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**Editor Speech of IC - BTI 2018**

International Conference is the 7th international interdisciplinary peer reviewed conference which publishes works of the scientists as well as practitioners in the area where UBT is active in Education, Research and Development. The UBT aims to implement an integrated strategy to establish itself as an internationally competitive, research-intensive institution, committed to the transfer of knowledge and the provision of a world-class education to the most talented students from all backgrounds. It is delivering different courses in science, management and technology.

This year we celebrate the 17th Years Anniversary. The main perspective of the conference is to connect the scientists and practitioners from different disciplines in the same place and make them be aware of the recent advancements in different research fields, and provide them with a unique forum to share their experiences. It is also the place to support the new academic staff for doing research and publish their work in international standard level.

This conference consists of sub conferences in different fields:

- Management, Business and Economics
- Humanities and Social Sciences (Law, Political Sciences, Media and Communications)
- Computer Science and Information Systems
- Mechatronics, Robotics, Energy and Systems Engineering
- Architecture, Integrated Design, Spatial Planning, Civil Engineering and Infrastructure
- Life Sciences and Technologies (Health and Food)

This conference is the major scientific event of the UBT. It is organizing annually and always in cooperation with the partner universities from the region and Europe. In this case as partner universities are: University of Tirana – Faculty of Economics, University of Korca. As professional partners in this conference are: Kosova Association for Control, Automation and Systems Engineering (KA – CASE), Kosova Association for Modeling and Simulation (KA – SIM), Quality Kosova, Kosova Association for Management.

This conference is sponsored by EUROSIM - The European Association of Simulation.

We have to thank all Authors, partners, sponsors and also the conference organizing team making this event a real international scientific event. This year we have more application, participants and publication than last year.

Congratulations!

Edmond Hajrizi,

Rector of UBT and Chair of IC - BTI 2018
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“Circular Economy” as an Imperative Indicator of a Sustainable Urban Development Derived by Construction Industry – Case study Pristina

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Abstract: Construction field is an important industry for improving resource productivity and with impact on urban development and GDP of the Country (actually in Kosovo, as calculated on the level of 15.76%). The intention of the system promoted by the European Union as “Circular Economy” is to keep the added value of the products for as long as possible and virtually eliminate waste from urban spaces as a fundamental guide of urban sustainability. The process of turning waste into a resource of new modes seems to reshape the development of construction industries, especially now when the need for building materials is increasing focusing on the rapid growth of urban areas. The overall objective is to minimize the critical impact that the industry has in the urban environment such as: Waste Generating, Greenhouse Gas Emission, Noise and Dust Generating. The six actions that rule the “Circular Economy” profoundly improves environmental benefits for urban area are:

- Regenerate
- Share
- Optimize
- Loop
- Virtualize and
- Exchange

Understanding the fundamental needs of Pristina (using qualitative and comparative methodology) to catch up with the actual European trends of sustainable economic development and sustainable urban development, trigger the question raised by this research to analyze the construction industry development vs. rapid urban growth in Pristina and give recommendations on feasible actions to comply with international standards of “Circular Economy”.

Keywords: Circular Economy, construction, industry, waste, environment, sustainability, urban, area.

Introduction

The actual urban development in Pristina and its rapid growth during the last 20 years indicates the fast enlargement of construction and real estate industry. The city population is expanded concentrating in the urban area along with the residential sector, which actually constitutes in the largest division of new constructed buildings.
The aim of this research is to analyze the challenges that pursue the construction and real estate industry, as two of the major contributors of country’s GDP. Their implementation faces with the constant demand of raw materials which encounter for 25-40% of global carbon emissions. Only 20-30% of these materials are reused or recycled while 70-80% of them are discarded mainly consisting of bricks and concrete (80-83%). In Kosovo the amount of waste generated from these sectors is 73 kg/inhabitant on annual bases with the potential threat of increasing during the upcoming years while the recycling sector still remain very deficient.

The latest global answer to these challenges is proven to be the “Circular Economy” which looks forward to a more restorative and regenerative approach as an opportunity of establishing a system which aims to keep products, components, and materials in the construction loop for a longer time by turning the ones that are at the end of their service life into resources for new materials. This viewpoint would lead to more Energy Efficient cities and would impressively decrease carbon emission, while boosting the global economy. From the urban development perspective, this approach would result as a tool for policymakers as well as it would trigger businesses toward a Recycling and Re-usage of Building Materials.

The case study is based on the analysis of Waste Management in Kosovo on one side, indicating the level of construction and demolition waste materials, and the level of residential uninhabited buildings stock which is continuously increasing on daily basis reaching the level of 2.9 million m² in 2016, only in urban area of Pristina. In reference to literature review and the data gathered through a qualitative approach, this paper triggers practical recommendations which encourage further examination of their useful implementation.

**Literature Review**

Circular Economy has been lately added in the professional vocabulary as an opportunity for future development in different industries even though it was initially initiated by European Commission 40 years ago as an attempt to substitute manpower with energy. As emphasized by Ellen McArthur (2017), the time for “Take, Make and Dispose” is now over and the world is looking forward to a more restorative and regenerative approach offered by Circular Economy as an opportunity of building an economic, natural and social capital which aims to keep products, components, and materials at their highest utility and value at all times.

A ‘circular economy’ would turn goods that are at the end of their service life into resources for others, closing loops in industrial ecosystems and minimizing waste. It replaces production with sufficiency: reuse what you can, recycle what cannot be reused, repair what is broken, remanufacture what cannot be repaired (Stahel, 2016).
In our current, linear economy, approximately 80% of what we use is directly discarded after usage (Sempels and Hoffmann, 2013), even more over 99% of the total material flow generated in order to produce different products ends up in waste disposal within 6 months (Hawken et al., 2013).

A recent study undertaken by Club of Rome in five European nations found out that a shift toward a Circular Economy by 2030, would insure economies of these countries to be 25% more Energy Efficient, would led to 50% reduction in carbon emission by using renewable sources in energy mix, and would extend to minimum 25% of material efficiency in manufacturing organizations (Wijkman and Skanberg, 2015). On the other hand, World Economic Forum, the Ellen MacArthur Foundation and McKinsey & Company indicated that the transition to a circular economy would create an opportunity in excess of 1 trillion USD for the global economy (E. M. Foundation, 2014).

The transition to a circular economy is not an easy process and it requires changing of consumer habits and routines. Research and innovation are needed at all levels — social, technological and commercial. Economists and environmental along with material’s scientists need to assess the ecological impacts and costs and benefits of products. An extensive effort is needed to convince businesses and governments that a circular economy is feasible. This transition entails four fundamental building blocks: Materials and Product Design; New Business Models; Global Reverse Networks; Enabling Conditions (Planing, 2015).

MacArthur (2013) identified a set of six actions that businesses and governments can take in order to insure a smooth transition to a circular economy: Regenerate, Share, Optimise, Loop, Virtualise, and Exchange.
Circular economy business models derive in two main groups: those that encourage reuse and repair, remanufacture, upgrades and retrofits as a prerequisite to extend service life; and those that turn old goods into as-new resources by recycling the materials (Stahel, 2016).

**Circular Economy in Construction Industry**

On the other hand, the construction industry’s appetite for raw materials is vast; it is the world’s largest consumer of them and accounts for 25-40% of global carbon emissions. In the last two decades an increasing research effort has been devoted to the evaluation of the sustainability of the construction and demolition sector in urban systems, due to its huge environmental impact and generation of a large amount of waste materials (Bowea and Powell, 2016). The circular economy framework and its basic principles “Reduce, Reuse and Recycle” have been proposed for evaluating and addressing more effectively the construction and demolition waste materials (Esa et al., 2017) as well as suggesting appropriate policies, in so making Circular Economy a current political goal in many countries worldwide (Ghisellini et al., 2016).

Based on the actual customer’s mindset, it takes more labour and fewer resources to refurbish buildings than to erect new ones. The principle is true for any stock or capital, from mobile phones to arable land and cultural heritage. Having said that, as an innovative economic and production model Circular Economy primarily implies a mind-set change that considers waste as potentially useful resources and not as a problem to manage and dispose of in landfills, as in the past linear economy.

In construction industry, waste is well managed by many companies in Europe and worldwide, but yet, a huge amount of recyclable/reusable materials are disposed. According to MacArthur (2013) only 20-30% of the materials used in construction industry are reused or recycled while 70-80% are discarded. This waste consist of different types of materials in variable amounts, depending on several factors such as their sources (residential, commercial, industrial buildings, roads, bridges), size (low-rise, high-rise), the type and method of activity that is carried out (e.g. construction, renovation, repair, demolition/deconstruction) and the location of the development (Diyamandoglu and Fortuna 2015).

In European countries, Construction and Demolition waste mainly consist of bricks and concrete (80-83%), the rest (17-20%) are packaging and structure support materials (such as plastics, wood, metal, paper and cardboard) as well as overburden, namely material coming from excavation sites (clay and rocks, asphalt) (La Marca 2010). Obviously demolition projects generate a larger amount of waste that could be more than 10 times higher than construction projects (Duan et al. 2014).
Applying this principle to the construction industry could bring extremely cost-effective benefits. The World Economic Forum’s report points out that by harnessing the capacity of the building sector, many countries could cut emission rates cost effectively and achieve energy savings of more than 30%, according to the United Nations Environment Programme.

From the urban development perspective, the Danish case study encourages delivering of the circular economy as “A toolkit for policymakers” (Egerton-Read, 2015). This study considers the policy and business opportunities in creating a construction that utilises industrialised production. Their proposal for government is: Re-Destination of Already Constructed Buildings Capacities
where the sharing and multi-purposing of buildings is increased, while for businesses they promote Recycling and Re-usage of Building Materials.

**Construction Industry and Urban Development in Kosovo**

The meaning of urban area is structured by functionality of buildings and sites “Buildings are constructed and sites are developed in ways that are sensitively to both: historical and contemporary context.” (LaGro Jr, 2013).

The general analyses of this research are based on systemic literature review related to people, buildings and public spaces, study cases and researches of public opinion related to the construction industry and urban development in Pristina. City, is considered to be a rational modelling, plan and design which is used by citizens while it depends mostly from the quality of public policy defined as “Institutional, groups and networks, rational actors, ideas (John, 2013) which relies in the quality indicators such as:

Number of the constructed buildings in relation with community needs, considering how many of them are not in use;
Trend of building permits issued and illegal constructions trends considering how many of them can be repurposed;
Investments trends.

Taking in consideration the rapid urban development of Kosovo capital City, Pristina, especially during last two decades, positive and negative aspects may be highlighted. In concentration of business and their potential unstructured investment capacities, the major consequences noticed indicate: increased number of inhabitants; mass new constructions; mass demolishing of existing stock, transformation from individual to collective housing, low quality of constructions, disproportion between demand and supply curve related to the buildings, disproportion between needs and buying capacities, disproportion between use and not use of constructed buildings, etc.

In this regard, the importance of “Circular economy” in a sustainable urban development of the country’s economy is unavoidable knowing that poor economy along with unplanned development concepts are characteristics of under development countries. In addition, study case of Pristina shows that there is a huge stock of un-used newly constructed buildings, a massive destroy of existing buildings, lack of buildings and spatial multi-functionality usage, huge stock of construction and demolition garbage and environmental problems related to that.
Based on the data gathered from Kosovo Agency of Statistics (KAS, 2017), Construction Industry, together with Food Industry and Minerals, is one of the sectors that produce most dangerous waste. Besides, within its territory, Kosovo is able to recycle only Metals (75.6%), Paper (5.4%), Plastics (8.0%), Glass (0.01%) and Textiles (0.8%).

On the other hand, according to the Waste Management Strategy of Republic of Kosovo, developed in 2013 by the Ministry of Environment and Spatial Planning, on annual bases, Kosovo produces 167,900 ton waste from Buildings Construction and Demolition or 73 kg/inhabitant. This amount is expected to be increased dramatically, when demolition of Buildings of “Kosovo

Fig.6. “Circular economy” and possible urban development benefit (source: research work, August 2017)

Fig.7. Waste recycling capacity in Kosovo
A power plant starts by 2018. Even though, based in this strategy, it is foreseen that 80% of Construction and Demolition Waste shall be reused by 2022. Moreover, in reference to the data published by Kosovo Agency of Statistics (2013), 24.1% of the buildings in Urban Area of Kosovo are Uninhabited. While, only in the urban area of the capital city of Pristina, the uninhabited area reach the level of 2.4 million m².

![Fig.8. Uninhabited buildings in Kosovo and Pristina](image)

Besides, the updated data published by Municipality of Pristina (2017) indicate that more than 80% of the total construction permits issued by this municipality during the years 2012-2016 relate to residential buildings.

![Fig.9. Number of construction permits issued by Pristina Municipality 2012-2016](image)

![Fig.10. Total residential area permitted by Pristina Municipality 2012-2016](image)

The total residential permitted areas in Pristina, reached the highest level of 787,000 m² in 2013 and dropped to 432,000 m² in 2016.

On the other hand, the investment trends, shows that Construction and Real Estate Industry remain among the most important sectors that in 2016 contributed with 8.3% and 10.2% in the country’s GDP respectively.
From the above presented data, it may be resumed that the Total Residential Area in Pristina up to 2011 was – 9.8 million m² and this amount is added by 2.135 million m² for the years 2012-2016.

If the previous trends of having 24.1% of uninhabited residential areas have continued, it means that by the end of 2016 there are 2.9 million m² uninhabited residential areas in Pristina.

**Conclusions**

The complex, dynamic, forever-changing construction industry has its own challenges that among others, relies in a massive amount of discarded raw materials which encounter to a huge environmental impact. The latest global reaction to this issue is the so-called “Circular Economy” which anticipates to a more sustainable approach as an opportunity of establishing a system which aims to keep products, components, and materials in the construction loop for a longer time by turning the ones that are at the end of their service life into resources for new materials.
This paper aims to analyse the construction industry in Kosovo, and the implication of Circular Economy approach to the future urban development of Pristina city. Utilisation of the up-to-date literature along with data gathered for the particular case study, encourage boosting of Circular Economy approach in Construction Industry and as a result, facilitating Urban Development of Pristina, by promoting the following steps in both, business perspective and as a policy making tools:

Expand the range of recycling and reusing of construction and demolition waste, including also:
- Concrete / Rock / Brick Waste - as a gravel and erosion control material;
- Gypsum Board - as a fertilizer additive;
- Asphalt Products - as road building materials;
- Lumber - as wood flooring construction material

Re-Destination of constructed residential spare capacities by embracing the six actions approach Regenerate, Share, Optimise, Loop, Virtualise, and Exchange:
- Considering the 2.9 million m² of uninhabited residential building in Pristina, the local government shall re-consider the regulations of issuing further permits, and aim to increase share and multi-purposing of space as a solution for slower urban area development, which will increase the capacities of the investment in actual infrastructure by reducing the need for building a new one.

From the undertaken research it may be derived that certain institutional and business term innovative modifications are required in Kosovo construction industry in order to enhance adoption of global trends of Circular Economy. This broad area of investigation, shall continuously motivate future researches who aim for sustainable restorative and regenerative solutions.

References


16. MESP. 2013. “Waste Management Strategy of Republic of Kosovo”. Ministry of Environment and Spatial Planning. Accessed November 20, 2017. [http://mmph-rks.org/repository/docs/Strategjis%C3%AB_s%C3%AB_Republik%C3%ABs_s%C3%AB_Kosoves_per_Menaxhimin_e_Mbeturinave__alb._219608.pdf](http://mmph-rks.org/repository/docs/Strategjis%C3%AB_s%C3%AB_Republik%C3%ABs_s%C3%AB_Kosoves_per_Menaxhimin_e_Mbeturinave__alb._219608.pdf)


Statistical Control of Mutual Exchange of Details (Tenon-Mortise) From Beech wood, in Some of Manufacturing Factories of Chairs in Region of Ferizaj

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Abstract. Like every manufacturing industry, the wood industry also faces with many challenges. For responding to these challenges, companies need to improve constantly the quality of their products, by using scientific analysis and putting them into use. This study presents statistical process control of the elements of tenon and mortise, based on data analysis, obtained from production. Based on data processing, the conclusions are given by regarding the possibility of cooperation of companies and their mutual exchange. The regular application of control charts, reduces defects and production costs, and keeps open possibilities for collaboration between enterprises, by exchanging certain parts (concrete case “parts of furniture from wood”). The aim of the study, are the possibilities of mutual exchange of parts produced at different factories and the possibility of collecting these elements in a certain place, where could be conducted only the joining process. The subject of the study were three different companies for the production of chairs, in region of Ferizaj, which use the same raw material, but use different types of machinery.

Keywords: chair, statistical control, control diagrams, wood.

Introduction

The reciprocal exchange of details or the interchange is a feature of the elements of the product that each element without any overhaul (without further processing to adapt) can be clamped with other elements of the product, and taking under consideration that the product will be fully completed by certain quality standards while it is being used. (Osmani, 2001).

This feature of the elements is realized with the help of two factors:
The technological factor, where the methods of machining and fastening of the product are defined and,
The exploitation factor, where the appropriate conditions of use of the product should be determined.

In the contemporary conditions of production, where is also used the cooperation and processing of some elements in different factories, interchange is greatly important.
To be realized it is necessary to meet certain conditions, which are:
• The use of verifiable tolerances and placements in practice,
• The appropriate design of the product and marking tolerances in the drawing,
• The possession of machines and equipment where it is possible to produce within the limits of certain tolerances,
• The possession of measuring tools of the required accuracy.
The adequate arrangements of control such as wood dryness accuracy, machine working accuracy, tools and molds conditions, climatic conditions in the ward, etc.

The accuracy of detail production is determined by these parameters: (Pandeli Marku, Sotir Dimoshi, 2007/2008):

- The Accuracy of dimensions,
- Corners that form the surfaces and ribs of the detail,
- The accuracy of the geometric shape,
- The accuracy of the mutual position of the surfaces (detailing),
- Surface cleanliness,
- Rough surfaces etc.

The strength of the attachment depends on the type of placement. According to Mr. Ilinskij, for the mortise and tenon, the maximum value is reached with a + 0.3 mm clamp.

According to Manzhos, the accuracy of processing depends on these factors too:

- a) Machines: geometrical accuracy of parts, elastic deformation of parts, thermal deformation, the blunt of blades etc.,
- b) Tools - geometrical accuracy, elastic thermal deformations, beveling of blades etc.,
- c) Casting and measuring instrument: the geometric accuracy, the elastic deformations, and tearing.
- d) The processor: material properties, which are not of the same size, elastic deformations, internal tensions of the wood, etc.
- e) Workshop: the incorrect foundation, the incorrect fixing of the machine, the ineffective mode of operation, the inaccurate measurements etc.

In wood processing, we should always take into account its hygroscopic properties. In this regard, depending on the condition of the surrounding air, the wood receives or releases moisture. Smoke and shrinkage cause the processor or workmanship to change, and, as is known, those dimensional changes are not the same in all directions, so the detail changes shape.

To avoid these consequences the wood will wither to some moisture, depending on the conditions of use. On the one hand, incorrect drying should be calculated and on the other hand, the increase in humidity (lag during enlargement, whitening, and coloring) may occur in the production process. The wood should be dried up to 2% under the moisture of the exploitation, so if the wood slightly bulges and the bonds will be a little stronger. Much worse is when the opposite happens, because the shrinkage will cause a crack into the wood or to the adjacent line.
Wood humidity for furniture, depending on the destination and technology, ranges from 6-12%.
To keep this moisture unchanged in the course of the production process, it is imperative to
condition the air. The limits on permissible relative humidity and air temperature in the
technological process are:
\[ \varphi = 35 \div 70 \% \text{ (optimal 55 \%)} \text{ l.r. ajit,} \]
\[ t = 18 \div 25 \, ^\circ\text{C (optimal 20 \, ^\circ\text{C).}} \]

To ensure the accuracy of detailing, you should:
a) The wood material should be dried according to the requirements of the technological process.
Before processing in machinery, the wood humidity in percentage must not be more than:
- For details of interior doors, wall coating etc. .....12-14\%
- For details of windows, exterior doors etc. ... 15-17\%
- For furniture details....... 10-12\%
- For parquet ......8-10\%
b) In the environment of the production, the temperature should be between 18-25^\circ\text{C and relative}
humidity of the air at 60-65%
- The processing of the details must be carried out on machines with high precision machining.
- The accuracy of the machine registration should be checked systematically.
- Checking the accuracy of the work should be performed with high precision measuring
instruments such as calibers.
- The creation of optimum working conditions in terms of cleanliness, lighting, order, etc.

It is difficult to give an analytical link to the impact of each of the factors mentioned above in the
accuracy of detailing. However, the most important ones are the three permanent factors:

**The Purposes of the study**

The study aims to:
Establish normal data distribution curves for each enterprise where the samples were taken,
Determine the accuracy of the machines for the formation of the mortise and tenon according to
the Russian standard GOST,
Build diagrams "X" and "S" for the measured data,
Set the standard deviation rate for each factory separately,
Analyze the possibilities of cooperation (exchange) of the details between the companies that are
under review.

**Material and Methods**

**Material Used for the Production of Details**

For the production of the details obtained in the study, beech wood (Fagus Sylvatica L) which is
grown in the regions: Kamenica, Kaçanik, Jezerc.

**Machinery Used for the Production of Details**

To connect the details of the interlocking to a fastening or a product, which is made of wood, it
is necessary to form connecting elements, such as mortises and tenons, and so on. Tenons are
created in the suction machines, which are often called tenoners, while the mortises are created by the means of drilling machines.

**Measuring Tools Used to Measure the Details**

The noniuses with 0.01mm accuracy are used to measure the mortises and tenons.

![Image of nonius](image_url)

Figure 3. The measuring of details are made with nonius

**The Building of Normal and Factual Curve**

After the measuring samples are taken in the terrain for mortises and tenons (60 measurements per each), their processing is done. Using tables and mathematical formulas, we have the results.

Table 1. Recording measurements at certain locations.

<table>
<thead>
<tr>
<th>Number of details</th>
<th>Recording measurements at certain locations</th>
<th>Notice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dimensions in mm in certain places for measurement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Σ = N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The number of groups is set according to the formula:

\[ I = 2\sqrt[3]{N} = 2\sqrt[3]{60} = 8 \quad (1) \]

N - The number of total controlled details (concrete case 60).
The limits between groups is calculated by using the formula:
\[ R_i = \frac{d_{max} - d_{min}}{l} \] (2)

\( d_{max} \) - The maximum value of the average of the groups.
\( d_{min} \) - The minimum value of the average of the groups.

Table 2. The table for construction of factual curve.

<table>
<thead>
<tr>
<th>Number of groups</th>
<th>Limits of groups</th>
<th>Average of groups</th>
<th>Frequency (f)</th>
<th>X*F</th>
<th>(X- M)</th>
<th>(X- M)2</th>
<th>(X- M)2*F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Sigma )</td>
<td>( N=60 )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The arithmetic average is determined by the formula:

\[ M = \frac{\sum XF}{N} \] (3)

While the standard deviation is determined according to the formula:

\[ \delta = \sqrt{\frac{\sum (X - M)^2 F}{N - 1}} \] (4)

To construct the normal curve, it is used the table:

Table 3. The table for normal curve construction.

<table>
<thead>
<tr>
<th>Deviation ± from M</th>
<th>Abscissa in mm</th>
<th>Coefficient h</th>
<th>The high of the ordinate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Në pjesë Në mm</td>
<td>Majtas (-)</td>
<td>Djathtas (+)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>0.883</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.607</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>0.385</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>0.044</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When it is known the value of standard deviation, then according to Russian standard GOST, it is easy to find the accuracy of the machine's work, which is as follows:

\[ c = \frac{133 \cdot \sigma}{\sqrt{d} + 20} \] (5)
Table 4. The assignment of machine accuracy:

<table>
<thead>
<tr>
<th>Nominal size in mm</th>
<th>The degree of accuracy</th>
<th>(GOST 6449-53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.30</td>
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<tr>
<td>30-50</td>
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<td></td>
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<tr>
<td>50-80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120-260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>260-500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500-800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>800-1290</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Russian standard GOST 644953 calculates the machine's accuracy depending on the size of the processor using the formula \( \Delta = 6\sigma \). Based on this and knowing the nominal size of the processor is found the accuracy of the machine.

The choice of the diagram was made according to the figure (Vincent K. Omachonu, Joel E. Ross, 2004):

![Figure 4. The choice of control cards](image)

As it is seen from the figure and taking into account the number of measured samples (60) it turns out that for the review we will get the diagram \( \bar{X} \) and \( S \).

In the following table are given formulas for calculations of the above diagrams.
The required coefficients for the calculation of the data are presented in the following table:

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Control limits of 3σ</th>
<th>Central line</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>( X \pm \frac{3MR}{d_2} )</td>
<td>( X )</td>
</tr>
<tr>
<td>X (using R diagram)</td>
<td>( X \pm A_2R )</td>
<td>( \bar{X} )</td>
</tr>
<tr>
<td>X (using S diagram)</td>
<td>( \bar{X} \pm A_3S )</td>
<td>( \bar{X} )</td>
</tr>
</tbody>
</table>
| R       | \( UCL = D_4R \)
          | \( LCL = D_2R \) | \( R \)       |
| MR      | \( UCL = D_4MR \)
          | \( LCL = D_2\bar{MR} \) | \( MR \)      |
| S       | \( UCL = B_4S \)
          | \( LCL = B_3S \) | \( S \)       |

The general terminology used in the control charts is as follows:

- \( m \) = number of samples or subgroups,
- \( n \) = number of observations for each sample.

\( x_1 \), \( x_2 \), \( x_3 \), ..., \( x_n \) = value (measurement) of an individual item

\( \bar{x} \) = sample average = \( \frac{\sum_{i=1}^{n} x_i}{n} \) (6)

\( \bar{X} \) = average of the sample average = \( \frac{\sum_{i=1}^{m} \bar{x}_i}{m} \) (7)

\( R \) = sample rank = \( x_{\text{max}} - x_{\text{min}} \)

\( \bar{R} \) = average rank = \( \frac{R_1 + R_2 + R_3 + \ldots + R_m}{m} \) (8)

= sample standard deviation = \( \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} \) (9)
\[ \bar{S} = \text{average of standard deviation of sample} = \frac{S}{m} \] (10)

\[ \text{UCL} - \text{upper limit of control,} \]
\[ \text{LCL} - \text{lower limit of control.} \]

**Results**

After collecting the sample data, it is necessary to analyze the results:

- To determine the standard deviation limits, by measuring the variability of the data and finding the arithmetic average of the variation. The smaller the standard deviation is the individual values of the variables are concentrated closer to the arithmetic average. The greater the standard deviation is the individual values of the variables are scattered beyond the arithmetic average.
- To determine if the process is statistically controlled and if the data is damaged. In the analysis of the control table X bar and S bar it is necessary to analyze the components X and S, and determine whether the measurements are out of control, and
- To determine the nature of the data distribution that are studied and how many times the values are repeated within the groups. In the analysis of the distribution of data, it is necessary to construct the normal theoretical curve and the actual distribution range of the detail groups (Gaussian curvature).

**Diagram X and S for "A" Factory.**

\[ \bar{S} = 0.13 ; \ UCL = 0.43 ; \ LCL = 0.00 \]
\[ \bar{X} = 9.67 \ ; \ UCL = 10.01 \ ; \ LCL = 9.32 \ ; \]

Figure 5. “X & S” chart – tenons of “A” factory.
\[ \bar{S} = 0.04; UCL = 0.12; LCL = 0.00 \quad \bar{X} = 10.06; UCL = 10.11; LCL = 10.00 \]

Figure 6. “X & S” chart – mortises of “A” factory.

The results obtained from the X, S diagrams from the tenon samples in factory “A” show that the process of tenon production is operating under control, and there has been no defect during the tenon process. While the results obtained from the diagram S for samples of mortises show that the process is within the control limits but there are indications that some of the points may fall below the limits. After the X-diagram from mortises, we notice that three points are out of control, which means that the process in this case is not operating in control and has caused errors during the mortise formation.

Mortise St. dev = 0.05 mm ; Tenon St. dev = 0.11 mm ;

Figure 7. “S” chart – the comparison between tenons & mortises of “A” factory.

In the case of the structure of the “S” diagram for the comparison of samples tenon-mortise, the graph clearly shows that the larger standard deviation has dips for the formation of the tenons (st.dev.: 0.11), while the diagram for the formation of the mortises seems to be closer to the arithmetic average and have a lower standard deviation (st.dev.:0.05), which means that the mortise-forming machine is more accurate than the tenon forming (within the factory).
\[ \overline{X} - \text{Mortise} = 10.06 \; ; \; \overline{X} - \text{Tenon} = 9.97 \text{ mm} ; \]

Figure 8. “X” chart – the comparison between tenons & mortises of “A” factory.

The mortise-shaped “X” structure diagram shows that the connections between the tenons and the mortises are loose, without tightening of the details and the tolerance between the tenons and mortises for the factory “A” is \((10.06 - 9.97) = 0.39\text{ mm} \). The Normal Gaussian Curve, and Factual Polygon of the Dimensions Distribution for “A” Factory.

Tenons (St. dev. = 0.11; \( \bar{I} = 9 \); \( M = 9.67; c = 4.88; \Delta = 0.68 \);)

Mortises (St. dev. = 0.05; \( \bar{I} = 9 \); \( M = 10.06; c = 2.09; \Delta = 0.29 \));

Figure 9. Construction of Gaussian curve and factual curve for tenons and mortises.

According to the curves obtained from the tenon-mortise samples, in the first case for tenon samples, most of the points have fallen between 0 and \( \sigma \), and there is no point out of the control limits. In the second case for mortise details, most of the points have fallen between 0 and \( -\sigma \), and there is no point out of the control limits, but even though the subgroup statistics are within the control limits, the process has shown a absence of statistical control. There are other factors that indicate the absence of control that should be studied.
Determination of the Scale Machine Accuracy for Tenons and Mortises According to the Russian Standard Gost, for “A” Factory.

Table 6. Determination of the scale machine accuracy.

<table>
<thead>
<tr>
<th>Nominal size in mm</th>
<th>The degree of accuracy</th>
<th>C coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>1 2 2-a 3 3-a 4 4-a 5</td>
<td>1 2 3 4 6 10 12 16</td>
</tr>
<tr>
<td>10-18</td>
<td>0.13 0.25 0.37 0.50 0.75 1.00 1.50 2.00</td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>0.18 0.35 0.52 0.70 1.05 1.40 2.10 3.00</td>
<td></td>
</tr>
</tbody>
</table>

The degree of accuracy is shown in table 6, according to the Russian standard GOST. From the measured samples, we get the coefficient C and through it, we determine the accuracy of the machine through standard deviation. In this case, the nominal size of tenons and mortises is 10 mm. We find that for tenons of 10 mm dimension, and the coefficient 4.88 (the nearest coefficient is 4), the degree of accuracy is 0.60. While for mortises with 10 mm dimensions and a coefficient of 2.09 (the nearest coefficient is 2), the accuracy of the machine is 0.30.

Diagram X and S for "B" Factory.

\[ S = 0.15 \quad UCL = 0.47 \quad LCL = 0.00 \quad \bar{X} = 10.21 \quad UCL = 10.51 \quad LCL = 9.73 \]

Figure 10. “X & S” chart – tenons of “B” factory.
$\bar{S} = 0.08 ; UCL = 0.26 ; LCL = 0.00$ $\bar{X} = 10.23 ; UCL = 10.44 ; LCL = 10.03$

The results obtained from the X, S diagrams from the tenon samples at factory “B” show that the tenon production process is operating under control, and there has been no defect during the process. While the results obtained from the S diagram for the mortise samples indicate that the process is within the control limits, but the sample distribution lies further away from the central line, and the risk of falling out of points is greater. Because of the structure of the X diagram for mortises, we notice that 22 points are out of control, which means that the process in this case is not operating under control and has caused errors during the formation of the mortises.

$\text{Mortise St. dev} = 0.11 \text{ mm} ; \text{ Tenon St. dev} = 0.22 \text{ mm}$

In the case of the structure of "S" diagram for the comparison of samples tenon-mortise, the graph clearly shows that the larger standard deviation has dips for the formation of the tenons (st.dev . : 0.22). While the diagram for the forming of the mortises seems to be closer to the arithmetic average and have a lower standard deviation, (st.dev. :0.11), which means that the mortise-forming machine is more accurate than the tenon forming (within the factory).
\[ \bar{X} - \text{Mortise} = 10.23 \; ; \; \bar{X} - \text{Tenon} = 10.12 \text{ mm} ; \]

Figure 13. “X” chart – the comparison between tenons & mortises of “B” factory.

The mortise-shaped “X” structure diagram shows that the connections between the tenons and the mortises are loose, without tightening of the details and the tolerance between the tenons and mortises for the factory “B” is \((10.23 - 10.12) = 0.11 \text{ mm}\).

**The Normal Gaussian Curve, and Factual Polygon of the Dimension Distribution for “B” Factory.**

Tenons \((St. \text{ dev.} = 0.11; \; I = 9; \; M = 10.12; \; c = 4.80; \; \Delta = 0.66;\)\)

Mortises \((St. \text{ dev.} = 0.22; \; I = 9; \; M = 10.23; \; c = 9.61; \; \Delta = 1.35;\)\)

According to the curves obtained from the tenon-mortise samples, in first case of tenon samples, most of the points have fallen between \(0\) and \(-\sigma\), and there are points out of the control limits. So in this chart the process of tenon forming, shows absence of statistical control. And there seems to be damages in products after production. In second case of mortise details, most of the points have fallen between \(0\) and \(-\sigma\), and there is no point out of the control limits, but even though the subgroup statistics are within the control limits, the process has shown a absence of statistical control.
Determination of The Scale Machine Accuracy for Tenons and Mortises According to the Russian Standard Gost, for “B” Factory.

Table 7. Determination of the scale machine accuracy.

<table>
<thead>
<tr>
<th>The degree of accuracy</th>
<th>1</th>
<th>2</th>
<th>2-a</th>
<th>3</th>
<th>3-a</th>
<th>4</th>
<th>4-a</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>C coefficient</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal size in mm</th>
<th>The degree of accuracy</th>
<th>(GOST 6449-53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>0.13 0.25 0.37 0.50 0.75 1.00 1.50 2.00</td>
<td></td>
</tr>
<tr>
<td>10-18</td>
<td>0.15 0.30 0.45 0.60 0.90 1.20 1.80 2.40</td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>0.18 0.35 0.52 0.70 1.05 1.40 2.10 3.00</td>
<td></td>
</tr>
</tbody>
</table>

The accuracy of the machine scale is found in the table 7., according to the Russian standard GOST. From the measured samples, we get the coefficient C and we determine the scale of accuracy through it. In this case, the nominal size of tenons and mortises is 10 mm and the coefficient is 4.80 (the nearest coefficient is 4) that the scale of accuracy is 0.60. While for mortises with 10 mm and the dimension of the coefficient and 9.61 (the nearest coefficient is 4) the accuracy scale of the machine is 1.20.

Diagram X and S for "C" Factory

\[ \bar{S} = 0.25 \]; \( UCL = 0.83 \); \( LCL = 0.00 \) \hspace{1cm} \[ \bar{X} = 10.25 \]; \( UCL = 10.93 \); \( LCL = 9.57 \);

Figure 15. “X & S” chart – tenons of “C" factory.
\( \bar{S} = 0.07; UCL = 0.21; LCL = 0.00 \quad \bar{X} = 10.44; UCL = 10.61; LCL = 10.26; \)

Figure 16. “X & S” chart – mortises of “C” factory.

The results obtained from the X, S diagrams from the tenon samples at factory “C” show that the tenon production process is operating under control, and there has been no defect during the process. While the results obtained from the S diagram for the mortise samples indicate that the process is within the control limits. However, the sample distribution lies further away from the central line and in the case of the structure of the S diagram as well as for X, we notice that 2 points are out of control in diagram S, while in diagram X are 7 points out of control limits.

Mortise St. dev = 0.14 mm; Tenon St. dev = 0.15 mm;

Figure 17. “S” chart – the comparison between tenons & mortises of “C” factory.

In the case of the structure of the “S” diagram for the comparison of samples tenon-mortise, the graph clearly shows that the larger standard deviation has dips for the formation of the tenons (st.dev : 0.15), while the diagram for the forming of the mortises seems to be closer to the arithmetic average and have a lower standard deviation (st.dev :0.14), which means that the mortise-forming diagram is more accurate because it does not have any points out of control.
\( \bar{X} \) – Mortise = 10.44; \( \bar{X} \) – Tenon = 10.25 mm;

Figure 18. “X” chart – the comparison between tenons & mortises of “C” factory.

The mortise-shaped ”X” structure diagram shows that the connections between the tenons and the mortises are loose, without tightening of the details and the tolerance between the tenons and mortises for the factory ”C” is (10.44-10.25) = 0.19 mm.

The Normal Gaussian Curve, and Factual Polygon of the Dimensions Distribution for “C” Factory.

Tenons (St.dev. = 0.15; \( I = 9; M = 10.25; c = 6.53; \Delta = 0.92; \))

Mortises (St.dev. = 0.14; \( I = 9; M = 10.44; c = 5.85; \Delta = 0.82; \))

According to the curves obtained from the tenon-mortise samples, in first case of tenon samples, most of the points have fallen in the middle of normal curve (point 0) and there is no point out of the control limits, but even though the subgroup statistics are within the control limits, the process has shown a absence of statistical control. In second case of mortise details, most of the points have fallen between 0 and \( -\sigma \), and there is no point out of the control limits.

29
Determination of the Scale Machine Accuracy for Tenons and Mortises According to the Russian Standard Gost, for “B” Factory.

Table 8. Determination of the scale machine accuracy.

<table>
<thead>
<tr>
<th>Nominal size in mm</th>
<th>The degree of accuracy</th>
<th>(GOST 6449-53)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1  2  2-a  3  3-a  4</td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>0.13 0.25 0.37 0.50</td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>0.15 0.30 0.45 0.60</td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>0.18 0.35 0.52 0.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.05 1.40 2.10 3.00</td>
<td></td>
</tr>
</tbody>
</table>

According to the curves obtained from tenon-mortise samples, both process have been defective and there are points that have been spread out of the Gauss curve. The standard deviation in this case is for the tenon samples is 0.15, whereas for the mortise samples is 0.14. The accuracy of the machine scale is found in the table 8, according to the Russian standard GOST. From the measured samples, we get the coefficient C and determine the scale of accuracy of the machine through it. In this case, the nominal size of tenon and mortise is 10 mm and the coefficient 6.53 (the nearest coefficient is 6) that the accuracy of the machine is 0.90. For mortise with a 10 mm dimension and a coefficient of 5.85 (the approximate coefficient is 6), the accuracy of the machine is 0.90.

The Comparison of Diagrams from Factories "A, B & C" for Tenon and Mortise Samples

St. dev. "A" Tenons = 0.11;
St. dev. "B" Tenons = 0.11;
St. dev. "C" Tenons =0.15;

Figure 20. The comparison of standard deviation of tenons, between “A,B,C” factories.
\( \bar{X} \) "A" Tenons = 0.967; \( \bar{X} \) "B" Tenons = 10.12; \( \bar{X} \) "C" Tenons = 10.25;

Figure 21. The comparison of arithmetic average of tenons, between "A,B,C" factories.

According to the diagram "S" with the tenons data for factories "A, B, C", we find that based on the standard deviation obtained from the "A" and "B" factories, machines in tenon forming have higher precision than the machines at factory "C". The results obtained from the diagram "X" from the tenons samples for factories "A, B, C" indicate that reciprocal exchange of details can only be done between "B" and "C" factories because they have the approximate average tenon formation.

St. dev. "A" Mortises = 0.05;
St. dev. "B" Mortises = 0.22;
St. dev. "C" Mortises = 0.14;

Figure 22. The comparison of standard deviation of mortises, between "A,B,C" factories.
\[
\bar{X} \text{ "A" Mortises} = 10.06;\quad \bar{X} \text{ "B" Mortises} = 10.23;\quad \bar{X} \text{ "C" Mortises} = 10.44;
\]

Figure 23. The comparison of arithmetic average of mortises, between “A, B, C” factories.

According to the chart "S", with the data of the machines for the mortise factories "A, B, C", we find that based on the standard deviation obtained, the "A" factory in mortise forming has the higher precision, than the machines in factories "B" and "C".

The results obtained from the diagram "X", (figure 23.), from the mortise samples for the factories "A, B, C", show that reciprocal exchange of details can only be done between the "A, B". Because the sample distribution of the "B" factory fits more with the distribution of "A" samples, than with samples of factory “C”, and they also have a same arithmetic average of samples.

Conclusions

From this study that has been carried out, we have these conclusions and recommendations are as follows:

1. Standard deviation for samples of each factory is:

   Factory "A" (tenon) = 0.11 mm          Factory "A" (mortise) = 0.05 mm
   Factory "B" (tenon) = 0.11 mm          Factory "B" (mortise) = 0.22 mm
   Factory "C" (tenon) = 0.15 mm          Factory "C" (mortise) = 0.14 mm

   Based on the standard deviation, the best results are notices in the "A" mortise forming, with a standard deviation of 0.05 mm, while the worst results are found in the "B" factory with a standard deviation of 0.22 mm.

2. The accuracy of the machines for forming the details according to the coefficient c for each factory is:

   Factory "A" (tenon) = 0.60         Factory "A" (mortise) = 0.30
   Factory "B" (tenon) = 0.60         Factory "B" (mortise) = 1.20
   Factory "C" (tenon) = 0.90         Factory "C" (mortise) = 0.90

   As for the greater precision of the machines for forming the details, more satisfying results are provided by the mortise-making machines at factory "A" with a precision of 0.30. While the "B" mortise forming machine is less accurate, (during the formation of the details gives more defects) according to the standard deviation (0.22 mm) and the scale of accuracy (1.20).

3. The reciprocal exchange of details (tenon-mortise) can be done between "B-C" and "A-B" factories.
4. The flat surface of the processor affects the fixing of the detail during the process of its creation, without forming the right tenon but with deviations. This then presents problems in linking the details (tenon-mortise).

5. Machine maintenance should be done according to manufacturer's recommendations.


7. Leveling of the machine.

8. Stabilization of the machine.

9. Lubrication of the machine.

References

1. Ymeri M. Teknologjia e përpunimit mekanik të drurit, Ligjerata të autorizuara për studentët e FSHTA-Ferizaj 2007/2008,

2. Sejdiu Rr. Menaxhimi i Cilësisë, Ligjerata të autorizuara për studentët e USHA-Ferizaj 2017,

3. Meta S. Struktura anatomike dhe Identifikimi i Drurit, Ligjerata të autorizuara për studentët e USHA-Ferizaj 2014,

4. Osmani O. Teknologjia e Finalizimit të Drurit, Universiteti i Prishtinës, FSHTA-Ferizaj Prishtinë 2001,

5. Osmani O. Makinat për Përpunimin e Drurit, Universiteti i Prishtinës, FSHTA-Ferizaj Prishtinë 2001,

6. Toska F. Materiale për prodhimin e objekteve prej druri, Ligjerata të autorizuara për studentët, Agjencia Kombëtare e Arsimit, Formimit Profesional dhe Kualifikimeve – Shqipëri, Tiranë 2013,
Development of Policies for Acquiring Municipal Land, through Planning Mechanisms to Achieve the Defined Goals in Prishtina

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Abstract. Prishtina and other capitals in the region are daily facing enormous requests to access public utilities. The development of construction trend that is still ongoing, with a combined architecture between the traditional and the modern, on one hand is contributing and generating revues to the budget of the capital city, and on the other hand is creating difficulties in providing infrastructural, social and public services. Spatial planning documents not always reflect the reality, because urban development is taking place rapidly in spite of legal capabilities to amend the development plans. The areas for public and social infrastructure have been defined by the Urban Regulatory Plans, mostly on private lands, lacking the Municipal land. Their expropriation is providing to be very challenging and in many cases unachievable. The low budget for expropriation and the necessity to gain municipal land pushed the Municipality of Prishtina to implement these goals planned by the Plans through forms of agreement for transfer of construction rights. Such expropriation method remains to be further analyzed and reconsolidated as a mechanism for acquiring and gaining municipal land. The aim is to facilitate the legal framework for finding the best ways of developing and satisfying the public and social interest, through appropriate and acceptable planning methods for expropriations of private land in order to provide for the citizens of Prishtina a healthy social, economic and environmental life.

Keywords: Expropriation, Public and Social Infrastructure, Urban Planning, Land Management.

Introduction

The City of Prishtina is located in the north-eastern part of Kosovo and cover an area of 7768.8 ha, with a central position in the Balkans Peninsula. (Prishtina M. A., 2013, p. 27) Prishtina is also the biggest economic, administrative, educational and cultural center in Kosovo (Prishtina M. A., 2013, p. 10).

Following the war of 1999, the development of the city by illegal construction affected the urban structure of the city and the major part of this structure underwent transformation. Through the years, different forms of construction and destruction have been formative and transformative of Prishtina, and this history is part of what goes into the post-conflict city of today (Norman, 2014).

Over the past 17 years since the war in Kosovo ended, many successful businesses have been developed as the result of illegal takeovers of publicly-owned buildings and agricultural land (Prebreza, 2016).
Today, more than ¼ of the whole Kosova population lives in Prishtina, majority of which are deprived of minimal utilities (Planning, 2010, p. 23).

By the growth of population, the demands for access to public infrastructure are also increasing. The Municipality of Prishtina “suffers” from the lack of municipal land under its ownership and it is one of the challenges it encounters daily as a result of not implementing the plans. The majority of these public and social infrastructure (school, kindergarten, basic health care institution, public park, roads etc.) are planned on private plots. Several ways of expropriation have been determined from the central and local government. In the capital of Kosovo, taking into consideration the low annual budget for implementation of public goals, apart from financial compensation, there were also undertaken several steps towards facilitation of gaining public land. This process results to be very slow and sometimes disputable, despite excessive demands and needs.

The plan should be effectuated largely through public capital investment on publicly owned. Support by the citizenry would be essential to provide the political will for making the necessary investment (M.Levy, 2017, p. 42).

The aim of this research paper is to present the current situation faced by the Municipality of Prishtina and to find new mechanisms for compensation of land and examination of the existing ones on acquirement of municipal land in order to implement municipal services for a healthy, social, economic and environmental life.

Lack of municipal lands impact on the loss of international investment

Forms of tenure and property rights to land vary from one society to another, since they reflect other areas of social and civic life. In all cases, rights normally include checks and balances. Modern states require land policies to govern access, tenure, use and development. These take the form of land laws, rules and procedures as well as of specialist bodies for land administration (UN-HABITAT, 2008).

Good city governance and management is a prerequisite for competitiveness and livability in any city (Stren, 2001). Architecture and urban planning are always political affair (Vockler, 2008, p. 16). Planning and politics are intimately related, and people who rise in planning generally have political smarts (M.Levy, 2017, p. 7). The main challenge to public planning is the way in which politics and planning thinks about the outcomes of the process, and a major challenge is the one-sided focus on consensus as goal (Jonathan Metzger, 2015, p. 115).

As of 1986, by the Law on Expropriation 46/86, the general interest was determined by the detailed urban regulatory plan, thus there were detailed regulatory plans. The Strategic Urban Development Plan for Prishtina, 2004 – 2020, and the Law on Spatial Planning No 2003/14, described regulatory urban plans, in which public services were determined, but, unfortunately, no strategy was defined on how to compensate for such private properties. All of these were based on the Law on Expropriation of Immovable Property 03/L-139, which determines that these properties shall be expropriated only by monetary compensation.

The war of 1999 opened a new chapter of history to the citizens of Kosovo. Known that during the period 1998-1999, Kosovo was in a chaotic situation with regard to developments in the field of construction and stabilization of the whole territory, where the order and the luck of institutions was almost at the ground zero. Such a need to build and stabilize the country was a challenge in itself to just the European Community addressed the latter to take the main burden in construction, development and stabilization of Kosovo in the future (Bajraktari, 2011, p. 5).

Until year 2008 and based on the constitutional framework, UNMIK was the authority with a reserved competency for expropriation. With a new constitution coming into force, a set of laws have been adopted which regulate the area of public interest and enable the implementation of
plans (law on expropriation, law on construction land, law on cadaster, and recently the law on public-private partnership) (NALAS, 2009, p. 52).

Even though the Constitution of the Republic of Kosovo states that “the right to own property is guaranteed”, and that “no one shall be arbitrarily deprived of property”, the practice by urban plans is proving the contrary. By delaying the implementation of spatial and urban plans, the municipalities often prevent individuals from using their real estate for an indefinite time. Thus, the municipalities frequently fail to provide affected property right holders with legal redress against their actions (OSCE, 2006).

On the other hand, Land Law is about the connections between people and land. It is also the relationships between people, jostling for space and allocating resources. It is as fascinating as people themselves, and as dynamic (Cooke, 2012, p. 1).

Even nowadays, after so many years, the Republic of Kosovo still does not have a Law for Construction Land, and in private property and existing legislation often represent serious obstacles to the organization of space when facilitates of public interest need to be built on such property. Since quality legislation is lacking in this field, it is often difficult to reconcile public interest and protection rights for a property subject to expropriation (Vockler, 2008, p. 26).

Municipality in Kosovo do own land and thus implementation of social infrastructure in usually done on municipal land (NALAS, 2009, p. 52), but according to urban and detailed regulatory plans in force, due to the fact that the Municipality possesses a small number of municipal lands, the majority of public areas have been planned in private lands. In these cases, expropriation does not begin at all, or it lasts for decades.

According to the Urban Regulatory Plan of “Mati1” from 2005, this area was planned for public and social infrastructure (school, basic health care institution and public park), even nowadays those plots are empty because municipality did not achieve an agreement with private owner and those are not expropriated.

On the other hand, despite the needs for such areas, the capital city does not have sufficient budget to expropriate them. The only relief for the land owner is to “pray” that such planning contents do not go through his/her land. Such situation forced the citizens to be interested in protecting and justifying only their land, without considering that in the future their children will not have any space for social, cultural and educational development. Based on municipal budget for year 2018, there were only 500 thousand euro for expropriation.
Different countries have regulated this phenomenon based on legislation in different ways. For example, the Planning law allows local authorities to expropriate up to 40 per cent of a plot for public purpose without paying compensation, provided the purpose of the expropriation is one of the following: the construction or widening of the roads and recreation grounds or the building of the educational, cultural, religious, health and sport facilities (Holzman-Gazit, 2016). The capital city of the Republic of Kosovo, lacking the municipal property or having usurped property, risks the benefit to receive international donations for investment in educational and social areas, sometimes it even does not receive investment. Therefore, the opportunity to attract donations appears to be difficult and challenging. As specific example, the European Bank for Reconstruction and Development (EBRD) has agreed to start negotiations for providing 60 million euro ($73.9 million) financing for a road upgrade project in Kosovo’s capital Pristina (Zhitija, 2018), but this process cannot take place without expropriating all of lands that are affected by the trace of this ring and the cost of expropriation appears to be around three times more than the cost of construction.

The Urban Development Plan of Prishtina 2012-2022 neither provides any strategy (proposal) for compensation, or expropriation, and on the other hand it has foreseen the expansion of urban area and growth of population in the city. Expansion of urban area, illegal construction and growth of population in the capital city are having effect on high demands for provision of public services. But, stopping urban growth is not an option. The world’s rural population has essentially reached its peak; but the global urban population is projected to double by 2030. Urbanization will require increasing supplies of land, more efficient land use and accessible forms of tenure; this is particularly the case in major cities, but also for growing small and medium-sized towns and in peri-urban areas (UN-HABITAT, 2008). Higher levels of commitment to infrastructure may be a need given that service level deficiencies will likely become a bottleneck for Kosovo’s aspirations to join the EU and reduce urban and rural poverty (Group, 2017).

While, infrastructure development will be an important part of Kosovo’s economic development for yours to come. There are growing demands for quality housing, office space, government buildings, schools, roads, highways and basic sanitation system, among other infrastructures needs (Publications, 2013, p. 121), the capital will face with major challenges and should be founded alternatives to achieve the planned goals.
Conclusions and Recommendations

Central level, especially Ministry of Environment and Spatial Planning and all Municipalities of Kosovo including Capital, must try to find better and more convenient alternatives for implementation of planned goals, through development planning policies for gaining public space determined by the development plans. Those authorities has to work more on doing regulations to establish and implement transfer development rights, zoning bonuses or compensation in exchange for providing a public benefit. The methods for their expropriation should have adequate approach and mechanism in order to accomplish their implementation within a convenient and necessary timeframe. Those methods and mechanism for public benefit has to be clearly determined in the laws, administrative instructions and planning documents. By finding new methods in planning process as smart models for expropriation of public contents will affect the saving of municipal budget in economic, social and environmental aspect. Municipality of Prishtina, has to analyze if the practices for gaining municipal land in regional capitals be adaptable in Prishtina case. These models of expropriation will be a mechanism for achieving development goals in order to provide a healthy, social, economic and environmental life to the citizens of Prishtina.

References


UNDERSTANDING OF MODERN MOVEMENT IN KAYSERİ BY USING ORAL HISTORY METHODS: A CASE ON AKDAMAR APARTMENT, 1960’s

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Abstract. In the recent history of the modernization of dwelling and housing culture, much attention has been given to oral history methodology. However, less research has been done on 1960’s houses and very little on actual homeowners’ firsthand experiences in their homes in Kayseri, Turkey. For this reason, this study attempts to use oral history as a way to critically understand how the modern home was built and how residents lived in the space in the 1960’s. In this context, the Akdamar Family Apartment is assumed to provide a large corpus of data, documenting the living, subjective, social, cultural, and dialectical experiences of a modern home during the 1960’s by utilizing oral history methods. To verify this hypothesis, interviews with Akdamar Family members have been utilized, and the physical space of the Akdamar house has been reconstructed and analyzed. In addition to this reconstruction, a floorplan and various photographs are used to demonstrate the actual family life lived within that space in those years. By using the data gathered from oral history methodology performed with the Akdamar Family, it is possible to examine how the family as individuals used their home during this period as well as the relationship between the space they inhabited and their domestic needs in order to understand the 1960’s modern house movement. This case study has also recorded stories about various aspects of historic neighborhoods, including architectural features and the alteration of Republic-era houses in Kayseri. As a result, this paper attempts to demonstrate that the way in which oral history stories are constructed tends to destabilize the notion of 1960’s architectural intention.

Keywords: Oral history, Akdamar Apartment, Modern house, Modern movement in 1960’s.

Introduction

No place in the context of social change is as important as the house [1]. Likewise, the modern house is one of the main research topics of modernism. It is a fact that modern houses introduced new methods for designing, constructing, and material usage, and captured the contemporary essence of modernism. Yet, in a social and cultural context, less research has been done on the modern home compared with the physical context. Furthermore, it is possible to argue that in traditional studies, modern houses have been examined through documents like layouts, maps, reports, and so on as a method, and less research has been done on actual homeowners’ firsthand experiences in their homes in Turkey.
The oral history method principally relies on the memories of individuals with personal experience of historic events [2]. Since this method not only records physical but also social, spiritual, and ritual phenomena, it is essential to understanding the intangible and capturing sense of place [3]. Though it is not a fully accepted method in the discipline of architectural history, oral history and memory studies are recently emerging in the related field in Turkey [4]. Within this context, this paper attempts to use the oral history method as a way of critically comprehending the intentions of the homeowner, the Akdamar Family living in Kayseri, Turkey, and through their memories and experiences, understanding the 1960’s modern house movement and domestic life. It is believed that by using this method with such a case study it would be possible to understand a neighborhood in the 1960’s in Kayseri based on archival research, architectural documentation, and oral history stories within a cultural context. As a result, by evaluating the narration of a family member and the documents (photographs, drawings) of the Akdamar Family Apartment, this paper discusses how oral history can contribute to understanding the domestic life in the 1960’s. As a conclusion, it is seen that the use of the oral history method can help to illuminate a historical period and the individual’s domestic experience with the changing of space.

Modern Movement in Turkey, 1960’s

During the 1950’s and 1960’s, Turkey was faced with significant changes regarding social, cultural, and economic aspects. After the Second World War, the changing social and political perception was reflected in Turkish cultural life. Following the integration into the international economic system, Turkey met with new building types, construction, and design methods in architecture [5]. A sizable increase in designing family apartments was witnessed during those years. Family apartments replaced modern houses and life in contrast to traditional houses and life. Batur (2004) argues that, in a modern architectural context, an apartment is totally different from a traditional house in every respect; not to remind of past, new, contemporary, and distinctive [6]. We may see it as an apartment was seen as a symbol of modern life. Moreover, as Allaback (2003) claims, if the modern house was a product of a century’s change, modernism as a style burst onto the architectural scene with hardly any notice and instantly challenged the modern tradition [7].

The first apartments in Turkey, designed by Greek/Armenian architects, emerged at the end of the 19th century in Galata-Beyoğlu, Istanbul for people running the embassy, members of the foreign traders, and Levantines living in urban areas [8]. In the Early Republican Period, Ankara met with the first apartments in the second half of the 1920’s [9]. Similarly, in Kayseri, the first family apartments were built in the second half of the 1930’s [10]. These are Mehmet Kızıklı-Mehmet Kaşıkçı House (1935), Örnek (İspanak) Apartment (1938), and Emek Apartment (1938). In the 1950’s and 1960’s, the number of modern houses increased in downtown [10]. It is possible to claim that family houses of the 1950’s and 1960’s especially have a potential to reveal how housing designs evolved through the new construction systems/materials and plan types affected by the modern movement in Turkey. Thus, important identity changes in the streets, neighborhoods, and cities have been witnessed due to these singular family apartments. Later, through the 1944-1945 Urban Plan by Aru Oelsner, most of the old buildings were demolished, and two/three-story buildings were built in the city center. It is possible to claim that all these changes caused an evolution in the domestic culture and daily life.

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1 Oral history, defined as “the interviewing of eye-witness participants in the events of the past for the purposes of historical reconstruction.”
Akdamar Apartment

Residential buildings are striking because they show the tendency of local people to modern architecture and lifestyle [11]

From the beginning of the 1950’s and 1960’s in Kayseri, the traditional housing plans with multi-functional rooms have been turned into housing plans with functional geometric volumes in a modern context. One of the residential buildings in Kayseri, the Akdamar Apartment, represents the 1960’s modern architectural style built in the city center. For this reason, by focusing on the families’ individual experiences during their occupancy in the Akdamar Apartment, the family’s domestic life and social life affected by the architecture is analyzed.

Akdamar family’s domestic life

The Akdamar Apartment as a family house, located in Sahabiye Neighborhood on Boylar Street, was designed by civil engineer Kamil Kundakçıoğlu in 1965, with modern planning considerations, construction materials, and systems. (See Fig.1)

Fig. 1. The views of Akdamar Apartment from Boylar Street.

For this study, an oral history interview has been actualized with Yusuf Akdamar (b.1952), the owner of the house, and information has been gathered about the changes of the apartment from the 1960’s to the present. From his words; “Mustafa, Mahmut, and Ahmet Akdamarlar decided to construct a family apartment. So they asked Kamil Kundakçıoğlu to design a 3-story house. Kundakçıoğlu designed the apartment on 1 March 1965 as a basement, ground floor, first and second floor. The ground floor includes a kitchen, hall, doorway, wc, bathroom, dining room, living room, guest-room. The first floor is the same as the ground floor besides two balconies. One of the balconies is connected with the dining room and living room. The other one is connected with the living room. Each floor consists of one family. For example, Mustafa Akdamarlar lived on the ground floor. Mahmut Akdamarlar lived on the first floor. Ahmet was located on the upper floor. The balcony was not designed next to the kitchen in the original layout, so a small balcony was added during the construction process. The basement floor was seen in the layout as a flat; on the other hand, it was used as a warehouse for woodshed, goods, and food storage. There had never been a major renovation on our house until 2005. We moved out in 2005. The current occupants, who run the office, made some changes by demolishing some walls in the house...”
His explanations coincide with the plans of the house given in Figure 2. Each floor is connected with a main stairwell. When the floor plan is examined, it can be seen that the whole floor was separated into two main functions as living and sleeping area with the corridor (See Fig. 2). Yusuf Akdamar described the living area as “a front area” and sleeping area as “a back area”.

![Fig. 2. First floor plan of the Akdamar Apartment.](image)

Yusuf Akdamar also added that “our apartment was different from the other apartments on Boylar Street. There was a unique main entrance façade designed with different geometric shapes – triangle, square, and circular windows that allowed sunlight to penetrate into the stairs inside”. (See Fig. 4) This information can be seen in Figure 3, which shows a drawing of the original façade design and a photo from the current situation.

![Fig. 3. A drawing of original West façade and a photo of current situation.](image)

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2 Original drawings of the projects have been provided by the designer Kamil Kundakçıoğlu
With its 144 square meters (9x16m) area in each floor, it is of the biggest apartments on Boylar Street. Total height of the apartment is 11 m built with reinforced concrete. As seen at the section drawing, the flat roof was also new in those years (See Fig. 5). The apartment’s heating system was provided by stove, and a radiator was added in the 2000’s. Tiles and mosaics as finishing materials were used in wet spaces like bathrooms, toilets, and kitchens, while wood parquet on the floor was proposed in the main rooms like the dining room, living room and guest room.

While describing their home, he continues, “Our guest room was a room with luxurious services such as a sofa set that was not used much. It was only open for celebrations and special guests”. Despite the fact that this family apartment’s plan is different from the traditional houses in Kayseri, the guest room is simply connected with the entry hall and living room and does not let guests enter the main living room. It means that the traditional privacy concept still continued in the plan level in those years.

Interestingly, while a bathtub has been seen in the plan, it was not installed during the construction. Yusuf Akdamar talks about this issue, “…there was a copper boiler/thermosiphon and a marble basin (kurna) in the bathroom”. So, it is understood that the use of the bathtub is still not widespread in those years.
As a general review, the apartment differs from the traditional house in the plans, building material, and construction technology. It also reflects the geometric system of modern architecture. (See Fig.6)

**Family’s social life in Sahabiye Neighborhood**

During the interview with Yusuf Akdamar, it was also possible for us to understand the social life in Sahabiye Neighborhood in the 1960’s. He gave us some important clues about the social life of his home and the neighborhood in relation to entertainment, weddings, and other social activities in the 1960s, which can be listed as follows:

- “When our family apartment was built, there were houses of Büyükbalbants, Özkoğler and Mermerler Family Houses opposite the street. These houses were built in the 1950’s. However, in 1960 there was an increase in the number of family apartments in the street. Dr. Ekrem Çetiner’s home was next to our house. In the same year, in 1965, we built our house.”
- “There would be help for weddings and important days. Our neighborhood relations were very good”.
- “In order to have fun in the Sahabiye, we went to the family hours/matte in Tan Cinema at 7:00 in the evening. We would prefer Çiçek Cinema as a summer cinema. Young people went to cinemas and teagardens too”.

He emphasizes that socialization of the 1960’s period is mainly based on actions such as bilateral dialogue and helping, by describing some activities such as visiting close relatives and neighbors and going to cinema and theatre. In addition, Yusuf Akdamar tells that sitting in the Sahabiye was prestigious in that era: He emphasizes that his house is close to the city center and that he has famous educated and merchant neighborhoods next to his apartment.

**Conclusion**

Akdamar Apartment is one of the typical family apartments in Kayseri built in the 1960’s. By using the oral history method as a way to comprehend the daily life of the Akdamar Family, this paper aimed to understand the 1960’s modern house movement and domestic life in Kayseri. It is assumed that, Yusuf Akdamar, one of the Akdamar family members, exemplifies the experiences in the new family apartment buildings in the 1960’s, which were different from traditional ones.

The paper is about the value of using oral history to add to our understanding of architecture and its impacts and on the importance of a historical area in a city as well. We are reading about the
oral history and how it relays more than just an accounting of history but also the personal and social aspects.

As a general perspective, Akdamar Apartment differs from the traditional house in the geometric plans, building materials - glass, concrete, metal etc. - and construction technology. It also reflects the geometric system of rational architecture during the 1960’s. Yusuf Akdamar also gave some information about the social experiences in the Sahabiye neighborhood. At the end of the meeting with Mr. Akdamar, an opportunity was obtained to compare what domestic life was like and how architectural spaces were designed in that era.

When other family apartments like this apartment are analyzed, detailed information about the place and the importance of the physical and social experiences of Kayseri in the modernization process can be reached. In this context, the current urban transformation project can play a role in preserving the disappearing Sahabiye Neighborhood as an example of modernization: "the first modern neighborhood” in Kayseri, Turkey.

Historic buildings often decay to the point of demolition nowadays. So, a historic building like Akdamar Apartment in Sahabiye is vital for the success of Sahabiye historic district’s preservation. In short, it is really important to save 1960’s modern buildings and old neighborhoods for our modern history. If we are not to be successful to save our modern architectural history, the character of the city is going to be destroying. We do see the point that we are trying to make about losing historical areas in a city is a loss of the character of the city.

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**References**

13. 13. Kamil Kundakçioğlu Project Achieve
Urban Sprawl and its impact on Economic, Social and Environmental factors  
Study case – Suburban Neighborhood of Pristina  
(International Village, Neighborhood Qershia, Swiss Village)  

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Abstract. The impact of Urban Sprawl in economic, social and environmental factors is the subject to this research paper. Measurement of Urban Sprawl in cadastral zone Caglavica is one of the main objectives of this research.  

Based on data provided by the Kosovo Agency of Statistics regarding the increase of the number of collective residence in Pristina, based on cartographies that show how Pristina was in the prewar period and how it was extended today, the cartographies that were presented in Pristina’s municipal development plan, we understand that Pristina has increased in recent years by the number of constructions. Also based on the statistics of the Central Bank for Economic Development, we understand that Pristina has undergone a very rapid economic development. According to many scholars, the rapid development of cities influences their expansion. This expansion may be in some form and be caused by many factors, and some of these forms may have evidence of the country where one of them is urban sprawl.  

By this paper research would be identified and weighted main indicators which are causing the urban sprawl in Pristina municipality.  

Keywords: Urban Sprawl, The impact of urban sprawl, Economic factors, Social factors, Environmental factors  

Introduction  

Based on data provided by the Kosovo Agency of Statistics regarding the increase of the number of collective residence in Pristina, based on cartographies that show how Pristina was in the prewar period and how it was extended today, the cartographies that were presented in Pristina’s municipal development plan, we understand that Pristina has increased in recent years by the number of constructions. Also based on the statistics of the Central Bank for Economic Development, we understand that Pristina has undergone a very rapid economic development.
Research purpose

The purpose of the research is to study that neighborhoods in cadastral zone Çagllavica respectively International Village, Lagjja Qershia and Swiss Village belong to the bad urban layout. Learn the causes of urbanization quickly, low-dwelling of the type distributed in cadastral zone Çagllavica. Also, the impacts of expanding these neighborhoods to land use, air quality and spending of natural resources, as well as to know how much the satisfaction, the well-being of residents or users of these neighborhoods is.

Types of urban sprawl

For a long time scholars have researched and analyzed the way urban layout, its nature and growth. From these analyzes it is understood that urban extension refers to the expansion of urban areas as a result of uncontrolled, uncoordinated and unplanned growth. Over the years, different research has made different denominations of forms of urban sprawl. A categorization of urban layout by two analysts of this problem Harvey and Clark (1971) is that the urban reach lies in three basic spatial forms such as: 1) Scattered development- uncoordinated, 2) Strip develop, corridors of high accessibility along roads, and 3) Continuous expansion of low density (Barnes et al., 2000).

Development of Building Construction

Urban development of the city of Pristina has been defined in the last 5 decades, where different urban planning plans began. But if we make a comparison of the spatial planning documents, the spatial plan that is in force today has expanded the boundaries of the urban area compared to the first spatial plan that was worked in 1986. Each city aims to preserve its identity, but Pristina with the unplanned and rapid development that has been in recent years, with the redesigning and incorrect restoration of historic buildings has greatly influenced the loss of identity, risking the city losing its identity.

According to Krasniqi (2011), the three main factors that have affected this urban condition are:

- Strategy planning using zoning as a planning tool and disrespect to the existing situation,
- The partial implementation of these projects and the other
- Lack of control of spontaneous constructions that have profoundly affected the physical and physical condition
- The aspect of urban urbanization

Case study

For the study, new residential quarters were built that were built in recent years in this cadastral zone. These neighborhoods are located in distance from each other. The International Village is located to the east of Cadastral Zone Çagllavicë which is connected by secondary roads with main roads, the International Village is limited to the north by the cadastral zone Matiqan whereas
in the south, east and west it is limited by the area of the zone Cadastral Cagllavica, areas covered with low individual housing, as well as areas of agricultural land that are not being cultivated. While the other two neighborhoods, such as Swiss Village and Cherry, are located in the eastern part of Caglavica.

Analysis

Measurment of urban sprawl in Caglavica zone

To determine whether neighborhoods in cadastral zone Caglavica represent urban stretches, or not, WUP will be used in this research (Urban Wonder Distribution (WUP) method is the metric used in this study to determine the extent of urban alignment in each unit reporting is a DIS product, a weight of DIS, percentage of built-up area (PBA) in the reporting unit, and a weight of LUP, measured in UPU per square meter (UPU / m²). The range of values of WUP depends on the degree of analysis, which is determined by the perception horizon (HP)). The method that is explained in the literature review chapter.

Tab. 4 Categories of sprawl level

<table>
<thead>
<tr>
<th>Unit</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 UPU / m²</td>
<td>Areas that are not sprawled</td>
</tr>
<tr>
<td>1-2 UPU / m²</td>
<td>Areas that are slightly sprawled</td>
</tr>
<tr>
<td>2-4 UPU / m²</td>
<td>Intermediate levels of sprawl</td>
</tr>
<tr>
<td>4-6 UPU / m²</td>
<td>Areas that are highly sprawled</td>
</tr>
<tr>
<td>6-9 UPU / m²</td>
<td>Very high levels of sprawl</td>
</tr>
<tr>
<td>&gt;9 UPU / m²</td>
<td>Extremely high levels of sprawl</td>
</tr>
</tbody>
</table>

Tab. 5 Parameters of urban sprawl
<table>
<thead>
<tr>
<th>Acronym of the metric</th>
<th>Name of the metric</th>
<th>Unit</th>
<th>Range of low values</th>
<th>Range of high values</th>
</tr>
</thead>
<tbody>
<tr>
<td>WUP</td>
<td>Weight urban proliferation</td>
<td>UPU per m² of landscape</td>
<td>&lt; 2 UPU/m²</td>
<td>&gt; 4 UPU/m²</td>
</tr>
<tr>
<td>PBA</td>
<td>Percentage of built-up area</td>
<td>%</td>
<td>&lt; 3 %</td>
<td>&gt;10%</td>
</tr>
<tr>
<td>DIS</td>
<td>Dispersion of built-up area</td>
<td>UPU per m² of built-up area</td>
<td>&lt; 42.5 UPU/m²</td>
<td>&gt;45.5 UPU/m²</td>
</tr>
<tr>
<td>LUP</td>
<td>Land uptake per person</td>
<td>m² per inhabitant or job</td>
<td>&lt; 111 m² per inhabitant</td>
<td>&gt; 222 m² per inhabitant or jobs</td>
</tr>
<tr>
<td>UD</td>
<td>Utilisation density</td>
<td>Inhabitant and job per km² of built-up area</td>
<td>&lt; 4500 inhabitant and jobs per km²</td>
<td>&gt; 9000 inhabitants km²</td>
</tr>
<tr>
<td>UP</td>
<td>Urban permeation</td>
<td>UPU per m³ of landscape</td>
<td>&lt; 2 UPU/m³</td>
<td>&gt; 4 UPU/m³</td>
</tr>
</tbody>
</table>

1.1 International Village- Measurement of urban sprawl

Tab. 6 Measurement of urban sprawl

**Percentage of built-up area (PBA)**

\[
PBA = \frac{\text{Built-up area}}{\text{Landscape}} \quad (1)
\]

PBA = 2.8 ha/ 6.3 ha = 0.444 x 100 = 44.4 % (High level)

**Degree of urban dispersion (DIS)**

\[
DIS = \frac{\text{Horizon of perception HP (AXB)}}{\text{Built-up area}} \quad (2)
\]

DIS = 0.120 / 2.8 = 42.85 UPU/m²

**Land uptake per person (LUP)**

\[
LUP = \frac{\text{Built-up area}}{\text{Number of inhabitant}} \quad (3)
\]

LUP = 2.8/ 448 = 625 m² per inhabitant (High level)

**Urban permeation (UP)**

\[
UP = PBA \times DIS \quad (4)
\]

UP = 44.4 x 42.85 = 19.02 UPU/ m² (High level)
Tab. 7 Weighted urban proliferation

<table>
<thead>
<tr>
<th>Weighted urban proliferation (WUP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WUP = UP x w1(DIS) x w2(LUP)</td>
</tr>
<tr>
<td>WUP = 19.02 x 0.75 x 0.9 = 12.83 UP/ m²  (High level)</td>
</tr>
</tbody>
</table>

1.2 Neighborhood Cherry - Measurement of urban sprawl

Tab. 8 Measurement urban sprawl II

<table>
<thead>
<tr>
<th>Percentage of built-up area (PBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBA = Built-up area / Landscape</td>
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<td>PBA = 2.6 ha / 9.3 ha = 27.95 %  (High level)</td>
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<th>Degree of urban dispersion (DIS)</th>
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<tr>
<td>DIS = HP (axb) / Built-up area</td>
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<td>DIS = 0.155 / 2.6 = 59.61 UPU/m² (High level)</td>
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<th>Land uptake per person (LUP)</th>
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<tr>
<td>LUP = Built-up area / Number of inhabitant</td>
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<td>LUP = 2.6/ 520 = 500 m² per inhabitant (High level)</td>
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<th>Urban premeation (UP)</th>
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<tr>
<td>UP = PBA x DIS</td>
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<tr>
<td>UP = 27.95 x 59.61 = 16.66 UPU/ m²  (High level)</td>
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</table>
Weighted urban proliferation (WUP)

\[ WUP = UP \times w1(DIS) \times w2(LUP) \]

\[ WUP = 16.66 \times 1.5 \times 0.9 = 22.49 \text{ UP/ m}^2 \] (High level)

Swiss Village - Measurement of urban sprawl

Percentage of built-up area (PBA)

\[ PBA = \frac{\text{Built-up area}}{\text{Landscape}} \] (1)

\[ PBA = \frac{0.8 \text{ ha}}{2.3 \text{ ha}} = 34.78 \% \] (High level)

Degree of urban dispersion (DIS)

\[ \text{DIS} = \frac{HP (axb)}{\text{Built-up area}} \] (2)

\[ \text{DIS} = \frac{0.25}{0.8} = 31.25 \text{ UPU/m}^2 \]

Land uptake per person (LUP)

\[ \text{LUP} = \frac{\text{Built-up area}}{\text{Number of inhabitant}} \] (3)

\[ \text{LUP} = \frac{0.8}{152} = 526 \text{ m}^2 \text{ per person} \] (High level)

Urban premeation (UP)

\[ \text{UP} = PBA \times \text{DIS} \] (4)

\[ \text{UP} = 34.78 \times 31.25 = 10.86 \text{ UPU/ m}^2 \] (High level)
The impact of urban sprawl in cadastral zone Çagllavica

Environmental impact

One of the most important factors that negatively impacts urban deprivation is the environment. Impact on the environment from poor urban sprawl includes some indicators such as impact on land use, mostly spending on agricultural land, then with the expansion of settlements there is a growing need for greater electricity consumption, as well as the extent of settlements away the urban area increases the need for greater use of cars, thereby increasing the level of air pollution and carbon dioxide emissions, as well as the noise level from large car use. With the expansion of settlements, there is a growing need for water consumption, especially in households, with the construction of individual homes with larger living space, and the price for communal tax payments increases. All of these indicators have been reviewed in this chapter, as well as the impact of the poor urban outlook in the Çagllavica neighborhood, including these indicators.

![Graph showing increased built-up area in Kosova](image)

Significant indicators in which urban wastes are affected is the greatest cost of electricity, as a result of building larger areas of living, which must be supplied with electricity. Electricity consumption in Kosovo has increased strongly since 2000 (2864 GWh) by 2007 (4582 GWh). The latest data show that consumption continues to grow to 5,420 GWh in 2009 (KOSTT's annual report for 2009). The main sources of domestic supply are the Kosovo A and Kosovo B lignite plants (97% of the local supply) and a small contribution (3%) from the hydro power plants. Balance between supply and demand is supplemented by electricity imports (around 10% a year).

Economic impact

Livelihoods affect larger communal prices, including property fees. According to the Immovable Property Tax Regulation of the Municipality of Prishtina (2011), where the areas and categories are allocated within the area, where based on the area in which the property is located, the tax per m² is also determined. Z.k Çagllavica respectively the quarters in question, are part of the third zone defined under this regulation and are part of the first category of this zone.
Recommendations

Concerns about losing open spaces, agricultural land productivity, traffic congestion, and increased public service cost should impact people's demand for more control over land development and construction. At the central level, it has great concern and increased funding to broaden the scope for protecting open spaces, environmental clean-ups, and new plans to protect agricultural land. The bad urban sprawl must be fought before it is too late. It is essential that urban planners stand against this stretch and create new innovative growth methods without expanding the city's physical boundaries.

Below are some recommendations, based on this research, which could help reduce the extent of urban misery.

Solutions to the Bad Urban Sprawl
- For developing countries, people living in the suburbs of the city are mostly rural immigrants who have come to town. The problem that needs to be addressed is, therefore, the creation of employment opportunities away from major metropolitan areas.
- Other solutions are the development or reuse of existing land within the city and the concentration of increased use of abandoned construction sites such as old schools, industrial land and parking spaces which can be reused by providing alternatives to land use virgin outside the city limits.
- The lack of a public transport system increases the dependence on private transport. One solution to this may be, the cars pay a high tariff for parking and use outside the urban area, thus driving these residents to return to the urban area. The municipality and the competent authorities are also the ones that can stop this phenomenon by giving high importance to the development of public transport.

Planned urban development for sustainable urbanization
One of the most important independent variables of global sustainability is urban development planning. In the broad, long-term, sustainable sense, urbanization should take the following indicators into a major concern:
• Urban planning process
• Sustainable urban environment components
• Definition and expected size of the city

References

7. Degorska, B. (2010). Transformation of Rural areas into urban areas within the warsaw metropolitan area in the early 21st centuries. IGU conference, Warsaw, Poland.
REVITALIZATION OF NEW DINAMO FACTORY THROUGH THE URBAN AGRICULTURE

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Abstract. Ever since ancient times the treatment of light and perception in the interior has been one of the main principles. It has always been a way of expressing, a language on the function and composition of a volume. This clearly states that the treatment of light in the interior is related to the typology, function and the psychological perception that we have about architecture. Nowadays in the time of modern architecture we have the opportunity to use light and volumetry in the interior in many different forms and complex textures. During a conceptual analysis done with a cube constantly changing the shape and position of the carved, we may notice that we have a change in the perception of space as well as a different psychological effect. The linear carvings located in the ceiling emphasize the main axis of the cubit creating an illusion of the extension of the building. If we had had carvings at the bottom of the cube, the idea of a disconnected space would have been created, which at the first expression seems to stay in the air, disconnected from the floor. This effect can give the idea of mystery in the interior, often used in religious buildings. Placement of small rhythmic carvings in the longitudinal section of the cube will create a rhythm by giving importance to only a certain axis. This is a good way of expressing the importance of an axis or a certain function through light. If we put small carvings like small holes, it will create the idea of a small sky in the interior with insufficient lighting. However, this will create peace of mind and can be used conceptually in exhibitions. The placement of the longitudinal carvings on the side walls will give the idea of framing the space and somehow will divide it. Natural interior light can be used as a form of communication, adapted to the function, volumetry and materials used in the interior.

Keywords: architecture, interior design, natural light, volume, perception of light

Introduction

The historical background

“Architecture is the skillful, accurate and magnificent plays of volumes seen in light.” - Le Corbusier
Since ancient times, light has been an expressive form of architecture in the form of an expressive language. In ancient Egypt the temples used natural light as a form of orientation giving it and the greatest importance in designing. Its architecture and expressive language was closely linked with the cult and the faith in these places. This brought some kind of fanaticism and deep study of composition as well as the study of the motion of the sun and the orientation towards the building.
“In Ancient Egyptian temples light was admitted to the Hypostyle Halls by clerestory, formed by the increased height of the columns in the central aisle, while the sanctuary was left dark or only dimly lit. Less prominent, but very common, lighting solutions included cutting angled slits or square holes into the roof slabs to allow daylight to enter the space” (LaChiusa 2009). Egyptians were the first to make a detailed study not only in architecture but also in astrology. The discovery and derailment of the Sun Trajectory favored the positioning and space composition of the temples. By calculating the angle of the light, they achieved the perfect symmetry, making light the main element in the composition. The light element was the one that oriented the composing in the interior by creating a central axis which counts exactly in the most important part of the temple. This was simultaneously related to their cult and belief in the sun and its power. “The most remarkable lighting scheme in Ancient Egyptian temples is the solar phenomenon at The Great Temple of Abu Simbel, where the axis of the temple was positioned in such a way that on October 21 and February 21 (allegedly the king’s birthday and coronation day), the rays of the sun penetrate the sanctuary and illuminate the sculptures on the back wall, except for that of Ptah, the god of the Underworld, who should always remain in darkness. Due to the displacement of the temple and the accumulated drift of the Tropic of Cancer during 3,280 years, these two dates have moved one day closer to the Solstice, occurring now on October 22 and February 20” (Skliar 2005; Siliotti 2008)

Temple were occasionally ‘hypaethral’ or partly open to the sky, but this system appears to have been reserved for the larger temples such as the Olympieion, Athens. However, the most acceptable system is that of a row of windows over the internal colonnades (Fletcher 1905). In Roman architecture, natural light was a domain, to which Vitruvius devoted a whole chapter in his book ‘De Architectura’. Roman space was concerned with lighting that allows interior decorations to be seen clearly. The oculus of the Pantheon is the most prominent treatment from this era, where light comes only from a round hole in the dome, about 9 meters in diameter, alluding to the (circular) perfection of the heaven and placing the emperor-god in direct relation with the heavens.
A general review of the problem

“Light is what gives character to architecture; without light form, color, or texture are not to be comprehended. It was considered as a celestial substance and the ultimate source of visual beauty in architecture since the earliest buildings. Depending on how it is used, light can transform the spatial context; create agreeable or disagreeable, sublime or mysterious sensations; or simply highlight aspects of the space that interest the viewer. Therefore, the history of architecture can be also told by referring to how natural light has been treated in accordance with different styles. Light has been used in the sacred buildings, not only to provide the necessary visual condition for the ritual acts to be performed, but also to evoke mystical and spiritual feelings. In ancient Egypt, where the sun was thought to be the eye of Ra, creator of the universe, temples were designed, so that, the sanctuary and processional paths were oriented according to its movement. In ancient Greek civilization temples were also orientated towards the east to relate directly to the first light of the day. The Romans, the first to consciously design interior space, also used light to enhance and articulate space and the most representative example for this concept was the Pantheon in Rome. Light was also given great significance in the early Judaism, Christianity and Islam. From the Byzantine monuments to the Gothic and Renaissance monuments, light was employed as the medium, through which the representation of heaven was given a temporal earthly reading” (Ramzy, 2013)

Light in architecture and mainly on its impact on composing is a very discussed topic today, by many architects. From the period of modern architecture there were many different assumptions and experiments in the form, in the interior as well as in the materials that began to be used in architecture. The treatment of light in the interior is an experimental process made from many archives over the years, which have been treated in various forms on the compositional side.

Objectives

The purpose of this research is to describe and analyze the influence of light on the perception of the interior, starting from the compositional and volume of the building. The purpose of this research is to make a contribution to the conceptual analysis, perception and composition of the volume, starting with the best combination of these three. This will help in the process of volumetric creation of an architecture as well as the language that can be used in the interior.

Research issues

Questions that will help us in the sensory perception of light and the impact of volume in inertial are:

1. What is the story of light in architecture since antiquity?

2. What is the difference in volume in the perception of light in the interior?
3. Does the shape of light change based on the typology?

Theoretical background

In the theory of light, it is common to find an explanation of what light is by considering it as energy or visible radiation. Our vision is then the perception determined by this radiation. However, the definition of our visual system by physiology and psychology goes to advanced image processing and psychological outcomes. When dealing with lighting analysis, many specialists consider light quality to be only physical aspects and run their principles by making measurements. They often rely their ideas based on a numeric and scaled light level, discussed in number of lux, which can be compared and detected by instruments. However, if we study deeper our relation to light, we will understand that light comprises a more complex field. Energy that can be measured it is not so reliable and comparative to our senses. According to Anders Liljefors’s lighting fundamentals, physical and visual terms are running parallel. The combination between the physical and the visual worlds is served by the stimulus of vision, the optic radiation from 400 to 700 nm wavelength. The vision is primarily concerned with lighting quality, with the information that is received from the objects in the environment (Liljefors, 1999).

Methodology

The methodology will be based on two aspects:

1. Analyzing the history of architecture and the relationship of volume with light through literature.

2. Finding and analyzing different examples in typology from the point of view of composition and relationship of lights.

Development

Case studies

Light can give power in architecture that affects the interior space and atmosphere. There is an increasing amount of transparent buildings being constructed all over the world along with LED installations that enforce the impression that light eliminates all relevance of shadow. However, Louis Kahn, known as the master of light, designs architecture was shaped by light and shadow. Louis Kahn’s archetypical forms relate back to Greek architecture, which he studied in the 1950s: “Greek architecture taught me that the column is where the light is not, and the space between is where the light is. It is a matter of no-light, light, no-light, light. A column and a column brings light between them. To make a column which grows out of the wall and which makes its own rhythm of no-light, light, no-light, light: that is the marvel of the artist.” (Louis Kahn). However, light was also a very important central element in Louis Kahn’s philosophy because he regarded it as a “giver of all presences”: “All material in nature, the mountains and the streams and the air and we, are made of Light which has been spent, and this crumpled mass called material casts a shadow, and the shadow belongs to Light.” (Louis Kahn). For Kahn, light is the maker of material, and material’s purpose is to cast a shadow.
And because Louis Kahn believed that the dark shadow is a natural part of light, Kahn never attempted a completely pure dark space for a formal effect. For Kahn, a glimpse of light elucidated the level of darkness: “A plan of a building should be read like a harmony of spaces in light. Even a space intended to be dark should have just enough light from some mysterious opening to tell us how dark it really is. Each space must be defined by its structure and the character of its natural light.” (Louis Kahn) As a result, the light as a source is often hidden well behind louvres or secondary walls, thus concentrating all attention on the effect of the light and not simply on its origin.

“The “mysteriousness” of shadow was also closely linked to evoking silence and awe. For Kahn, while darkness evokes the uncertainty of not being able to see, of potential dangers, it also inspires deep mystery. It is in the hands of the architect to evoke silence, secret or drama with light and shadow – to create a “treasury of shadows,” a “Sanctuary of Art.” Even though Louis Kahn designed and constructed many buildings in regions exposed to extreme sunlight, he did not design his buildings just to protect users from the sun, but rather to protect the sanctity of the shadow. He did not believe in artificial shade. “The outside belongs to the sun and on the inside people live and work. In order to avoid protection from the sun I invented the idea of a deep intrados that protects the cool shadow.” (Louis Kahn). Louis Kahn’s path of designing with shadow has attracted and influenced numerous followers, like Tadao Ando with his Church of Light, Peter Zumthor and his Therme Vals or Axel Schultes with his Crematorium. All of these buildings include shadow as a form giver for silent spaces. This perspective presents a pleasant counterpoint in the modern architecture of today that strives for dynamic and bright icons.

Conclusions

This clearly states that the treatment of light in the interior is related to the typology, function and the psychological perception that we have about architecture. Nowadays in the time of modern architecture we have the opportunity to use light and volumetry in the interior in many different forms and complex textures. Natural interior light can be used as a form of communication, adapted to the function, volumetry and materials used in the interior.
References

LIVING SPACES AT MULTI-FAMILY APARTMENTS IN REPUBLIC OF KOSOVO

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Abstract. Based on the research that was performed at the multi-family apartments generally built in Republic of Kosovo, it was observed that these types of buildings underwent several transformations that can be classified in two groups. The manner of organization of living space at multi-family apartments differs in the buildings constructed before 1999 and those constructed since that year up to present time. Due to the various changes, be it political, the manner of construction of the buildings after 1999 and other issues of this nature, the living spaces started to shrink, in some cases to such a degree that they are not suitable to meet the needs of the users. All this doesn’t end here, the issue is more sensitive when one deals with social housing buildings, the latter used by the inhabitants that cannot afford to solve by themselves the housing issue based on the monthly incomes that they have. The researcher endeavored to offer a description regarding social housing and to perform an analysis in functional and surface area aspect of the multi-family apartments in order to understand if the living space transformation phenomenon is prevalent also at the social housing.

Keywords; living spaces, multi-family apartments, social housing, Republic of Kosovo

Introduction

Generally speaking, Kosovo society faces great challenges regarding the issue of the housing. On the other hand the social housing problem in Kosovo remains an issue which is rather sensitive and which was not adequately treated for many years in this country. As a result of ever changing Law on Social Housing and other financial aspects, the issue is increasingly becoming more challenging. The users of Social Housing in Republic of Kosovo are in continuous struggle in attempt to obtain proper treatment and support by the responsible institutions. The latest research indicates that Social Housing which was built after 1999 does not fulfill the needs of the users in terms of living spaces. Often there were dilemmas regarding the Social Housing to have been distributed in unfair way to the families in need, as a result of the lack of proper coordination between the Municipalities or Ministries.

In order to evaluate the conditions of Social Housing and the legal framework that has to do with Social Housing in Kosovo, the Swedish agency for Peace, Security and Development – Folke Bernadotte Academy (FBA) has financed a pilot project in Kosovo. FBA cooperated with UNDP in Kosovo, the latter cooperated closely with the OSCE mission in Kosovo in order to implement the project “Measurement of rule of law in public administration in the Municipalities of Kosovo” through the implementing partner “Movement FOL” [1].

The issue of social housing differs depending on the state or region. The Concept Document on Social Housing stresses that the countries in the region such are: Albania, Slovenia, Montenegro,
Serbia and some cantons of Bosnia approached the issue of social housing through the laws on Social Housing, Slovenia and Macedonia through the law on housing, Croatia through the law on social care, whereas other countries through special Law on social housing [2]. In some countries of Europe, such as Austria, social housing is supported by a public–private partnership as well as by non-for-profit agencies. Kosovo is considered to be one of the least developed countries of Europe where the unemployment is one of the main factors of poverty, it is indicated that 6.9% of the population are on social assistance (welfare programs). A higher degree of poverty is observed in families with more than seven members, which indicates a poverty rate 7% higher than at the families with less than four members (around 4%), this is more prevalent in the families with single moms more than in families where the father is the head of the family [3]. A considerable number of citizens have not solved the problem of housing, therefore such an issue should be treated with more seriousness, and one should take urgent measures to improve the crisis in the country.

Objectives

The goal of this research is the analysis of the multi-family apartments which are constructed in the Republic of Kosovo. The buildings are analyzed be it in functional aspect, as well as in terms of surface area (m²) and lastly they are compared to other multi-family apartments, in order to understand if the social housing projects have underwent transformations with the passing of time, as it was the case with other general multi-family apartments.

Multi-family apartments in Republic of Kosovo;

The construction of multi-family apartments in Kosovo can be categorized into two groups, those constructed before 1999 and those after 1999. The projects of the buildings constructed before 1999 are implemented through complying with the standards of Yugoslavia on planning – JUS, whereas the period after 1999 is characterized by a transitional period wherein the projects are implemented without complying with a specific project design criterion. After this period of time in Republic of Kosovo there was not a technical regulation that architects and construction companies were obliged to respect during the implementation of the projects. The lack of law and technical regulations was accompanied by a chaos in the sphere of architecture that left a lasting consequence in the country. Before 1999 all the multi-family apartments including the social housing ones, were constructed by the public sector, whereas after 1999 they started to get constructed by the private sector. Multi-family apartments that were constructed before 1999 are characterized by clear definition of calm area from the noisy one, and they used to have a larger usable surface compared to those built after year 1999 [4], see Figure 1.
Latest research that was conducted regarding multi-family apartments indicate reduction of living space at the one, two and three room apartments built before and after 1999, Figure 2.

The technical regulation entered into force in 2016 for the first time after 1999, the after-war period.

**Research methodology**

Research methodology for this paper is presented in *Figure 3.*
In Figure 4 one presented the plans of two social housing buildings which were constructed in different time periods (before and after 1999). The aim was to analyze these buildings in functional, constructive and in terms of surface area aspect (m²), in order to see if the social buildings have undergone transformations during their construction in various time periods as it was the case with other multi-family apartments.

In multi-family social housing constructed before 1999 the quiet area was clearly defined from the noisy one and the kitchen was separated from the living room, which differs from those constructed after 1999 where we cannot find a clear definition of quiet and noisy areas, whereas the kitchen in some cases was divided from the living room, and in some cases it was integrated within it. Concerning the construction system, the majority of the social buildings constructed before 1999 were made of the pre-fabricated elements with a combination between massive and skeletal system, whereas those after 1999 were all characterized by skeletal building system. In Figure 5, one presented the plans of the one and two room apartments.
Concerning the usable area, in the cases that were taken as key study samples, one cannot observe a considerable reduction of the surface, if you compare the social housing units constructed before and after 1999. However, the biggest problem lies on the fact that social housing units are occupied by families with a large number of family members, which is a feature of the families with low incomes in Republic of Kosovo, which renders these units as not fulfilling the needs of the users.
Result and discussion

Multi-family apartments in the Republic of Kosovo before 1999 were constructed by public sector, whereas after 1999 such buildings started to get constructed by the private sector. Living space got reduced considerably which came as a result of economic conditions which Kosovo finds itself in. For the inhabitants it is easier to obtain a smaller housing unit, therefore construction of such buildings represents a lucrative proposition for construction companies which were involved in sales. As a result of this, the mentioned buildings are characterized with changes in functional aspect and regarding surface area.

Public sector remains synonymous to the social housing. Social multi-family apartments were constructed and continue to get constructed by public sector in Republic of Kosovo. The reduction of the usable surfaces is not present in these types of buildings. Social housing buildings did not undergo transformations in terms of square meters, however the quiet area is not clearly defined from the noisy area as it once was.

Conclusions and recommendations

Generally speaking, Kosovo faces great challenges in the area of housing and in particular with the social housing. The latter does not fulfill the needs of the users in terms of living space, taking into account that the average number of family members in Republic of Kosovo is five up to six family members. There is no database regarding the present state of the housing and there is a need for housing in the municipalities. It is very important to establish new policies in the area of housing in Republic of Kosovo. The offering of sustainable and affordable housing for all the categories of society is ever indispensable. The establishment of a cooperation between Ministries, Municipalities, public-private sector and various donors is more than needed.

References

Urban Heritage and Place-making: Preservation through mobility enhancement in the Historic Centre of Prizren

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Abstract. Since the armed conflict ended and during a decade of state building Kosovo has gone through substantial reforms required for its European Union integration. This was reflected into its built environment including the historic areas and cultural heritage preservation. Legislation, plans, policy documents and strategies foresee an all-inclusive and a balanced way of development. Practice, however, informs the opposite as the drafted documents are hardly implemented. This paper discusses and examines the mobility in a public space in the Historic Centre of Prizren in relation to the preservation of urban heritage. The paper reveals how the institutional (non)action and, the socio-cultural and political dynamics largely affect the implementation of preservation and planning documentation. Furthermore, the paper provides spatial analysis and suggests a mobility enhancement option aiming for a car-free area as basis for further research towards a sustainable solution for the implementation in practice.

Keywords: Historic Centre, Urban heritage, Place-making, Mobility, Preservation, Kosovo, Transition, European Union, International good practices.

Introduction

The end of the armed conflict in the South East Europe, Western Balkans, marked the beginning of a new era for the state building processes of newly emerged countries after the collapse of Yugoslavia. The path is made clear for the Western Balkans countries; integration into the European Union (EU) structures. The reforms and transformations of the transitional period introducing new legislation, policies and practices, plans and projects reflected into the built environment as well and affected cultural heritage preservation.

Architecture, and urban design and planning are interconnected and function in relation to one another. A building cannot be imagined as an independent structure on its own or ‘egotistical’, even if it represents an architectural value if it’s not well thought in the context of a previously developed urban fabric. Alongside with the building the development of a space around it is important, in order that the new structure is well interconnected, and is in cohesion and harmony with the existing urban setting.

It is equally important that the same principle applies to inherited urban environments. Cultural heritage, looking at historic areas, tends to be often understood as architectural heritage only, which of course has its own significance as a value and representation, however, the inherited urban layout, public spaces, streets and squares, configuration of a terrain, proportions and functions of buildings in relation to the outdoor world – the urban heritage, is often neglected.

This paper will examine and discuss the preservation of a historic centre in the town of Prizren in Kosovo in the context of urban heritage, in post-conflict and during the state building socio-cultural and political circumstances. It will discuss how mobility enhancement and a place-
making approach for people-friendly environments can contribute to its preservation. Furthermore, it will analyse the current mobility situation in the town with effects to the historic centre and suggest a mobility enhancement option as basis for further research towards a sustainable implementation in practice.

**Historic areas’ preservation in the context of urban heritage: the role of place-making and mobility**

Cultural heritage conservation and revitalization often only applies to the physical structure of the building with lack of attention to how the building will interact with the space around it in the current socio-cultural, economic and political circumstances. In transitional countries such as Kosovo, urban development dynamics of a modern world often fail to correspond to the heritage buildings’ preservation in the sense of the harmony or disharmony they might create between the building and the ongoing activities in their surrounding area. This can also impact the preservation and revitalization of a heritage building itself increasing or decreasing their unique architectural value.

UNESCO (2011) has recognised for the urban heritage to be for humanity a social, cultural and economic asset, suggesting a historic urban landscape approach for identifying, conserving and managing historic areas within their broader urban contexts, by considering the interrelationships of their physical forms, their spatial organization and connection, their natural features and settings, and their social, cultural and economic values, and ensuring that contemporary interventions are harmoniously integrated with heritage in a historic setting. In the frame and the spirit of this UNESCO Recommendation (2011) place-making is recognised to be a valuable approach not only for the creation of places for people but also for the urban heritage preservation in order to meet its purpose. The Future of Places (a global forum about public space) I, II and III conferences organised in Stockholm (2013), Buenos Aires (2014) and Stockholm (2015), focused on key issues of public space as a fundamental component of sustainable urban development. The work during three conferences resulted with seven Key Messages as a contribution and integral part of the New Urban Agenda for HABITAT III (Quito, 2016). One out of seven Key Messages addresses Culture and Context in place-making. It states that ‘Public space is made unique and meaningful through cultural and contextual elements that complement and enrich its identity. Spaces should be place-based, adaptable and responsive to geography, climate, culture and heritage’ (Future of Places, 2015).

In place-making, special character and the identity of a place are also recognised to have a particular significance. According to Butina-Watson and Bentley (2007) the character is something that makes a place unique and distinguishes one place from another and that was created not with an intention or by purpose but because of the vernacular processes that have produced the buildings.

One of the key elements for creating places for people is by mobility enhancement measures. Car-free people-friendly environments are the new and expanding trends in the Western European countries and wider with number of international good practices including in the United Kingdom, Spain, Sweden as well as in the Balkans region: e.g. in the town of Split in Croatia, Riva, a popular public space in the Split harbor, located in the Historical Complex of Split with the Palace of Diocletian, listed as UNESCO World Heritage Site was a left over space partially used for parking and its urban regeneration in 2005 transformed it into a car-free pedestrian area for a day and night public life, respecting its historic and cultural context. The project was seen as a ‘progressive design’ (Rupnik, 2010, p216). Tirana, a capital city of Albania, won the European Award for Urban Public Space 2018, for the renovation of a Skanderbeg Square. The square has a central location in the city and was previously dominated by vehicles. The project has turned it into a pedestrian area which is surrounded by mainly socialist heritage iconic buildings, offering opportunities for different public activities for the citizens and visitors.
Kosovo as a case study

Socio-cultural and political phenomena during post-conflict and state building period: Influences into the built environment

The European perspective for Kosovo requires number of reforms for the alignment with the EU acquis. It was stated for the Western Balkans in particular ‘that it is crucial that the countries remain firmly on the path of reform, leaving the legacy of the past behind and investing in their European future’ (European Commission, 2012, p11).

The international standards and good practices have served as basis to develop and draft legislation, planning, development and preservation documents, policies and strategies. Although the legislation framework is in place and the spatial and urban plans mostly drafted, the implementation remains a real issue. The Kosovo Law on Spatial Planning (2013), drafted in line with European standards gives competency to the local authorities for drafting their spatial and urban plans with the aim to also comply with what has been identified as a general challenge of the EU countries, a sustainable land use and development as a balanced social, ecological and economic change (Maier, 2012). The Law on Cultural Heritage (2008) requires the establishment of protective zones around the architectural and archaeological heritage with the aim for a controlled and harmonious development in the heritage sites for their better preservation. This process has not yet been initiated, creating opportunities for uncontrolled development in these protective areas.

An important factor during the Kosovo’s post conflict period of consolidation and reforms was the involvement of the international community, at various stages and different time-frame. After the 1999s war the international presence varied depending on the political circumstances, its status and the state building at a later stage. It started with UN Mission in Kosovo (UNMIK) administration in 1999, EU and USA presence and the International Civilian Office (ICO) for the supervision of its independence, declared on 17 February 2008. ICO ended its mission in September 2012.

This has largely influenced the creation of a culture of an overall ‘dependence’ from the international community during the process of reforms in Kosovo, without having much ‘space’ for struggling and trying to find solutions on their own. Its implications are serious for the ‘ownership matter’ which relates to the implementation of the reforms at a later stage; same as for the implementation of spatial and urban plans including for the cultural heritage preservation.

The historic socialist background, the conflict and the war discontinuity left traces for being ‘extremely suspicious to any collective and collaborative action reasoned by better futures’ (Maier, 2012, p148). This is fundamental and critical and can be explained in terms of collective and collaborative action in the circles of civil society and citizens, institutions of municipal and national level as well as the professionals and experts.

In this kind of atmosphere, the political influences and personal interests prevailed and ‘coalitions between politicians and business became frequent practice to adjust plans to the interests of business groups and individual developers. Residents and environment groups are treated rather as nuisance than as partners’. The developers were rather aggressive with an intention for ‘speculative profits’ and without a community well-being oriented vision (Maier, 2012, p149).

Instead of the efforts for implementing international good practices ‘in practice’, Kosovo I suggest, started developing a culture of almost a ‘formal’ drafting of plans, often lacking substantial analyses and a comprehensive vision for sustainable development; and instead of the participatory planning approach to the consensus based negotiation between stakeholders, it was more a ‘defeat’ or a ‘surrender’ of architects and planners and majority of the civil society to the political and business personal interests. Moreover, a certain number of planners and architects contributed to the formation of such a culture, serving to the above mentioned profiteers.

The Historic Centre of Prizren – a unique cultural and natural heritage
The Historic Centre of Prizren is recognized locally and internationally for its unique cultural and natural heritage – the historic urban landscape. Despite a multi-layered diverse heritage of monuments and sites dated since ancient times, distinguished for their architectural and environmental values, the urban heritage at its organic pattern and terrain topography form a specific value, all together making a cityscape as an identity for the city. It is the most popular area in the city for residents and visitors, for gathering, socializing, site seeing, festivals, fairs, protests.

The Historic Centre is an urban area defined by a protective zone and protected by a special law, the Law on Historic Centre of Prizren (2012). In 2008 Municipality of Prizren approved a plan for its preservation and development, a Prizren Historic Area Conservation and Development Plan (CDP). The plan clearly defines the vision, goal and objectives providing planning decisions in functional, physical, cultural and transportation aspects.

Both the law and the CDP require special regime for vehicle transport encouraging non-motorized means and pedestrian only movement in the Historic Centre.

The socio-cultural and political dynamics in the transition period in Kosovo largely influenced the heritage preservation as well, specifically in the urban historic areas. In these circumstances the legislation and plans face serious challenges and are hardly implemented in practice. As regarding the mobility regime, despite the clear legal and planning requirements, the Historic Centre of Prizren remains ‘threatened’ by free vehicle access, movement and parking throughout the zone. A local non-governmental organisation EC Mana in Prizren has identified 34 parking lots within and in the vicinity of the Historic Centre out of which over 90% are private and informal parking with around 25 parking lots created over the demolished traditional houses.

Sub-zone analyses: the bridge for vehicle access and the parking

The study area for this case is a public space, a continuation of a traditional market zone in the historic centre, along the river Lumbardhi and below the Fortress hill. In discussion with two of the first experts in the city, with over 40 years of working experience that also includes the socialist period, an architect and an urban planner, it was explained that initially as of 1960s, there was a concrete structure (as an aqueduct) shaping the water supply tube for the city, that citizens had used as an informal bridge to pass from one to another river bank (nr.1 in Fig.2). Almost attached to this ‘bridge’ around 20 years ago was built a pedestrian bridge (nr.2 in Fig.2). During the transition period with the support of the Ministry of Environment and Spatial Planning a new bridge of a large reinforced concrete structure was built close to the two previous bridges, that exclusively provides free access for vehicles in a most authentic part of the historic centre, below the hill where the Fortress is located (nr.3 in Fig.2 and Fig.3).

Number of cars pass the river and park in this picturesque place of the historic centre (Fig.4). The pedestrian movement is not the same anymore and the visual and environmental aspects, and the spirit of the place are affected. People do not feel comfortable to go and sit along this route as today it is dominated by cars.
Fig. 1. Historic Centre of Prizren. Fig. 2. Map of Historic Centre, location of the bridge for vehicle access and parking.

Fig. 3. Three bridges. Fig. 4. Bridge for vehicle access.

Fig. 5. The space is designed to clearly mark the vehicle road and a sidewalk dividing the two by vehicle barriers. Pedestrians naturally walk at a wider space and the conflict of use with vehicles is evident.
Mobility analyses and the enhancement option

With the aim to improve the current situation as regarding the vehicle access and mobility in the Prizren Historic Centre the situation is examined in a wider picture of an urban zone of Prizren town. There are four main entry points for motorised vehicles in the town of Prizren (as presented in Fig.6). In the wider spatial analyses, the town has good road infrastructure connection at national level and through the R7 Dr. Ibrahim Rugova Highway also at regional level with Albania, Macedonia, Serbia and Montenegro. This is an advantage for the historic town as it increases the number of tourists and visitors especially during the summer time. However, there is a lack of vehicle regime during this period, especially for the public parking and the access to town and the same issue is especially reflected in the most attractive place for the visitors, the historic centre.

![Prizren urban zone - the historic centre and four main access points for vehicles.](image)

The analyses in Fig.7 map show the vehicle movement in town in relation to the historic centre marking the regional access roads that ‘attack’ the historic centre as well as urban and local roads within the centre. Furthermore, in the map are highlighted the location of the only bus station in town and the higher density commercial area at the western side. All the vehicle entries access
freely up to 70% of the historic protective zone in the centre and through the newly constructed bridge mentioned above enter and park their cars in a public space subject of this research paper.

Fig. 7. The analyses of vehicle movement in the Historic Centre of Prizren.

Looking at the road infrastructure and the spatial analyses with the intention to reduce the vehicle access and movement in the historic centre this research paper suggests the option for the creation of public parking at entry points in town and applying of the feeding bus routes model (Fig.8). With the analyses of the topography at all four access points it suggests that the north-west, south-west and north-east directions are considered for the public parking. Due to a high degree of slope-terrain and in order to preserve the specific natural landscape at the south-east entry to the historic centre, this point is not recommended for any parking.
The public parking at three entry points in the periphery of the town would collect all the vehicles mainly of the visitors and would reduce their presence in town and especially at the historic centre as step one of the suggested model. Step two is to provide a suitable public transport (i.e. minibuses) for people from the public parking to the historic centre and back through the feeding routes.

The analyses and the suggestion of this paper provide the basis for further collaborative research and examination with an all-inclusive approach with professionals, institutions, civil society and other stakeholders, towards a sustainable solution to make the international good practices not only remain informative but also implemented in practice.

Conclusion

Cultural heritage preservation especially in the urban historic centers often only associates with architectural heritage without enough attention for the activities and development in the surrounding area of the heritage buildings. International standards and good practices inform for the necessity of the preservation in a broader urban context - as an urban historic landscape, and recognise it to be a social, cultural and economic asset for the humanity. Place-making through the mobility enhancement is one of the methods to tackle this issue and contribute to the preservation of the urban heritage.

The purpose of this paper is to raise the issue and engage in the discussion about the importance and the role of urban heritage in the historic areas. In this context it engages critically and examines the preservation of the Historic Centre of Prizren in Kosovo in the post-conflict and during a state building social, cultural and political circumstances. It discusses how this phenomena affected the built environment and reflected into the cultural heritage preservation specifically at what is inherited as an urban space. The paper brings a practical example as a case study to demonstrate how these circumstances can affect the understanding and preservation of a historic centre in a broader context.

The paper further provides spatial analyses of the ongoing mobility situation in town and impacts on the historic centre. It suggests a model for its enhancement, public parking in three
main access points to the urban zone of Prizren and feeding bus routs within the historic centre. The model provides basis for further collaborative research for the sustainable solution for implementation in practice with the aim to set a vehicle regime and create a car-free urban environment in the historic centre. The reduction of vehicles will contribute to make the historic centre a more people-friendly place and preserve it by planning and designing its public spaces in a more harmonious way with the cultural heritage setting.

References

5. EC Ma Ndryshe (2017). Historic Centre of Prizren parking map power point presentation. UNDP Kosovo Re-imagining cultural heritage workshop: EC Ma Ndryshe.

Legal sources and other official documents


**Visual material**

Hisari, L., (2014). Historic Centre of Prizren, Kosovo. Fig. 1. Photograph


Hisari, L., (2017). Historic Center of Prizren, Kosovo. Fig. 3. Photograph

Hisari, L., (2014). Historic Center of Prizren, Kosovo. Fig. 4. Photograph

Hisari, L., (2018). Historic Center of Prizren, Kosovo. Fig. 5. Photograph

Law on Historic Centre of Prizren 2012, annex 1. Kosovo Cadastral Agency. Fig. 6. Map. Historic Centre, Prizren: Geo-referenced and elaborated by the author.


The Traditional Tower Houses of Kosovo and Albania - Origin, Development and Influences.

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Abstract. Gheg-Albanians as well as Tosk-Albanians consider a distinct tower-house type of their traditional heritage. The closer look upon the structures in their geographical distribution from the Dukajin plains in nowadays Kosovo into the Dropull valley in Southern Albania provides a wide range of variations. Generally those structures served as impressive residential houses (banesa) for rich landlords, warlords, tax collectors and merchants performing a rural-urban lifestyle. Therefore, a sophisticated blend of the all-time defendable Albanian tower house (kulla), still existing quite intact in the western Kosovo plains, and the comfortable Turkish lifestyle influenced residence was developed during the long centuries of the Ottoman rule over Western Balkans. In the later 19th century, within the important trading towns of the south-eastern Balkan Peninsula also Western European ideas of National-Romanticism seemed to have led to the transformation of the rural kulla type of the Dukajin plains into the totally urban kullat of Gjakova and Peja.

With the distinct knowledge of the widely renowned Albanian interdisciplinary craftsmanship of masons and carpenters, - well organized under master craftsmen for the planning and contracting -, stunning and sophisticated building structures were successfully erected on most difficult morphological sites, fulfilling different wishes of their multi-ethnic clients all over the Ottoman Empire. Additionally to the solid and earthquake resistant stone basements, light-weight construction methods of plastered wooden lath (bondruk-technique) for upper floors guaranteed an expanded climatic comfort for the hot seasons and avoided heavy damage in the seismic emergency case for the quite high-raised houses.

The article tries to trace the different cultural influences transforming the original stone-tower houses probably kept for a long time in their Mediterranean-Medieval original configuration over the course of the times. Besides, the 19th century Austrian descriptions give a deeper insight into the usual workflow of the craftsmen troops from the Dibra region, responsible for the mason – carpenter structures, the gypsies (Egyptians), which they contracted for the metal work and the stone mason specialists from the Adriatic coast, who were in charge of specific fortification features.

Keywords: Albanian kulla and banesa, rural-urban traditional architecture, mason-carpenter structures, earthquake resistant construction, fortification and defense characteristics, Ottoman life-style, comfort

Introduction

Nowadays Albania and Kosovo always have been positioned at the crossroads of cultural spheres. Due to its geographic position, within its territories already in ancient times Eastern and
Western influences met. During the first millennium after Christ, the administrative as well as religious differences between Latin Rome and Byzantine approaches grew constantly. In 1054, the Christian Balkan World divided officially in Roman Catholicism and Byzantine Orthodoxy and from 1018 to 1204, also the profane administration of most parts of nowadays Kosovo and Albania resorted under Byzantine rule. Only the Croatian coast towns and the North of Albania remained under Latin episcopal and Venetian economical influence, whereas the Greek Byzantine culture and religion dominated clearly the south. East of the mountains already in the 12th century the Serbs of Rascia managed to take over political as well as religious power, which lasted until the Ottoman conquest starting with the mythical battle of Kosovo in 1389. Other parts of the region resisted the foreign domination for more than another century, thanks to heroic native lords like Scanderbeg (who died in 1468) or Christian bishoprics like Dyrrachium (Durrës), which fell in 1501. Officially, the Ottoman Empire ruled the region into World War I, followed by several kingdoms, partially under foreign influence. After World War II various socialistic/communistic regimes dominated, until the general collapse of the former Eastern bloc brought back the region into influence spheres of the West. If there is constancy within the history of the region, it manifests itself through the permanent shift between East and West, which the rich architectural heritage of the territories mirrors intensively.

But how could those shifting influences reach the region so effectively? The major trading routes connecting Rome with Byzantium/Constantinopolis (Istanbul) and crossing through the region are one driving factor. During ancient epochs, the Via Egnatia as well as the Roman roads connecting Lissus (Lezha) and Saloniki with Naissus (Nis) and the Danube region, allowed the permanent exchange of various influences. In medieval times, an even denser road network (Via de Zenta, Via de Bossina), starting from several Adriatic coast towns south of Ragusa (Dubrovnik) reached finally Constantinople via Kosovo and Albania and provided the Venetian as well as the Florentine markets permanently with fresh money from the silver mints of the region. The organization of the Balkan inlands trading system lay in hands of few trading families from Ragusa (Dubrovnik) and Kotor and passed away in 1526, when the Republic of Ragusa fell into the hands of the Ottoman regime. These strong connections to major economic and cultural centers of Europe as well as Eastern Asia explain the various Italian and later Ottoman influences and enriched the built heritage of nowadays Kosovo and Albania.

**Traditional Residential Houses of Albania and Kosovo**

**Albanian residential house types and life-style**

Besides, the Albanians are without doubt survivors of the Balkan natives from classical times and at present differentiated from neighbors by religion and general culture [1]. Certainly their specific Albanian life-style in combination with exceptional skills in building crafts shaped fundamentally their architecture beyond all foreign influences and fashions. When Kiel summarizes, that “the history of the country is that of occupation by foreign rulers and the struggle of minor native lords against these foreigners or among themselves” [2], we have to assume, that defense features characterize the traditional residences of the Albanians in a specific way.
In contrary to the major Adriatic coastal cities, which were used as "springboards for the expressionist schemes of several Mediterranean powers", and therefore left in principal “fortress works as their legacy” [3], in the far less densely populated mountain regions and highlands, the settlement schemes are different. Johann Georg von Hahn describes around 1850 the region with “households … that are scattered about, in Albanian fashion, either as individual farmhouses or as loosely settled neighborhoods that all fall under one name” [4]. Those distinct characteristics of Gheg (the northern group) Albanian settlement culture survived in the west of nowadays Kosovo along the Dukagjin plains. Dranoc combines some of those specific tower-houses, which the literature [Flamur Doli, 1993, 2001, 2009; Emin Riza 2006, 2009, 2010, 2013] names Albanian (or Schiptar’s) *kulla* (alban. *külë*; pl. *kullat*), to densified settlements in the tradition of the Byzantine *pirgos* [5]. That fortress like compounds made up through a distinct way of grouping several *kullat* is named *mat*. Interestingly, the same literature names the other type of domestic structures *banesa* (pl. *banesas*), expressing its major function as comfortable dwellings, as residences. Herein, the national attribute is normally skipped, indicating the awareness that this type might represent a rather big portion of Ottoman life-style that transformed the Albanian upper classes during the long lasting rule of the Turks. That type of residential buildings is used for the manors of the wealthy landlords equally to the ones of the tax collectors and other high-ranked administrative family houses both based themselves within important rural settlements or urban trading centers. This building type signals to the passing-by a certain will of incorporation of its inhabitants into the Ottoman political and administrative world. In its physical appearance, here no longer the defense character of the Albanian tower house is normative, but the comfortable wealth of those, who have arranged with the ruling regime as well as the ruling climate of the region. Hence, also on Balkans in the 18th and especially the 19th centuries life of the people changed fundamentally. “The migration of the population – and with it the architecture of the traditional country house – towards the cities … was a consistent and regular process. The clear genetic and typological link between the town house and the country house in the town’s adjoining region is due to this migration”[6]. This process is still in particular visible in western Kosovo, in the adjacent towns of the Dukagjin plains Peja and Gjakova. The originally rural tower house type of Dranoc and Junik, the *kulla*, was re-launched as urban and more modern residential type in the neighboring market centers. If the genesis of those late urban tower houses (*kullë qytetare*) had an additional political motivation caused by the national-romantic *League of Prizren-Movement*, seems not yet researched.

In the south of Albania and specifically noticed for Gjirokaster, the reverse process seemed to have happened within the 18th and early 19th centuries. Here, around the market town core on the foot of a fortress, several additional neighborhoods (*mahale*) of traditional tower-houses scattered.
on the extremely steep, rocky southern slope above the Dropull valley. Those tower-houses are a remarkable blend of the traditional (Italianate) stone-tower houses with the more luxurious dwelling models of Salonica (Thessaloniki) and Stambul (Istanbul) that returned back to Gjirokaster together with the trading and warfare expeditions of its distinct society.

Fig. 2. Traditional tower houses combined to a fortress-like compound in the countryside (Dranoc - left); urban tower house in the middle of the market area (Gjakova - center); freestanding, comfortable tower residences forming a neighborhood (Gjirokaster – right); all photographs by Jaeger-Klein

The buildings and their functions

The settlement patterns and house types of the Northern Albanian Gheg vary from district to district, resembling their tribal and clan system as well as different natural resources and climatic conditions. Yet, the northern Albanian tower-house type is unmistakably distinct in its physical appearance. “The kula is a three storey building of rectangular plan, whose sides are 7-8 m (23-26 ft) high; it is built with heavy stone walls, 70-80 cm (27-31 in) thick, with no or very small vaulted openings or rifle loopholes on the ground, which become more numerous towards the upper storeys. On the top floor, there are living-quarters with a sitting space (divanhana). This floor is built in light material, mainly of wooden skeleton with larger openings frequently forming a sitting balcony or an enclosed wooden chardak, a much lighter room than those below. The raised sofas (dysheklleku) covered with kelims are very much comfortable. The overlooking view, for control and inspiration, seems also to be an important criterion for such a house form.” [7]. For matters of security, a sophisticated stair concept is provided; the only way to reach the upper floor is by means of an outside, wooden staircase, which in case of an attack is burnt. Then the circulation of the house is completely autonomous inside the solid stone shaft of the tower house. During the daily use of peacetimes, the basement of the tower houses are serviced from the enwalled yard, but can also be reached through an inner wooden staircase down from the family (women and children) floor. There the rooms are separated by thin walls of wooden planks. The comfortable and representative upmost floor with the sitting balcony or gallery in stone or wood was the area for the men and their guests. More of the description of Prodanović, that some Albanian kullat are “divided vertically into women’s and men’s quarters according to Islamic rules”, we never could verify. The basement of the tower house with kitchen, storage and room for the cattle is only accessible from the grounds of the yard enwalled in stone completely. A huge, roofed door with heavy wooden planks armed in metal is the usual and distinct entrance to the yard.
The Zekate house is the eye-catching tower house structures of Gjirokaster and represents pretty authentic the southern Albanian Tosk type of the wealthy Albanian early 19th century residence. The particular grand fortified tower house was constructed in 1811-12 by Beqir Zeko, a general administrator in Ali Pasha’s government. Through an imposing front door you reach the lower hall with attached the storeroom for milling cereals and the large water cistern. The first floor contained the lower divan for guest receptions and central kitchen, situated directly on top of the cooling cistern. Hence, this arrangement is unusual, as the other important manor houses of Gjirokaster do provide the kitchens’ in closer spatial connection to the family apartments. The second floor contains the rooms for the two branches of the family, arranged around the central divan. All of the rooms are provided with low couches running around three sides of the room and smaller storage cupboards built into the walls. Within the largest wooden cupboard (musandra) at one end, the mattresses and other bedding equipment is stored during the day. It additionally covers the entrance door and adjacent toilet. This musandra conceals a short staircase leading to a small gallery overlooking the room, where women and children retired during formal meetings. The third floor resembles this room display. The two smaller rooms are summer chambers following the model of the (winter) rooms on the floor below. The grand reception room is defined through its magnificent open fire-place, elaborately decorated with frescos and a finely carved and gilded ceiling. It provided a spectacular view over the town and the valley below and was used for the most important social occasions. For the daily use, we have to follow the final statement of the Gjirokastra Foundation: “An important feature is the general lack of a distinct gender division between selamlik (male) and haramlik (female) quarters”[8]. Also the description of the daily family life within his own family house in Gjirokaster, which the famous Albanian novelist Ismail Kadare gives in Chronicle in Stone, does not tell any opposite.
Finalizing the description of 19th century social life in Gjirokaster, Johann Georg von Hahn is again helpful. “They (the landed gentry of Gjirokaster) live in high-rising solid homes that have only loopholes and embrasures on the main floor, but high windows on the third and fourth floors. The courtyards are protected by high solid walls, and the heavy gates are usually in double rows. The outer gate leads to a small forecourt that can be reached from everywhere in the interior of the house. The inner courtyard is situated so that one cannot see it from the outer courtyard. … In peacetime, when the parties who had divided the town up themselves were in conflict – and this situation was often the norm – they used their retainers to protect their homes and wasted a lot of gunpowder by shooting from behind their walls at the embrasures of the neighboring houses with which they were in conflict. As they all remained behind protective walls, blood was rarely spilled in the urban wars.”[9]

Material and Craftsmanship

In material and construction techniques, the traditional Albanian tower houses differ according to local resources and climatic conditions. In the high plains of Kosovo or in the flatlands along the Adriatic coast, mud bricks are more often used, whereas stone is certainly the dominant material for all mountain areas. Besides this fact, they all are mason-carperter structures, which already Johann Georg von Hahn mid-19th century studies definitively stressed. He, quite extent reports on the Albanian craftsmanship, for example that they came “in particular from the regions of Kolonja and Dibra. There, not only whole villages but whole regions have one and the same profession. All the men in European Turkey and in the kingdom of Greece who build walls, fell trees and saw lumber are from Albania, almost without exception. There are areas that are inhabited exclusively by traditional woodcutters, sawmill people and diggers. These professions are carried out by journeymen who wander in groups under their master craftsmen and take pack animals with them to carry the material they need. It is said that there are 6,000 Epirot labourers employed in Constantinople and the surrounding region.” Hahn tells us further that they spend their summers in the healthy air of their mountainous homelands to stay healthy, and that they join forces for major work, but more often separate into smaller groups to work in different places at the same time. “A group of masons rarely consists of less than twenty men. Woodcutters are often in larger groups, and diggers from northern Albania often consist of over 100 men in a group. The master craftsman arranges the contacts and is often not on site with them so that he can look around for more work. The contacts usually involve a certain amount of money for a cubic cell …, which is the equivalent of two feet, but there are also contracts for day wages or for the job as whole.” [10]
This explains pretty well their flexibility and smartness to use the available materials according to specific circumstances, no matter if war, earthquakes or extreme climate were the challenges. Only the more peaceful periods seem to have allowed foreign specialists to sneak into that local business. So, it seems that the wish for more prestigious Gheg-Albanian tower houses in the 19th century called some advanced stone-cutters, probably from Dalmatia (the medieval monastery church of Decan in the same neighborhood is reported to be made by master masons from Kotor), into the Dukagjin plains. All of a sudden, the former wooden dyshëkëlekë (outlook galleries) are now made of stone, neatly translating their characteristic features of carpentry into sophisticated miniature galleries from cut stone.

For the south, already the historic Turkish travel report from Çelebi in 1670 stresses the exceptional quality of the stonework in Gjirokaster. “The manner in which the outer walls of all the houses are constructed has no parallel in all the world. They are all twenty ells high (approximately 15 meters) of red sandstone blocks, just stone on stone with no mud, lime or plaster. The walls and the houses are all centuries old, dating from the time of the infidels. The walls are so lofty and solid that not even a sparrow can get a clawhold”[11]. For the Zekate house, the quality of the stonework is even connected to its master craftsman. As the house was built in the times, when Ali Pasha Tepelena made Gjirokastra to his headquarter of the region, his preferred fortification engineer Petro Koçari worked also for the Zeko family [12]. This fact explains the sophisticated load bearing structure of the four-storeyed, grand tower house. The two arches of the kamerie and the two vaulted rooms covering the whole basement enclose the structural core of the building with the cistern and the several staircases on vaulted supports, all made of stone.

Fig. 5. Traditional Albanian crafts do not divide into masonry and carpentry: the sophisticated wooden roof structure of the Ethnographic museum house in Berat (left); horizontal wooden reinforcement of a double shell stone structure wall (Gjirokaster – center left); lightweight upper floor in bondruk construction method (Gjirokaster – center right); the arched doorway is probably constructed from foreign stone mason specialists, the metal work by local gypsies (Gjirokaster – right); all photographs by Jaeger-Klein

Earthquake proof and comfortable structures

Heavy earthquakes any times have shaken the whole region. Therefore the classic Byzantine architecture, which was carried on through the later times by the orthodox building tradition, preferred burnt brick structures with extent mortar joints for matters of elasticity. The Albanians seemed to have reacted, for whatever reasons, differenitly on the permanent threat. They hang on their structures of stone instead, but reinforced them with wood. Horizontal layers of pinewood every 80-120 centimeters, connected with shorter binders through the 70-120 centimeter thick walls, distribute the loads like frames and additionally give certain elasticity, both features supportive in case of emergency. Maybe they did not trust in brick masonry for reasons of defense; certainly stone masonry was also considered to be more prestigious and more adequate for a heroic warriors’ culture, which was kept as kind of national identity all through the times and its foreign administrations. On the other hand, in times of inner and outer fights and conflicts, as permanent a threat as earthquakes, the protection behind a solid shell of stone proofed to be a
solid solution over the course of the years. Especially in case of fire, the perimeter stone walls outside protected the interior wooden staircases and ceilings quite effectively. In Gjirokaster, but also other regions, even the roofs are made from stone plates, which for earthquake cases is quite dangerous, but very effective in case of fires, shooting and suddenly heavy rainfalls. With the times becoming more peaceful, the stone walls of the upper stories vanished and were replaced by lightweight structures, additionally providing far more climatic comfort, but also a certain safety in case of earthquakes. For Berat, it is documented that after the serious earthquake from 1851, the constructive system was remodified [13]. The Gjirokastra Foundations summarizes material and construction of the upper (summer) floor with all experience from restoration: “The walls are wooden lath covered with a special plaster compound produced from a mix of aged lime, goat hair, egg whites, fine sand, mixed with straw”. [14]

It seems that this was the traditional way of building, but after the serious damage of Berat in 1851 and already with the society changed to a more peaceful way of living together, the lightweight solution for the upper parts of the houses took over. The younger solution additionally allowed much more climatic comfort during the hot season. Gjirokaster is centrally positioned on the Western side of the Drinos valley, “on the north-east slopes of the mountain Mali I Gjërë, which separates the valley from the Mediterranean region” [15]. Therefore, it shows a rather extreme climate with generally hot and dry summers, but cold and wet winters. Especially the intermediate seasons surprise with enduring heavy rainfalls. The Gjirokaster building tradition shows interesting answers on such specific climatic conditions. As they are so far completely unsearched in terms of measurements and simulations, here we can just describe first glimpses. “The house has normally a tall basement, above which the first floor was for use in cold season, and the second floor for the warm season [15].” The concept was comfortable for its inhabitants and in generally a climate friendly architectural design: The surrounding stoned walls of the winter floor “made them easier to heat. Each has an adjacent toilet and bathroom (hamam), which were heated by the fires in the main rooms,” the GCDO describes in detail the Zekate House [14], whereas the summer rooms are all situated within the “uppermost timber gallery”, where you even nowadays feel the light breeze coming through the wooden lath only covered with plaster. Additionally “the windows, bar the lunettes with their multicolored glass, are unglazed to allow a cooling draft.” [12]

Herewith the building tradition of adjacent Thessalia, the neighboring region belonging to nowadays Greece, shows up. Eleftherios Pavlides describes the Thessalian towns the following: “The large mansions of the mercantile towns of Pelion, Ossa, Olympus and Pindhos had three levels which were seasonally zoned. The first two levels were built in the masonry base. They consisted of a storage space on the ground floor, and a ‘winter zone’ with fireplaces and small windows facing south on the second floor. The top floor, the ‘summer zone’, consisted of light frame construction cantilevering over the base, with numerous windows to capture the summer breeze and frame distant views.” [16]
Fig. 7. Comfortable structures through smart adaptation to the climate: the summer-floor with the light breeze floating through the rooms (Gjirokaster – left and center left); different heating facilities for winter like the hamam-chimney-combination in the Emin Gjiku complex of Prishtina (center-right); chimney in the most representative room of the Zeka house (Gjirokaster – right); all photographs by Jaeger-Klein

Concluding Remarks

It can be stated with certainty that through its strong trading connections to the cultures of the East as well as the West, the traditional Albanian tower houses, originating in the uncomfortable tower houses of stone around the Medieval-Mediterranean, could enhance their comfort as well as security standards to astonishing results. This process probably took place during the late 18th and 19th century. Nevertheless the inherited and carefully safeguarded carpenter-mason craftsmanship in special regions like Dibra enabled the Albanians to build up a strong reputation within the Ottoman as well as the European elites for elaborate results in the segment of advanced residential housing. How much this particular international experience has influence the transformation of the originally rural type of house into an expression of the urban lifestyle during the national-romantic movement of the League of Prizren at the end of 19th century, seems so far still not yet researched at all.

References


The role of community in urban regeneration
Case study city of Skenderaj

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Abstract The essence of the research is to study whether the role of community opinion within
the decision-making process is a fundamental and essential factor to ensure the enhancement of
the quality of urban regeneration activities. Various international researches show that
community involvement can have an essential impact on quality improvement during the
sustainable planning process and can lead to successful urban regeneration initiatives. Also, it
emphasizes the need to integrate social elements in urban regeneration practices in order to have
different approach by socio-economic changes, and socio-spatial planning and community. In
this case, the city of Skenderaj was taken as the case study in order to obtain the community's
opinion regarding their decision-making in sustainable planning concerning public facilities and
public spaces in the city.

Keywords: community, urban regeneration, Skenderaj, industrial zone, social aspect.

Introduction

Urban regeneration and the role of the community: Towards a community empowerment
significant changes in the theoretical background of planning practice in urban regeneration and
its conceptual paradigms have evolved over the last decades. A historic moment in returning the
final approach reflected in the 1960s model, in a new model presented by the main ideas for
identity and participation by (Jacobs, 1961) and (Davidoff, 1965). The community's importance
for the urban regeneration policy has been recently discussed by (Bailey, 2012) which thoroughly
assesses the phenomenon of community enterprises, that is, social enterprises involved in a
geographically defined area by referring to a particular community. Bailey concluded that "The
primary force of the community enterprise is that it can utilize visible social capital in local
communities and use it to achieve positive results" (Bailey, 2012, p. 7). In the 1990s, there was
a massive interest in the Italian culture of planning, with the experience of integrated programs
(Ricci & Avarello, 2000) culminating in participatory and identity-driven regeneration
experiences, widely researched in Italian literature from (Magnaghi, 2000) in the production of
values for the territory (Ombuen, Ricci, & Segnalini, 2000).
Even though communities play a crucial role in urban regeneration, the assessment of their
contribution is still a challenging issue. A possible approach, suggested, derives from the
reprocessing of the value system involved in urban regeneration processes. It is assumed that a
link is made about economic values between wealth production and social networking, provided
that the concept of "value" is adequately reviewed in the context of the citizen's economy, in
doing so, the paper focuses on community role and in good public participation as possible, and
best, alternatives to urban regeneration.
Literature review

Urban regeneration is an attempt to renovate neighborhoods in the city by improving physical infrastructure and revitalizing local economies. The concept of urban regeneration can be interpreted in different ways, mainly depending on the country's development stage. After World War II, many Western cities sought to reduce poverty and loss through urban development policies, including providing social housing, public infrastructure, and welfare assistance. However, in the 1960s, poverty was still widespread within the inner cities, and many urban neighborhoods struggled with a high degree of crime, unemployment, and higher levels of stress (Atkinson, Combating social exclusion in Europe: The new urban policy challenge, 2000). Planners and policymakers began to review traditional approaches to urban development. As a result, in the 1970s, in western cities, the reduction and renovation of large urban projects diminished and urban regeneration appeared as an alternative to urban renewal Couch, Sykes, & Borstinghaus, (2011).

It is claimed that residents participate in urban regeneration projects is more efficient and effective in achieving the purpose of the schemes because it helps address the most important problems perceived by residents (Dargan, 2009). Sometimes, residents are better at extracting new and innovative ideas to solve problems. Furthermore, residents’ participation can prevent existing neighbors’ schemes from ignoring and strengthening schemes by drawing them into the urban regeneration process (Dargan, 2009). Another advantage of urban residents participation in urban regeneration is the prevention of social exclusion linked to unemployment, weak skills, high crime, inadequate housing, and family segregation. With this prospect, many scholars have investigated how the participation of residents affects the success of urban regeneration. (Rabbiosi, 2016) (Dargan, 2009) (Couch, Sykes, & Borstinghaus, 2011)

The general belief is that participation is a 'good thing' for urban regeneration projects. However, some researchers have pointed out that residents are often excluded from the urban regeneration decision-making process (Atkinson, 2003). Without the redistribution of power, Arnstein argued that participation is an empty experience. In her study "A degree of community participation" she stressed that participation is about power. She suggested a typology of eight levels of participation. The two lower levels (manipulation and therapy) describe non-participation, while the top three levels (citizen control, delegated power, and partnership) imply an increasing degree of decision-making power.

Fainstein also stressed that values of equality, diversity, and democracy could bring better results for the city. She argued that powerless and marginalized groups in the community should be encouraged to participate in the decision-making process (Fainstein, 2014). Besides, scholars have argued that high social capital generates higher satisfaction and quality of life. For example, social capital increases employee satisfaction (Requena, 2003) public health (Maass, Kloeckner, Lindstrom, & Lillefjell, 2016) and life satisfaction (Hoogerbrugge & Berger, 2018). However, the relationship between urban regeneration participation and neighborhood satisfaction is mainly unexplored in urban regeneration research. More studies that examine how community participation in urban regeneration projects affect neighborhood satisfaction are needed for a better understanding of the results of urban regeneration projects and for suggesting more sustainable urban regeneration policies.

Commitment to the community has not escaped criticism. It has been argued that despite the sound understanding of engagement, the evidence base does not support this critical belief in engaging with the mixed results that have been reported. This suggests that apparent and measurable causal benefits cannot be easily recorded (Lawson & Kearson, 2010). Moreover, it has been suggested by critical community engagement analysts that the practice disguises the growing community's "responsibility", an example of a state that exerts responsibilities on communities that are increasingly expected to take responsibility for their surroundings (Lawson & Kearson, 2010).
Case study, city of Skenderaj

For our study, to measure community role in urban regeneration in the city of Skenderaj, we interviewed citizens to whom we addressed nine key questions about public spaces and functions. The selection of the respondents was not intentional and not deliberate. All the participants were residents of the city of Skenderaj. The majority of respondents were male and the rest female. Based on the interviews addressed to different individuals according to the questions listed, we have come to the following conclusions:

Regarding the first question whether there is a special place to develop their activities, most respondents have responded that they didn’t think so, but according to them, there is no place to promote activities in the city where they reside. A small part of them said that activities were usually organized in the “Adem Jashari” square that was not suitable for all types of activities, or in the House of Culture “Hasan Prishtina” which does not meet the youth needs for activities, mainly due to the amortization of the facility.

The second question addressed to respondents was whether they had room to watch movies (cinema) and this question received a negative response to the vast majority of respondents. A small part of them said that there was not a good cinema, but there were spaces where the films were shown through the city in some cases, although very rarely and also the movie was shown at the “House of Culture” in Skenderaj, which was not an adequate as an environment for watching films. All respondents saw the necessity of building a movie theater in the city.

Another interview question was how much the Municipality invests in the cultural aspect in Skenderaj and if it does enough work in this regard. All the respondents were dissatisfied with this issue and stated that only in some periods, the commune engages in small organizations, but the investments were very weak, and they think that special attention should be given to the cultural aspect in the city.

The dissatisfaction of the respondents emerged and when the fourth question related to finding the necessary materials in the library owned by the city of Skenderaj. Some of them thought the library did not meet the minimum requirements and lacked material and had to supply newer books from all areas of study. Others suggested that the facility should be expanded for the library to serve as an environment for reading not only to attract the materials or books that citizens need. Continued with the fifth question, on how functional the “House of Culture” is, most respondents responded that it was very partly functional and had many problems as a facility. First, it was not suitable for all kinds of activities. Second, the building was heavily amortized and outdated and needed urgent investment as it did not have the right conditions for young people to develop their activities. The question as to whether there were spaces where young people could develop certain sports some of the respondents said they did not have enough while others suspected that such areas existed but needed to be increased and the existing ones required to be maintained. That such spaces were under construction and hoped that with the completion of the structure, space would be abundant for sporting activities. All the respondents considered it very necessary and very urgent to build a playground where the children of the city could have fun to feel safe and to socialize more with each other by breaking away from the world of technology that has returned in a difficult problem.

The other question addressed to the respondents was whether Skënderaj had sufficient public spaces. The vast majority of respondents thought that the public space was adequate for the population of the city but needed to maintain and adequately planned for the community to use them. While, others thought that public areas were not enough and it would be an excellent municipal policy to offer more, as this would be in the general interest of the community. The last question of the interview was more in a suggested form, on what the community thought should be done to change the current situation, and the main suggestions of the respondents were that spaces that are currently dysfunctional, to become functional and that the municipality to make a priority culture and sport in the city. Others argued that the municipality should increase
investment in the town regarding cultural aspects and that the youth should be more active in seeking to improve the conditions of the current facilities and make requests for the enhancement of cultural objects. Another citizen had more concrete thoughts, he suggested that the points discussed in this interview should be put to the discussion table and to prepare a more concrete plan by the municipal authorities. They are allowing the opportunity of all categories of citizens, all ages to share their thoughts about their needs concerning these issues. It is worth noting that a park, renovation of the cinema hall, repair and library material supply are most urgent and should be initially invested in these facilities. In conclusion, according to the community of the city Skenderaj, the involvement and the role of the population in urban regeneration it’s of high importance.

Conclusions

As also emphasized by the literature review, a strong need for greater community engagement in urban regeneration is motivated both by the importance of the community factor in itself and by the progressive reduction of the availability of public resources. However, in addition to the theoretical concept, the idea of community role in urban regeneration still needs to be verified to translate into criteria that can be applied. From the conducted interviews we concluded that the city of a study had many problems and the residents were dissatisfied about the social investments and the development of public spaces. For this fact they provided many valuable suggestions for improving the current situation, suggestions that should be taken into account by the local authorities because other studies have shown that in the process of urban re-certification it is necessary cooperation between investors and the community who knows better the cultural heritage values of the city.

To summarize, the main contextual factors to be considered in case studies are:
1) the high level of self-promotion of the local community; long-term community engagement in finding solutions to urban regeneration;
2) enhancing the quality of the socio-economic and physical context of heritage; high level of integration between heritage and urban context;
3) Relevant presence of urban identity elements and a range of other urban identification assets. This can lead to a more sensitive methodology of assessing the urban regeneration initiative that should be able to predict, through discourse, the qualitative contribution of the civic community's role in urban regeneration. However, more knowledge of the quantitative aspects of the suggested factors further can be studied, either through a proxy or by creating some appropriate indicators that will apply to future regeneration initiatives.

References

Abstract. The paper presents a research on parameters of sustainable architecture identified in the vernacular architecture of Kosovo, specifically in the urban dwelling constructed during the 18th and 19th centuries. Main principles of sustainable architecture in general were initially evaluated and elaborated in order to identify and compare to the study cases included in this research. Analyses have shown characteristic architectural elements of this typology such as: extended eaves, open end closed çardak (gallery) and qoshk (garret), window wooden shutters, natural building materials, vegetation and more, to be part of the conscious architectural design with sustainable approach. As conclusion, these models illustrate an excellent example of the contribution of traditional construction in improving sustainable architecture parameters, especially when taking into consideration the context, time and circumstances of their construction. Reinterpretation of traditional architectural elements was observed in various contemporary architecture examples. In this regard, these precedents are a great example of how the principles of sustainable architecture and sustainable approach in general, should not be considered as a "task" determined by today's energy and sustainable policies, but as a practicality and prudence of the man in co-existence with the nature.

Keywords: sustainable architecture, Kosovo vernacular architecture, urban dwelling, architectural elements, natural building materials;

Introduction

Vernacular architecture as a common human value built and inherited from generation to generation, without any doubt, represents one of the most comprehensive historical, cultural, economic and social developments of a society. In its great examples surviving present days, we can witness technological achievements through construction techniques, use of materials, intelligent approaches such as flexibility and sustainability, the development and appreciation of art and culture through decorative crafts, wall paintings and more and the overall cultural emancipation understood through functional and volumetric composition of the space. Impelled by these indisputable values, vernacular architecture has always been a topic of study and research for experts in order to identify, preserve and promote these cultural values.

Aim of the study is to identify and analyze sustainable approach and architectural elements in vernacular architecture of 18th and 19th century urban dwelling of Kosovo, often known as banesa. In order to identify and compare this approach in the study cases chosen for research, general principles of sustainable architecture were primarily evaluated and elaborated.

Notwithstanding the lack of studies on vernacular architecture in Kosovo, some of its multidimensional values are already known and discussed by researchers. In this context, the
contribution of “Albanian Tower (Kulla) of Dukagjini region” can be distinguished as one of the earliest forms of collective housing [5], the values of "Kosovo's urban dwelling of 18th-19th century” as one of the most developed building typology in the region in the functional, volumetric and aesthetic context [6], up to the original techniques of architectural and constructive systems latent in the urban dwellings [3].

Despite its bioclimatic powerful elements that contribute positively to the advancement of sustainable building parameters and principles, banesa is studied very little in this regard, therefore it remains an appealing topic for researchers of architectural heritage.

**General Parameters of Sustainable Architecture**

The attention of mankind in the use of natural recourses based on the location and climatic conditions, with the aim of creating high comfort living spaces, is noticed from the first forms of the environments that he constructed to shelter and cultivate his vital activities. Since the 1st century BC, the Roman writer, architect and engineer Vitruvius, considerers homes to be well planned if primarily the location, context and the climatic characteristics are taken into consideration [8].

Today, in the context of global sustainable development, the existence of policies and the possibility of measuring sustainable construction parameters has defined specific structures and forms regarding the evaluation of these parameters. LEED - Leadership in Energy and Environmental Design, has built a structure under which each building is assessed through the following criteria:

- Water efficiency;
- Energy and Atmosphere;
- Materials and Resources;
- Indoor Environmental Quality.

Fulfillment of these criteria directly affects the improvement of living comfort parameters such as: air quality, thermal and visual comfort and acoustics, free of harmful substances to the health of users.

Regardless of the extensive number of factors contributing to the creation of satisfying life comfort, regulation and conservation of accumulated energy inside the building can easily be considered as the main contributing factor. Equivalently important are the orientation of the building in interrelation with its location and climate characteristics, proximity between buildings, choice of adequate vegetation, construction material and more. The greater the perimeter of the surface is, the higher the possibility of losing energy with facility increase, therefore depending on the shape, a building with the same floor surface can have different perimeter surfaces and consequently different energy coefficient.

**The 18th and 19th Century Urban Dwelling of Kosovo in the Context of Sustainable Architecture**

Urban dwelling of Kosovo can widely be evaluated as smart architecture in both formal and principal aspect, when considering the efficiency using limitless natural sources of energy and material, flexibility, adaptability and luxuriousness.
General Characteristics of *banesa* of 18th and 19th century

In the towns of 18th and 19th century of Kosovo, a house (also known as *banesa*) represents the basic unit of urban configuration by which neighborhoods (*mahale*) as greater ensembles were formed. Unity of these (organic) neighborhoods created the city structure. The urban developed was created spontaneously, without any anticipating planning but always based on the context and necessities of the residents. As the most advanced and influential architectural urban element of the time, *banesa* shaped the overall urban development.

Admitting the great number of factors influencing the typological shaping of *banesa*, the most accurate classification could be done based on the main compositional element as follows:

- Dwellings with a porch (*Banesa me hajat*);
- Dwellings with an open/closed gallery (*Banesa me çardak*);
- Dwellings with garret (*Banesa me qoshk*);
- Urban tower (*Kulla qytetare*); [7]

Additionally, as a result of functional necessity and plot constraints or the growing requirements in terms of aesthetics, composition and space, led the emergence of additional sub typologies based on the position of the compositional element (porch, gallery or garret) in the facade and its enclosure. Study cases chosen for this research represent the most advanced examples remaining in present days Kosovo [6].

**Sustainable features of Ethnographic Museum (Emin Gjiku complex) in Prishtina**

Identified sustainable features of the Emin Gjiku museum in Prishtina are:

- Efficient, passive protection from strong solar rays during summer and obstruction of low angle solar rays during winter season through the extended eves;
- Passive protection from sun through wooden window covers (shutters) with horizontal opening at different angles depending on the angle of sun rays;
- Reduction of accumulated energy loss as a result of the floor plan compactness by reducing to the maximum the perimeter of the building and volumetric difference of the spaces based on the seasonal use and their need to be heated;
- The positive impact of the open or closed gallery or garret as the transitional space between the external environment and the interior of the building representing quality, relaxing outdoor spaces, for all seasons;
- Use of circumstantial materials such as sun dried earth bricks (adobe bricks - *qerpiqë*) as infill or masonry material, wood for floor and roof construction, backed terracotta tiles (*qeremidja*) for roof covering, have a positive impact on the maximum reduction of the energy needed for production as well as transportation of the materials to the construction site;
- All construction materials used are easily recycled with minimal energy required.
- Accumulation of rain water and well (ground water);
- Hot gasses from the cooking fireplace heat simultaneously the bath (*hamamxhik*);

A very distinctive architectural element we can witness in almost all cities of Kosovo is the extended eave. Apart from its compositional character and aesthetic purposes, it undoubtedly has a bioclimatic character too. This element is clearly expressed in the Emin Gjiku complex, with a
depth of up to 2.85 meters, supported by diagonal beams (pajanta) as consequence of constructive support.
In order to determine the favorable bioclimatic characteristics of extended eaves, analysis of sun penetration during both winter and summer solstices have been carried out. As these graphical analysis illustrate, the extended eaves have a positive impact in creating a cozy ambiance by disabling the strong, direct sun rays during the summer while not hindering sunlight during winter, allowing the low angle rays to penetrate and heat naturally the premises of the building.

Figure 1. Analysis of the sun angle during summer and winter equinoxes in relation to the extended eave at the ethnographic Museum Emin Gjiku, Pristina.

Furthermore, extended eaves protected the façade surfaces from heavy rains protecting the construction material – adobe bricks, as knowingly sensitive to water absorption. Akin to the extended eaves, window wooden shutters have a protective importance to control the excessive sunlight during hot seasons. The shutters open in the horizontal axis, with possibility of different angle adjustment to allow sun ray regulation.

It is often discussed by many authors whether the role of wooden shutters is related to security or strictly bioclimatic. Characteristics such as the opening in horizontal axis, presence of the shutters on the first floor where the most important premises are located and the security is not an issue, strongly indicates that their character was essentially bioclimatic. This architectural element is widely found in this building typology among all urban centers of Kosovo and region, always in accordance with microclimatic needs related to location.

Figure 2. A detail of the opening of the window shutters on different angles. The Ethnographic Museum, Emin Gjiku, Pristina, beginning of 19th century.
Sustainable features of Ethnographic Museum in Gjakova

Identified sustainable features of the Ethnographic Museum building in Gjakova are:

- Positive characteristics of the passive house using garret (located in east and south) to accumulate energy during cold seasons;
- Air circulation (natural ventilation) throughout the interior spaces contributing to the air quality parameters;
- Elimination of roof overheat by extracting warm air from the dorm vent installed on the roof;
- Use of circumstantial materials such as sun dried earth bricks (adobe bricks - gerpiqi) as infill or masonry material, wood for floor and roof construction, backed terracotta tiles (geremidja) for roof covering and organic additives have a positive impact on the maximum reduction of the energy needed for production as well as transportation of the materials to the construction site;
- All construction materials used are easily recycled with minimal energy required.
- Hot gasses from the cooking fireplace were used to heat simultaneously the bath (hamamxhik) and rooms;
- Stone and thick wall mass used to refrigerate the space as storage for the goods sold by the family involved in the commerce of foodstuffs;

The gallery and the garret as forming elements of the banesa, on the basis of their position in the façade, may appear to be lateral, central and frontal as well as in some cases enclosed or open [6]. In the functional sense this compositional element was used as common area where the stairs connect the two stories and other residential spaces meet, forming a lovely summer environment especially in cases when opened. This architectural attitude, the open garret or gallery as well as porch reinforced the connection of human and nature. Besides their functional importance, considering their usual positioning on the southern or southeastern part of the building, with an array of windows along the entire perimeter increasing the maximum access of light within it, constructs a logical argument for their bioclimatic character. This approach of considering the relation of the building and its location (climate) can be easily distinguished in the Ethnographic Museum of Gjakova (former dwelling), where both closed garrets (positioned in east and south) can collect sunlight throughout the entire day. As figure 3 illustrates, the accumulated heat from the southern and eastern garret, controlled by a door, can be distributed throughout the central corridor and other interior spaces. On the other hand, during summer time by closing the door in the garret, the undesired energy from the garret will be entraped.
Additionally, due to its plan composition, this building provides good ventilation and lighting. The two corridors stretching east-west and north-south, with openings in four sides of the cross, can circulate the air and create wind drafts, significantly raising the air comfort and illumination of the space.

Given the circumstances of a society without developed material trade, widely used construction materials in the entire territory of Kosovo were local materials such as: stone, wood, clay and lime. Stone, due to its properties of mechanical resistance to atmospheric agents, was commonly used for the foundations of buildings and in some cases external constructive walls. Almost exclusively, bearing walls are accompanied by horizontal wooden beams (hatulat) as a solution of improving elastic performance of the wall, documenting the seismic knowledge of the popular masons. Considering its thermal nature, stone represents a material with excellent heat accumulation properties but relatively poor isolation [4].

Widely used materials in urban dwellings of 18th and 19th century are the soil-based materials, with their indisputable bioclimatic features. Soil can be found used differently along the building. For instance, previously molded, rectangular sun dried bricks were used as masonry or brick infill in the wooden skeleton construction. In the compressed form, soil was used as sound and thermal isolator in the floor construction, especially on the ground floor while when mixed with straw fiber as an addition for binding capabilities, it was used for plastering. Soil based construction materials have good thermal insulation capability, are resistant to burning, good regulators of moisture and above all at the time when the building is no longer needed they return to their organic state without a need for additional energy and pollution to the nature whatsoever.
Different from the materials used in their pure natural form, the semi-processed materials such as lime, obtained by burning limestone in impromptu ovens, served as binding material. The process of baking clay in furnaces produced bricks and terracotta roof tiles.

The use of the correct vegetation as a contributing element in the formation of suitable microclimate life is known and mentioned by Turkish-Ottoman guide Evliya Çelebi, who had visited Kosovo in the 17th century and speaks about the beautiful and rich gardens with variety of vegetation, throughout Kosovo [2]. Planting of deciduous trees on the southern and eastern side of the building provided shade during summer season as a result of the growing season of the tree and sun penetration during winter season when the tree would be stripped from the leaves. Moreover, almost every family would cultivate the grape plant stretching along the entire garden which during summer, the growing season for grapes, would create a very pleasant microclimatic environment.

**Application of Sustainable Features of Vernacular Architecture in Contemporary Architecture**

Previous chapters clearly enlisted the sustainable approach and expression in the urban *banesa* of 18th and 19th century. Having in mind these technological values of the vernacular architecture, novel for the time of their construction until present days, many of these elements and principles have been reused in contemporary architecture with different materials and architectural accent.

![Figure 5. Similarity between the shutters of the Ethnographic Museum of Prishtina, early 19th century and Campeon Office building in Munich, arch Maier + Nueberger, 21st century.](image-url)
The formal and sustainable resemblance inbetween the urban dwelling of 18th and 19th century in Kosovo and Swiss passive house model illustrates the adaptation and reuse of spatial composition and architectural elements of the vernacular architecture in creating the ideal passive house.

Figure 6. The similarity of dwelling with qoshk, the Ethnographic Museum of Gjakova and the Swiss passive house

Conclusion

Based on the analysis of the urban dwellings of 18th and 19th century, carried with the focus on principles of sustainable architecture, one can identify a great number of important architectural and technical elements contributing to the advancement of building bioclimatic parameters. Since analysis were carried in most representative examples of this building typology, the extracted characteristics can be employed for all dwellings belonging to the same typology and period of construction throughout the territory of Kosovo.

The solution of temperature and sun penetration control inside the building during different seasons by introducing extended eaves which interrupt direct sun rays during summer and allows sun rays during winter, the use of window shutters with horizontal opening adjustment depending on the angle of the sun's rays, the use of gallery and garret as heat accumulators during winter seasons and the possibility of retaining them during the summer, up to the use of natural materials with excellent bioclimatic features, recycling possibilities or return to their natural form without the need for additional power, without contaminating the environment, clearly declares an approach towards a smart and efficient architectural conscience of local masters of 18th and 19th century.

From invisible principles until formal elements of vernacular architecture have been often reused in the contemporary architecture. Even though, they appear to be reinterpreted with contemporary architectural expression and different material technology, the principles are purely derived from lessons of vernacular architecture.

Based on the abovementioned arguments, we can finally conclude that vernacular architecture in general and urban dwellings of Kosovo of 18th and 19th century in particular are exceptional lessons of the respect for principles of sustainable architecture and sustainable development in general, not as imposition from policies but as a natural practicality of harmonizing human activities with the natural habitat.
References

2. Çelebiu E., Në Shqipëri dhe viset fqinje: Kosovë, Mal i Zi, Ohër, 55, Tiranë (2008)
Underground house as a new concept of housing

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Abstract. Since the beginning of human existence, housing is considered one of the basic elements for survival and protection from difficult natural conditions. The purpose of this research is to treat underground homes, as a new form of residence. In addition, the study will seek to discover the underground houses that were developed in Switzerland, China and Greece as constructions and that have gained good results in the field of housing, integration of outdoor construction, design and saving energy. The research is intended to serve as a basic, basis for informing the typologies, advantages, and disadvantages of the underground houses. Moreover, the topic addresses the advantages and opportunities of underground houses that can be developed in our country, which of the typologies is preferred based on research and conditions such as the extent of the land, climate and culture that our country possesses. The research reaches to the result of the definition of typology, its function, and the project proposal that can be considered adequate under the country's conditions.

Keywords: Underground house, Kosovo, housing, typologies, efficiency

Introduction

The purpose of this research is to treat underground homes, as a new form of residence. Since the beginning of human existence, housing is considered one of the basic elements for survival and protection from difficult natural conditions. The house is the central focus of our living. Every form of lifestyle depends on nature's ability to produce clean air, clean water, fertile soil, waste recycling, etc. Every man's duty is to follow the changes and not to be an indicator of the deterioration of the destruction of nature.

A home is not home if:
- Does not provide housing for residents
- It does not save the environment where it is part

Underground house in Vals, Switzerland

In a picturesque location like Vals, in Switzerland, it is difficult to imagine any new construction that would hurt the beautiful landscape, of SeArch and Christian Müller. Built in the Swiss Vals village, the house is almost invisible, located on a mountain such as the terrain invisible. In the introductory part there is a central courtyard which is surrounded by a large facade formed by large window openings that offer bright reflections of the Alpine view on the opposite side of the narrow valley. (Pham, 2014)
Aloni House Greece

This stunning subtropical house from Deca Architecture uses a natural range of materials to keep a low profile by complementing the quiet Mediterranean landscape surrounding it. The house benefits from simple materials that maximize energy efficiency, allowing the house to melt with the rugged terrain of Greece's Antiparos island. The Alon's House Plan consists of five inner areas enclosed by four courtyards that are carved into the landscape. The interior space features large windows that allow sunlight to penetrate home while shelter and ground support protect the home from bad weather and excessive solar heat gain (Chino, 2010).

The ecological house was designed by Longhi Architects between 2006-2008.

China, underground habitats

In the northwest of China, the variety of these structures have evolved, ranging from cave dwelling units to the most advanced underground types. In the case of traditional underground homes in China (called 'yao dong'), the rooms were dug into loose, dry ground, mainly to fight hot summers and cold winters (Anselm, 2012). Chinese culture that is in harmony with nature and its preservation. People and their culture survived here for hundreds of years without leaving any significant mark on the environment.
Case study (Tipologies of underground houses)

Depending on site construction and site analysis, underground homes are divided into the following categories:
- Ground floor
- Underground house with atrium
- Underground house with a free façade
- House with two facades inexpensive
- Combined House
Advantages of underground houses

- The underground homes offer a safe haven from extreme weather like tornadoes, hurricanes, strong winds and volcano storms
- Underground homes are well mixed in the environment
- The earth being a natural insulator, keeps such warm homes in the winter and cold in the summer. This reduces home energy requirements, especially in windy areas
- Because of the constant temperature of underground homes, energy costs have been significantly reduced
- With proper planning and construction, these homes can have good light conditions
- These homes require little or no external maintenance, such as re-painting, thus reducing maintenance costs
Ground houses can be built on steep terrain surfaces
These homes offer fewer opportunities for insects and other pests, due to the smaller number of openings
These homes are almost safe from robbers and thieves when compared to traditional homes, as only one side of the home needs to be protected

Disadvantages of the underground house

- There may be a psychological adjustment needed for a person who moves from a traditional house on the ground to an underground home.
- These homes are unusual and require careful planning.
- One of the main problems with underground homes is that they can not be built in a flood-prone area
- The process of applying for construction permits and mortgages can also be challenging for these homes
- Construction of such houses requires complex procedures of ventilation, lighting, and construction

Construction law in Kosovo

The aspect of residential forms in Kosovo is quite well explained by the construction law (Spatial, 2018). Construction Law 04 / L-110, dated 31.05.2012, respectively Article 15 defines the following categories of construction:
- 1.1. Category I - low risk construction;
- 1.2. Category II - Construction of Medium Risk
- 1.3. Category III - Construction of high risk and construction of national interest.

Kosovo in the legislative aspect does not contain the law on the construction of underground houses (Hapësinor, 2018).

Methods used for research

A new type of residential buildings that have not yet been applied in our country and which can conclude that we do not have enough information about the conditions that the underground house can provide. The resident questionnaire asked the residents that “Would they have accepted living in a subterranean home?”. Based on the obtained results, about 35% responded by accepting to live in a subterranean home, commenting that it would be a new experience of residential function, many of them point out that these homes offer comfort in terms of the efficiency that the summer house keeps freshness and winter heat because the soil is a pretty good isolator, some of the locals support nature conservation, protection from air pollution, protection from pollution of rivers and lakes and according to them the underground house would help preserve the natural conditions. A small number of around 14% claim that they would not accept living in a subterranean home, the main reasons being the fear of lack of air and lighting and the basic conditions for living in residential areas. However, given that Kosovo has not dealt with a construction of the underground house, residents are not sufficiently informed about this construction category, about 55% of the residents have not admitted or opposed housing in the underground home. Based on this research will beat let's find that residents would be able to decide on whether we would build a subterranean house that would serve as evidence that would help the knowledge and advantages that underground homes can provide.
Conclusion

Research has helped to determine the free form of a subterranean home that adapts to land in accordance with the principles of stamina by adapting the construction to the environment. The design of the underground home allows us to understand how we can outsource our cities to “ecological cities” with the resources offered by architectural and engineering studies. The underground facility offers comfort in the residential area, and is considered as an efficient house that saves energy well, helps maintain environmental degradation and provides basic living conditions.

Results

The territorial expansion of Kosovo is characterized by steep and sloping terrain, which provides good conditions for the construction of these. Adequate typology according to the layout of the terrain in our country is the underground house with a free facade. The project proposal is a demonstration of how we can make a solution to the development of tourist areas by protecting nature from the rough constructions that interfere with the degradation of the terrain and the loss of green spaces also helps to reach an energy solution with our environment living by taking part in a culture where climate change cannot transform our cities. A sustainable architecture could be a response to the problems of our city exposed by a social crisis.
References

The Advantages of Prefabricated Concrete Structures

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Abstract: The research deals with the analysis and advantages of prefabricated (precast) concrete structures against steel structures. The focus of the study is mainly montage structures as: School's Sports Hall, Commercial Hall and Service Hall, mostly one storey, but the height of which is 7 and more meters, that is to say several times higher than that of normal storeys. The research is based on the comparative method, followed step by step throughout all phases - from production to assembly of structures, which helps the final results. In addition to the many advantages, here the analysis will be based and verified mainly on two main aspects:

1. – The aspect of construction time (Fast produced, Easy Assembly (Installation) – Fast mounting and Demounting).
2. – Aspect of the construction cost (Cost Effective).

The analysis shows that the application of structures from prefabricated concrete elements, compared to steel structures, in addition to the above mentioned advantages (Speed & Strength and Cost Effective), there are many other advantages, such as:

- Flexibility during design process
- Covering large spaces
- Flexibility on construction elements shape or entire building shape form.
- Law requirement for precision during concrete structures assembly.
  – Long Life construction structures
  – Architecture - the aesthetic aspect
  – Easy Maintenance Structures
  – Construction of all constructive elements of the building
  – Thermal Performance (Layered elements - Sandwich elements for the closure of buildings)
  – Acoustic Performance
  – Fire Resistant
  – Resistant to atmospheric conditions)
  – HCS (Hollow Core Slabs) Act as a Ducting System
  – Minimal Activities in the Site
  – Minimal negative effects on the Site during the assembly
  – Water impermeable
  – Recyclable, etc.

Keywords: prefabricated concrete structures, steel structures, advantages, commercial buildings, school's sports halls, construction time (fast produced, easy assembly (installation) – fast mounting and demounting) and construction cost.
Introduction

Prefabricated concrete structures are construction products, which are produced in a controlled manner at the adequate factories, giving concrete the desired forms - according to the project, figure 1, which after solidification are transported for assembly at the site. Based on the process and the conditions of production, it can be concluded that precast concrete structures are more qualitative compared to cast-in-situ concrete structures.

Figure 1. At the Concrete Factory in Mitrovica - during the production process of prefabricated concrete structures in various forms.
(Source: Author's photography in September 2011).

Prefabricated concrete structures, for the first time, began to be applied at the beginning of the 20th century. Along with the industrial development of construction materials, the industry of prefabricated concrete structures has been successfully developed. Now this industry, at the same time develops in two areas, the prefabricated concrete industry, figure 2 and the pre-stressed concrete industry, figure 3.

Figure 2. Prefabricated concrete structures.
(Source: Author's photography in September 2011).

Figure 3. Pre-stressed concrete structures.
(Source: Author's photography in September 2011).

Construction method with prefabricated structures is a modern method of industrialized construction, which is applied where there is a large number (series) of buildings, with the same,
or almost the same constructions, respectively elements. Prefabricated structures produced in series, mostly outside of sites, in specialized factories, then by means of transport vehicles and related mechanisms transported in the site, figure 4 and assembled, by non-high skilled workers, figure 5.

Figure 4. Transportation of prefabricated concrete structures.
(Source: Author's photography in May 2015, March 2012 and October 2011).

Figure 5. Assembly of prefabricated concrete structures.
(Source: Author's photography in September 2011, March 2012 and May 2015).

Prefabricated concrete structures has many advantages over cast-in-situ concrete structures, as well as wood and steel structures. Process of manufacturing prefabricated concrete structures, provides faster and more efficient construction process, compared to cast-in-situ concrete structures.

Prefabricated concrete structures system has its own characteristics, which influence in: layout, flexibility during design process, coverage of large spaces – pre-stressed concrete structures, figure 3, construction depth, easy assembly – installation and de-installation, stability system, etc.

During the assembly process of prefabricated concrete structures (surface structures for closing the building), all joints between the elements can be made and processed in such a way that the structure looks like a monolithic entirety of cast-in-situ concrete, figure 6.
Therefore, prefabricated concrete structures, day by day, are very suitable for low constructions (bridges, viaducts, aqueducts, irrigation canals, retaining walls, protective elements along the roads, etc.) and high construction of buildings with different destinations, such as: business, school, catering, Industry, housing, trade, sports, agriculture, etc.  

With the application of prefabricated concrete structures, buildings can be built as complete, as technology has managed to be able to produce all of the constituent elements of the building, starting from the foundations, columns, beams, rafters, slabs, walls of sandwich panels, and other structural components, figure 7, 8 and 9.
Prefabricated structure and their comparative parameters

The study is mainly based on practical cases, starting from the design preparation period, production of constructive elements, their transportation and construction of various types of buildings with prefabricated concrete structures, such as: School Sports Halls, Business Buildings, Economic Buildings, etc., which are built in the period from 2011 to 2015, in several different places in Kosovo. Some of the above mentioned buildings, due to the various advantages (mainly due to the time factor), have been constructed with prefabricated concrete structures, although designed and intended to be constructed of steel structures!

The reason for this topic was to verify, in practical terms, some of the many advantages of prefabricated concrete structures to steel structures such as:

1. – The aspect of construction time (Fast produced, Easy Assembly (Installation) – Fast mounting and Demounting).
2. – Aspect of the construction cost (Cost Effective).

During the period of construction of the buildings mentioned above, where all stages of the works, both during the production and during the construction, were closely monitored, where they were analyzed and studied and as a result of the practical verification, almost all of the above mentioned advantages of prefabricated concrete structures to steel structures. Whereas, in the future, in case of eventual demolition (demounting) or relocation of any building, remain to be confirmed the priority of demolition or relocation and any other possible advantage, of prefabricated concrete structures to steel structures!

In different locations in Kosovo (2011 and 2012), as in the towns: Podujeva and Hani i Elezit, and in villages: Miradë – Municipality of Fushë Kosovë, Cercë – Municipality of Istog and Pasiq – Municipality of Arbanë (Novobërde), with prefabricated concrete structures, are built school's sports halls, almost the same, with some minimal differences in dimensions.
Mainly these halls have dimensions of bases: $a=33.20\, \text{m}$, $b=28.60\, \text{m}$, net height $h=7.90\, \text{m}$ and area of about $950\, \text{m}^2$, figure 10 and 11.

In 2015, also with prefabricated concrete constructions, two buildings (Commercial Hall and Service Hall) were built in the industrial zone of Pristina, respectively in the 10th kilometer near the highway Pristina - Skopje. The Commercial Hall with dimensions $a=156\, \text{m}$, $b=60\, \text{m}$ and net height $h=7\, \text{m}$, respectively area of about $9500\, \text{m}^2$, figure 13 and 14 and Service Hall with dimensions $a=60\, \text{m}$, $b=20\, \text{m}$ and net height $7=9\, \text{m}$, respectively area of $1200\, \text{m}^2$.

At the beginning, all preparations have been planned and completed, hall to be constructed by steel structures, and the closure of the building and its cover with sheet “sandwich” panels, while the Service Hall with monolithic reinforced concrete constructions (cast-in-situ concrete
structures). So, projects for both buildings were designed, the hall project is shown in Figures 13 and 14. However, based on the previous with the School’s Sports Halls, and now recognizing the advantages of prefabricated concrete structures to steel structures, it is proposed that even in this case the steel structures be replaced with prefabricated concrete structures. After some analyzes and reviews, as well as after market research for both types of structures, the proposal was accepted when the project was changed and the construction of the hall with prefabricated concrete structures was started, figures 15 and 16.

Figure 15. Base of Commercial Hall, prefabricated concrete structures.  Figure 16. Axonometry of Commercial Hall, with precast concrete structure.

In figures 17 and 18 is presented the Commercial Hall building, during the various stages of construction, while in figure 19 is presented the Service Hall, both buildings are constructed from precast concrete structures.

Figure 17 Commercial Hall.  Figure 18. Commercial Hall.  Figure 19. Service Hall.  (Source: Author’s photography in July 2015).

Conclusion

The aim of this paper was to analyze and verify, with the method of comparison, the advantages of prefabricated (precast) concrete structures, against steel structures, in two main aspects:

1. – The aspect of construction time (Fast produced, Easy Assembly (Installation) – Fast mounting and Demounting).

2. – Aspect of the construction cost (Cost Effective).

1. – The aspect of construction time (Fast produced, Easy Assembly (Installation) – Fast mounting and Demounting).
The production process, up to the final form, of the prefabricated concrete structures is done in specialized factories for the production of these structures for a very short time, compared to the steel structures, figures 20 and 21.

Thus, the prefabricated concrete structures that are transported to the site, are completely ready for assembly, where besides the assembly of the structures, no other process is carried out, either processing or any intervention for mounting such as extending, cutting, welding, drilling, etc., this enables these structures to be mounted very quickly, figures 22, 23, 24 and 25.

Figure 20. During the production process of prefabricated concrete structures.
(Source: Author's photography in September 2011).

Figure 21. During the production process of steel structures.
(Source: Author's photography in September 2011).

Figure 22. The process of assembling precast concrete structures (columns).
(Source: Author's photography in September 2011, Jun 2015, July 2015).
As a result, after the comparisons, it appears that the Hall constructed with prefabricated concrete structure, has been completed in a period of 4 months, which includes all phases, starting from: design, production, transportation and assembly.

While manufacturers of steel structures, for the completion of all the above mentioned phases, envisioned the period from 12 months to 15 months and more.

2. - Aspect of the construction cost (Cost Effective).

Based on many analyzes, and especially on domestic and regional producers' offerings of steel structures, the unit price per [kg] ranged from 1.00[€/kg] to 1.30[€/kg], while the unit price per square meter ranged from 70[€/m²] to 90[€/m²], and in the offerings of local producers and those in the region of prefabricated concrete structures, where the unit price per square meter [m²]
ranges from 60[€] to 70[€], or expressed in total, the price of prefabricated concrete structures results more than 10% cheaper than steel structures.

**Disadvantages**

The non-good concrete attributes - especially in pulling, compared to steel, affects the increase in the cross-sectional dimensions of the structure, respectively in volume and its weight. As a result, the costs of transport and loading and unloading increase.

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