

PAPER • OPEN ACCESS

Urban Landscape- Cubic Stone Streets in Historical Areas, Advantages and Disadvantages, Case Study Timisoara Versus Rome

To cite this article: Irina Mohora and Anamaria Andreea Anghel 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **471** 082028

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the [collection](#) - download the first chapter of every title for free.

Urban Landscape- Cubic Stone Streets in Historical Areas, Advantages and Disadvantages, Case Study Timisoara Versus Rome

Irina Mohora ¹, Anamaria Andreea Anghel ¹

¹ Architecture and Urbanism Faculty, POLITEHNICA University Timisoara, 2A Traian Lalescu Street., 300223, Timisoara, Romania

irina.mohora@student.upt.ro

Abstract. Cubic stone streets are part of the identity of historic cities. Over the last decades, most of the streets have been replaced by new but more perishable finishes, which have seriously damaged their historical appearance. Timisoara, the city on the Bega River, also called Little Vienna, still owns fourteen historic streets covered with cubic stone from the interwar period. From an urban point of view, there are two coherent assemblies of cobbled streets in Elisabetin interwar neighbourhood and four other isolated streets in other areas of the city. Architects, landscape architects and culture people, inhabitants of Timisoara, want to stop the approach of local councillors who adopted in 2016 a feasibility study on the modernization of the last fourteen cubic stone streets by asphaltting them. The immediate result of this article is the awareness of those involved in the city's problems by accessing a detailed and clear explanation of their importance to the city and the consequences of removing the cubic stone streets from the city. The multiple advantages of these streets are studied in direct connection with the area they belong to, depending on their local need and the benefits they give. A simple comparison with cities from Italy, such as Rome, can make us not only more aware of their importance, but also teaches us that without a clear set of rules on their maintenance over time, the city could not still benefit from their existence, after hundreds of years of use. Historic areas are massively losing their appearance once the old pavement is replaced by asphalt cover. The areas of the cobbled streets mentioned in the modernization program are part of the historical protective areas or even integral part of the Elisabetin neighbourhood monument areas. To uncover the streets in question and to deprive them of their original image of cubic stone pavement, it simply represents the destruction of the historical identity of an entire area and therefore the image of the city.

1. Introduction

While most cities in Europe are busy discussing and militating for returning to cubic stone streets, Timisoara's municipality wants to cover them as quickly as possible by asphalt, thus eliminating the last fourteen cubic stone streets from the city: " ...there were times in Germany when asphalt was considered the latest craze. Planning director Peter Schroeders justified the return to building materials of past centuries with the goals of city marketing. Paving in conjunction with historic buildings was a quality that had long been realized by cities such as Lüneburg, Sonderburg, Aarhus and Copenhagen." [1]

Local councillors adopted a feasibility study in 2015 concerning the modernization of the last fourteen cubic streets in Timisoara by asphaltting them. The study includes the following streets: Argeş (delimited by Mitropolit Varlaam and Cluj), Dr. Ioan Mureşan (the section between Salcâmilor and Drubeta), Ludwig van Beethoven (between C.D. Loga and Mihai Eminescu), Mitropolit Varlaam



(between Aurel Căndea and 1 Decembrie), Putna (delimited by Ion Vidu and Mitropolit Varlaam), Remus (delimited by Braşov and Romulus), Saint Rozalia (between Remus and Mihai Viteazu), Sorin Titel (delimited by Victor Babeş and Protopop Gh. Dragomir), Topliţa (delimited by Calea Circumvalaţiunii and Făgăraş street), Virgil Madgearu (between Mihai Viteazu and Filaret Barbu), Bela Bartok (between Victor Babeş and Argeş), Filaret Barbu (delimited by Saint Rozalia and Braşov street), Arcidava (around Arcidava Park, to the streets of Mureş and Ulpia Traiana) and Romulus (between Gh. Doja and Saint Rozalia). The judgement was appealed in court by the Cultural Association „Save Timisoara’s Patrimony”, which asked for its suspension, stating that „the historical areas are massively losing their attractiveness by replacing the pavement with asphalt covers. To uncover the streets in question and to deprive them of the already established image of the cobble stone pavement represents the erosion of the historical identity of the area and implicitly of the city.”

The main reasons evoked by the feasibility study were:

„the technical condition of these streets is inadequate for cars’ running in optimum safety and comfort conditions due to problems such as pronounced unevenness of the tread, rounding of the pavements through wear, clogged or broken pavers, polished surfaces that become very slippery in case of precipitation”; low stability of pavement elements; clogging of joints. (...) In view of the above, the necessity and opportunity of asphaltting paved cubic streets results from the technical and exploitation characteristics of the pavement streets, which are inadequate for optimal safety and comfort. For all these reasons, the proposed work is impetuously needed and opportune. [2] The poor local condition shown in figure 1 is due to the lack of current care and can be remedied relatively easily by re-laying the cubic stone and the edges where appropriate.



Figure 1. Current situation of Timisoara’s cubic stone streets

The city has a vast architectural heritage. Timișoara has the largest protected architectural area in Romania. The buildings in the city center reflect the tendencies of European architecture, from Baroque to Art Nouveau, Cubism and modern architecture. Most of the notable old buildings can be found in the historical quarters of Cetate, Fabric, Iosefin and Elisabetin, which emerged in the 18th century. [3] [4] Historic streets shown in figure 2 are an integrated part of the identity of a city, simply removing them from the urban landscape denotes a rejection of history and the loss of important testimonies.



Figure 2. Interwar Timisoara, historical photos of cubic stone streets

2. Characteristics of the cubic stones, dimensions, assembly and restoration

The cubic stones are versatile products that combine the aesthetic effect of natural stone with the utility of any paving material. Not only aesthetically pleasing, these products are almost indestructible and require little effort for maintenance, considerably lower as compared to modern asphalt covers.

Cubic stone increases that old, historical look of a town by creating an overall image of a harmonious and vibrant space by representing another concept of landscape planning, totally opposed to the uniformity given by cement or asphalt. The result of a landscape based on historical cubic stones, setts or cobblestones, is a place with personality, memory and a special identity.

Originally obtained naturally by simply collecting the round-shaped stones by the rivers (cobblestones), the cubic stone in its modern version (setts) is made of granite or other rocks - marble, limestone, andesite, slate - processed and cut into rectangular shapes. The product is available in a wide variety of sizes, quantities and colors, and the assembly is done either on sand substrate or other similar materials, or bound together with mortar. Cubic stone roads can be used throughout the year without major problems. Among the benefits of using cubic stone in paving the surfaces is the fact that it does not allow the deposition of mud or dust, does not require special care, its simple periodic cleaning is sufficient and prevents the formation of gutters often found on the adjacent roads. In addition, under normal conditions, cubic stone roads can last for more than one hundred years.

Cubic stone borders become an indispensable accessory, as it completes and fits with any paved space. Beyond the aesthetic considerations, the borders bring many benefits: prevent mud deposition, fix the stone and the sand used for the bedding course, and prevent overpassing by cars or the penetration of vegetation on the paved surface.

3. History, the art of Cobblestone in Rome

The art of cobble stone cutting dates back to Roman times and streets paved with cubical stones from those ancient times are still used today in Italy. As shown in figure 3, many of the roads inside the historic centre of the city of Rome are made of handmade cobbles called Sampietrini from Saint Peter's square: „The Sampietrini pavement is a particular road surface paved in natural stone with irregular sharp elements that are assembled by hand with the evident irregular effect. Because of their peculiarities, they are not suitable for streets where high speed is allowed.... The first documented use of Sampietrini stones in Rome was during the reign of Pope Pius V (1566–1572).” [5] In the outskirts of Rome there are numerous basalt quarries that provided the city with building blocks for centuries. Basalt is a particularly hard stone, difficult to cut, but extremely durable. It's said a cobble stoned road can last a hundred years without maintenance. Cobblestone cutting is an art which takes three years to learn. Unfortunately, this is an art doomed to disappear since since it is completely handcrafted - there cannot be an industrial production because the cobblestone, the so called Sampietrino - is completely hand-made and once the old cobble craftsmen are gone, it is going to be unlikely to find apprentices willing to start such a kind of work.



Figure 3. Rome (1890-1900), historical photos of cobblestone streets

The shape of each sampietrino block is similar to a cube or a square-based truncated pyramid solid. Different dimensions can be used and start from very small rare ones (a square head of 6 cm x 6 cm) to large ones (a square head of 12 cm x 12 cm and 18 cm height), figure 4. The performance of the Sampietrini pavements depends on the resistance of each block but also on the desired tile pattern,, which meaningfully affects the global behavior of this kind of pavement. [5] These patterns can be found in Timisoara also, figure 5.

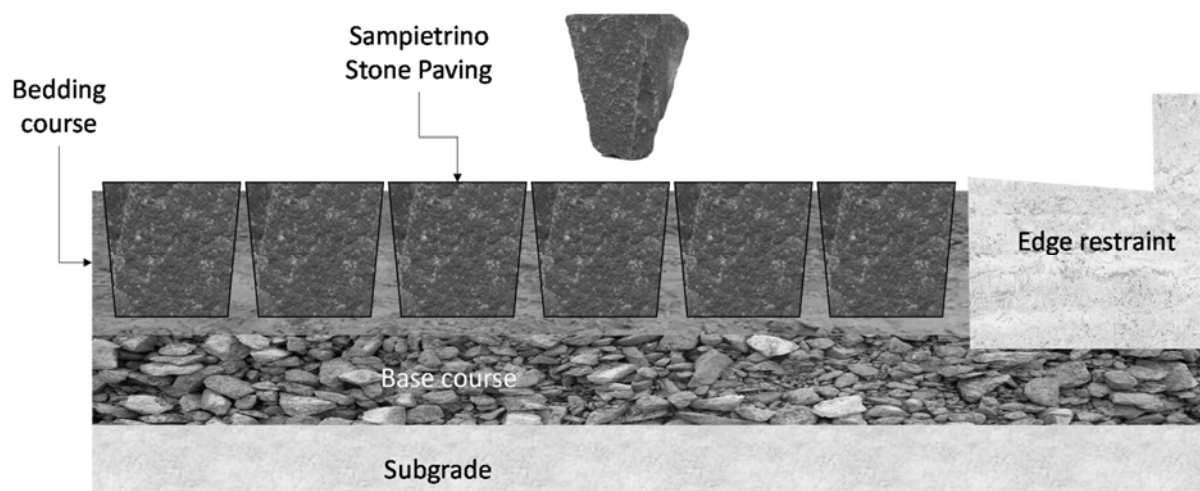


Figure 4. Typical cross section of a block pavement structure [5]



Figure 5. Geometric patterns in Timisoara: herringbone at 45 or arc

4. Methodology

The present article aims to be an alarm signal on the current issue in which the city of Timisoara started the procedures to replace the last fourteen cubic stone streets and their transformation into typical asphalted ones. The main role of this paper is to emphasize the benefits and advantages of the cubic stone streets, focusing on their importance in everyday life, over those covered with asphalt carpet.

From the urban point of view, there are two coherent assemblages of cobbled streets in Elisabetin interwar neighborhood (one formed by the streets of Arges, Putna, B.Bartok, Varlaam and Sorin Titel and one of V. Madgearu, Remus, Romulus, Filaret Barbu and Saint Rozalia streets) and four other isolated streets from other areas of the city: Toplita, Beethoven, Dr. Muresan and Arcidava. The high cost foreseen by the feasibility study of approximately 3.3 million € for asphaltting a number of fourteen streets could be made much cheaper by rehabilitating and repaving them with the existing cubic stone.

If we make a short comparison with Italy, the costs to construct Sampietrini pavements are significantly greater than the costs required for asphalt concrete pavements. The estimated costs provided by the city of Rome, in fact, indicate a cost equal to about 200 /m² for Sampietrini pavement and about 50/m² for asphalt concrete ones. [5] It will be a great loss to eliminate Timisoara's cubic stone streets since their value is extremely high.



Figure 6. Map of Timisoara with the location of cubic stone streets; analysis and solutions

In figure 6, the existing cobblestone streets are marked on the Monuments and Protection Areas Map of Timisoara. It is easily noticeable that a large part of the cobbled streets (marked with a red interrupted line on the plane) are inside or connect protected areas. Therefore, in order to obtain a Building Authorization for these streets, it is necessary to obtain the opinion from the County Department of Culture. The Arcidava and Dr. Ioan Muresan streets do not appear on the map because of their position, more on the outskirts of the city.

The present study consisted in identifying the existing cubic stone streets of Timișoara. Each street has been analysed individually: location, area specificity, conservation/ degradation degree, types of buildings they serve, neighbourhoods, etc.

5. Problem statement: Advantages and disadvantages of the conservation of historical cubic stone streets in Timisoara

Most city residents appreciate the value of these streets. The interviewed people had different opinions, divided in two distinct directions: those who appreciate the benefits these cubic stone streets can bring and their historical value and those who are against them, considering them cheap, inappropriate for traffic (although they do help reduce vehicle speed in required areas) and want to replace them with commonplace asphalt, for personal aesthetic reasons that are generally questionable and not always right for the general interest of the community.

What can we do so the existing cobblestone streets could regain their aesthetic value and have a more accurate and neat look? The major problem of these streets of Timisoara is their abandonment and poor care which the competent authorities should provide.

In times when the quality of new and old streets in Timisoara (and not only) have huge gaps when it comes to their appearance and functionality (after only a few months of use, major problems affect the quality of the wear and the support layer (pits, bumps); patching is often used as a provisional and final solution). Thus, cubic stone streets are more advantageous in areas where they are suitable. The reduced number of current cubic stone streets in Timisoara should make us more aware of the necessity and immediate need of rehabilitation. They are in an advanced state of continuous degradation, totally neglected, perhaps even intentionally. If basic interventions would be provided to maintain this type of pavement, the city would benefit from wonderful sidewalks with positive and beneficial effects for urban residents. The degree of degradation of a cubic stone street can be determined by analysing the following points:

- degree of severity of each individual cubic stone block (chipped or rounded edges, cracks);
- depressions severity;
- edge restraint severity;
- joint sand severity;
- patching with inappropriate material;
- drainage solutions;

The city studied and regarded as a model and source of inspiration is Rome, figure 7. The historical area accessible to cars is completely covered in cubic stone, perfectly matching the archaeological sites and historical monuments. It creates the ideal theatrical setting, where you can fully have the feeling of an atypical, timeless world.

This is in fact the unique charm of the cubic streets, which European capitals, and not only, highly value and give them full attention to be appreciated by both locals and tourists. Apparently, a common thing, insignificant to most viewers, these cubic stone streets have a well-built role to complete the historic atmosphere of the city as whole. It creates the perfect framework in which one relives the glory of the past, easily recreated in the imagination.



Figure 7. Historical district Rome, Italy, 2017

6. Results and discussions

After studying the different cubic stone streets and their main characteristics, we can easily highlight their advantages and disadvantages.

6.1. Advantages of cubic stone streets

- Vehicle speed reduction in residential areas, specially designed to reduce accidents caused by distraction or excessive speed in residential or historical areas;
- Facilitates natural drainage of rainwater - a huge advantage during heavy rains when the city's sewer system fails to cope, flooding the streets and basements. The simple advantage of not getting muddy in wet weather or in dusty weather makes these roads functional and healthy;
- Aesthetically, superior appearance compared to streets covered with asphalt carpet;
- Relatively easy maintenance over time if the support layer is well-made;
- High historical value, the existence of cubic stone streets increases the value of the historical areas they serve (although not perfect but as the Japanese Wabi-Sabi aesthetic term says, one can focus on finding beauty within the imperfections of life by accepting peacefully the natural cycle of growth and decay).

6.2. Disadvantages of cubic stone streets

- Speed and traffic fluidity reduction;
- The manufacturing process required to obtain the material is made by few trained craftsmen;
- Slow execution as compared to streets covered by asphalt carpet.

When we speak about traffic and noise pollution, there is a deep link between the surface of the roads, that can create various levels of noise when combined to the speed of the vehicle, tire characteristics and volume. The texture of the surface, porosity, structure and drainage level can give different results

according to certain input data. Porous asphalt with about 20-25% air void inbuilt can absorb noise and drain water better than classical asphalt solutions. [6] Cobblestone and other paved roads are examples of good drainage but on the other side, noise pollution caused by traffic on these surfaces, raises when crossed by high speed cars. In order to decrease the noise on these paved roads, periodical maintenance is necessary. Although some may be against them and willing to destroy the historical cobblestone roads, the best solution in these cases could be a study aiming to establish characteristics and urbanistic rules that can decide if a certain area is suited for cobblestone coverings or not. In historical areas where vehicles are obliged to decrease speed, using this type of pavement may be a very suitable solution for avoiding high traffic noise pollution and can give a certain authentic historical sound. The use of pavements is highly recommended on pedestrian streets, like the ones near the historical areas. The specific sound signal helps keep pedestrians alert for the proximity of vehicles, decreasing the risk of accidents.

The city is divided in areas that are more suited for cubic stone roads and others that require updated coverings. Areas where these types of cubic stone streets are unsuitable are those with heavy traffic (3-4 lanes), major traffic boulevards, belts, national roads, highways. The areas suitable for cubic stone streets are, besides the historical ones, those that serve dormant neighbourhoods where the population wants a more relaxing, quiet, livelier atmosphere. If there are clear and logical reasons to remove a cobbled street from the city, their replacement may be acceptable if the raw material (cubic stone) is to be reused in other areas of the city where required, or whether there is a necessity to replace damaged pieces on other cubic stone streets of the city. Deterioration of these materials is very small, it is caused mainly by inappropriate use such as the access of unauthorized heavy vehicles, or degraded support that leads to corrosion or chipping of the stone. The idea of selling the cubic stones has to be excluded because they belong to the city, it is part of its history.

A positive example is the Union Square, located in Timisoara's district "Cetate", that undertook a long rehabilitation process, that also considered the replacement of the original cubic stone with modern pavements. The final result is satisfying because the cubic stone regained the rightful place and so the main pedestrian square of the city regained its historical value and appearance. There are also bad examples of pedestrian walks in the historical area of Timisoara that have been covered by asphalt without any mandatory characteristics and practical issues to consider. The absence of drainage systems leads to the intense degradation of the historical buildings neighbouring on the respective area. A beneficial solution for pedestrian areas, shown in figure 8, is the alternation of smooth pavements with cubic stone, both aesthetically and functionally, making walking less problematic.



Figure 8. Union square and street from the district "Cetate" Timisoara, after the rehabilitation project

7. Conclusions

Almost beneath every modernized asphalt covered street lies a small part of our history because most of the cubic stones were not removed but only covered. The topic regarding the situation of the cubic stone streets is an up to date mater for local press, since the majority of these streets are located only two steps away from Timisoara City Hall and the centre of the city to be European Capital of Culture in 2021. The cubic stones were implemented in the interwar period, almost 90 years old. The poor state of these streets is only due to lack of current care and can be remedied relatively easily by re-laying the cubic stones and borders where appropriate. Cubic stone paved streets from the Roman period are still in use in Italy, so the age criteria do not apply in this case. From the traffic point of view, asphaltting these streets will increase the volume and speed of traffic on these mostly residential streets, which will lead to increased pollution in the area and lower quality of life for the inhabitants of these areas. Cubic stone requires a low rolling speed for cars, which adds to the safety of car and pedestrian traffic. Regarding the rainwater drainage, due to the existing joints between the stones, it drains naturally into the soil without additional loading of the sewer system. Because the advantages of preserving the cubic streets are significantly above of their disadvantages, we hope that in the future, after serious works of rehabilitation, Timisoara's last cubic stone streets will still delight our citizens. The elimination of these streets will represent a great loss for the city's heritage.

References

- [1] SHZ.DE, "Stone pavement or asphalt?: Road construction: Flensburg wants back to the Stone Age", 2015
- [2] Timisoara Municipality, "Fesability Study regarding the modernization of the cubic stone streets of Timisoara", 2015
- [3] M. Opris, "Timisoara: Urban Planning little monography," Bucuresti: Editura Tehnica, 1987
- [4] M. Opris, and B. M. 2014 "Historical Architecture from Timisoara," Editura Tempus, Timisoara, 2014
- [5] P. Zocalli, G. Loprencipe, A. Galoni, "Sampietrini Stone Pavements: Distress Analysis Using Pavement Condition Index Method," *Zhanping You*, 29 June 2017
- [6] V. Petrescu, R. Ciudin, C. Isarie, L. I. Cioca, V. Nederita, "Traffic Noise Pollution in a Historical City Center – Case Study Project within Environmental Engineering Field of Study," *3rd International Engineering and Technology Education Conference*, Sibiu, Romania, November, 1st – 4th, 2015