advertising signs placement

Fig. 4. Advertising structures placement, in Kharkov, street Sumskaya, 2, Ukraine: a) existing; b) project

Table 1

**Comparison between Conventional zoning and Form-Based Codes [4]**

Conventional zoning	Form-Based Codes
Legal regulations which regulate what is prohibited	Normative document which describes what is need
Based on separate use areas	Based on mixed-use areas
The preparation process includes minimal public participation	Public participation to solve problem on the urban areas use is an inalienable part of the process
The focus is not on the urban areas use that are need for, but the prohibition is to use.	Connects urban form and land use

lines, street width, perception characteristics a certain urban fragment, etc [18, 19]

For an American city, the floor area ratio is one of the main indicator that calculated following formula 1:

$$FAR = \frac{S_{gen.building}}{S_{plot.ratio}} \quad (1)$$

where FAR is floor area ratio;  
 $S_{gen.building}$  is general building area;  
 $S_{plot.ratio}$  is area of the plot.

This indicator can be used when developing Form-Based Codes in Kharkov. In the historical part of the city, under the conditions of reconstruction, the all parameters will need to be brought in according to established parameters and, thus, it is ensured a systematic change in the building towards improving its quality.

**CONCLUSION**

The Form Based Code is a new evolutionary stage in the development of the building regulation system which is provided for a completely different level by relationships

in the urban space, with the awareness of the importance in shaping the environment, rather than regulating individual buildings.

The Form Based Code principles are universal, and these principles adaptation will be allowed to save and to improve the urban environment in the modern cities. In an urban environment that is required renovation or it is had the ability to accommodate new buildings and structures, Form Based Code will be significantly speeded up the development process and project approval. In Europe countries have long developed clear and yet invisible rules that is created a comfortable and non-aggressive environment.

Today, the use by Form Based Code in the cities of the world is becoming a widespread practice, but in Ukraine this practice is been still underdeveloped both at the performer’s level and at the user’s level. On issues of urban improvement, city brand and comfortable urban environment, some Ukrainian cities are already worried about developing their own design code. Despite Ukraine’s lag behind developed countries in understanding the values of the urban environment, it need to use this approach to solve specific problem for the development regulation in the city.

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## АНОТАЦІЯ

### **Чепурна С., Жидкова Т., Дудка О. Інструменти для сталого розвитку громадського міського простору.**

*У середині 20 століття спостерігається розростання міст і поява величезних просторів у містах, викликаних швидким зростанням населення, розвитком автомобілебудування та житлової політики, спрямованої на поширення приватного домоволодіння. У таких умовах неможливо було передбачити, яким буде розвиток забудови і, тому потрібно було шукати нові шляхи вирішення цієї проблеми. Тому, виникла потреба у перегляді існуючих документів щодо зонування та у нових інструментах щодо регулювання забудови.*

*Принципи Form Based Code є універсальними, і адаптація цих принципів дозволить зберегти та покращити міське середовище у сучасних містах. У міському середовищі, яке потребує реконструкції або має можливість розміщення нових будівель та споруд, Form Based Code значно прискорить процес розробки та узгодження проекту. У європейських країнах вже давно виконані чіткі правила, що створюють комфортне та неагресивне середовище.*

*В українських містах розміщення забудови відбувається за функціональним зонуванням, для цього використовується набір параметрів, який не дозволяє отри-*



мати зрозумілого та передбачуваного розвитку забудови, що приводе найчастіше до дисонансу. Параметри задаються не враховуючи показників міського середовища, на вирішують проблеми, що виявлені під час аналізу території. Сьогодні в Україні виконуються спроби створити комфортне міське середовище для городян. Для цього розроблено Дизайн Коди у Житомирі, у Києві. Незважаючи на відставання України від розвинених країн у розумінні цінностей міського середовища, країні необхідно використати цей підхід для вирішення конкретного завдання щодо регулювання забудови у місті.

У статті представлені можливості покращення естетичного вигляду міського середовища згідно з основними принципами Дизайн Кодів, які б забезпечили зовсім інший рівень взаємозв'язку у міському просторі. Показано порівняльну характеристику принципів Дизайн Кодів порівняно з традиційним зонуванням. Визначено основний вектор регулювання суспільних просторів на прикладі Харкова в Україні.

**Ключові слова:** Формальний кодекс, умовне зонування, інструменти, житлова забудова, промзона, рекреаційна зона, забудова, містобудування, відкритий простір, вулиці, об'ємні параметри.

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