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INTERIOR DESIGN

ARCHITECTURE

PRESERVATION AND HERITAGE

URBAN DESIGN AND PLANNING

Interior design

“Caruso” Restaurant in Timisoara. A Counterpoint Case

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ABSTRACT

Inserting a new function in an interior space located on the ground floor of a historical building placed in the central area of a city with a touristic potential is a common subject.
Finding an appropriate manner of intervention, both with the features of the existing architectural context and the specific features of the new function itself, becomes a basic condition.
However, in order for the new functionality to become an attractive one and, in order for it to be able to trust a carefully selected clientele, the finding of an unusual specific theme and also in keeping with the characteristic spatial, functional, cultural and historical context constitutes an advantage.
The present paper proposes an analogy with the musical world, namely the technique of counterpoint in the field of sound harmony, which involves the overlapping of two or more themes with different meanings, in order to synchronize three different themes in an interior design project: the restoration / rehabilitation / re-use of a space in a historic building, that of the new contemporary functionality introduced, as well as the “novel theme”, unspecific neither to the space nor to the function, but as a link between them, coming from the outside of the subject but with the (temporarily) role of a cultural stabilizator.

Keywords: interior design, heritage, re-use, counterpoint, musical analogy

I. THE CONTEXT

The case study describes the refunctionalization of a commercial space located on the ground floor of a historic building from the old center of Timisoara, Romania, near the St. George Square, a building that occupies a whole quarter, from a bread shop into a restaurant with a non-specific menu but intended for a sophisticated clientele, by overlapping an exterior theme, that of the personality of tenor Enrico Caruso, taking advantage of the fact that the street sector of that space bears the name of the famous character.

Fig. 1. The Citadel of Timisoara in 1758 and in present https://mercytimisoara.com/2018/06/17/denumirile-strazilor-din-timisoara-la-1750/

Although the building has a postal number on Augustin Pacha Street, one of the entrances to the building and, at the same time, the entrance to the commercial space - the subject of the intervention - is on Enrico Caruso Street, no. 2. It is the only street in the Citadel that does not follow the cartesian character of the tram, beside the Alba Iulia street, both of which pointing to landmarks now disappeared. The Jesuits Church dedicated to Saint George was demolished between 1913-1914, along with the House of the Jesuits to make room for Szana Bank, designed by Kremer Josef jr. [1].
The main space in the neighborhood is St. George’s Square, undergoing rehabilitation at that time - autumn 2013, exactly 100 years after the demolition of the church.
The space had a total usable area of 98.34 square meters. The heights of the rooms were 4.80 m. The floors were made of cast mosaic or rolled concrete, plasters were in an advanced state of depreciation due to improper use of the interior space and its subsequent abandonment.
The window frames were made of metal to Caruso Street. Except for this showcase, all the showcases on the ground floor of the building had already been replaced with PVC windows - most of them, aluminum - 1, wood - 1.

Fig. 2. The showcase in November 2013, before intervention, Photo: A. Racolta

II. AIMS AND OBJECTIVES

It was obviously desired to maximize the potential of the existing space, emphasizing the personality and identity of the architectural ensemble, preserving and highlighting the original substance of the building. In this regard, the following were proposed:
- the demolition of unstructured compartments that occurred within the space before 1989, which “parasite” and obstruct their functionality, the dissolution of the destroyed plasters and paintings and their reconstruction in a fair and contemporary manner, highlighting the qualities of the edifice and of the interior spaces
- re-partition in a manner designed to increase the functionality of the existing space and the creation of a sub-slop / mezzanine, a partial level made of light structural elements, wood and metal, with the role of adding a useful surface to increase the potential that the existing represents it.
However, in order for the new functionality, that

of a restaurant, to become an attractive one and, in order for it to be able to trust a carefully selected clientele, the finding of an unusual specific theme and also in keeping with the characteristic spatial, functional, cultural and historical context constitutes an advantage.
The name of the street, Enrico Caruso, was the one that suggested the musical theme and the superposition of the tenor's personality theme over the usual themes in an interior design work - those of the restoration / rehabilitation / reuse of a space in a historic building – leaded to the use of a tool from the musical world, namely the counterpoint technique.
The technique of counterpoint in the field of sound harmony involves the overlapping of two or more themes with different musical meanings [2].
Because the analogy could not be a complete one with what is happening in music - the one-dimensional and temporal artistic genre that uses sound as work material - , the use of visual language elements in a syntax specific to music together with the strong involvement of the semantic level in the expression of forms and materials used was the challenge of this project.

III. THE EXPERIMENT

III.1 Thematisation

The client wanted the design to be very stylish, simple, contemporary but anchored in history, elegant but not ostentatious, a place to feel relaxed but not very familiar, not to look cheap but not too expensive. He also funded me for a trip to Cluj city to see a certain place in the central area, which, he said, fits perfectly with the description in terms of status, to see the place, to feel the atmosphere and to order what food I want, depending on what status I will have there. As the layout seemed to me a successful collage, but without any clear thematic suggestion, I ordered a pizza! Disappointed with my culinary choice, the client asked me to conceive a theme.
It was clear that he wanted something different, neither futuristic nor historistic, not aseptic, a hook, an over-theme that could come from anywhere but fit perfectly with the local physical context, suited to a sophisticated but stingy customer, intellectually enough to decipher the clichés, but not so snob to pretended to digest something too hermetic.
Then I realized that the right scenography would be entirely based on logic. I started from the data the place offered to me: Who is my "patient"? - The former bread shop on Caruso Street. Who's Caruso?

Fig. 3. Enrico Caruso Source: http://edison-effect.blogspot.com/2006/10/enrico-caruso-king-of-operatic.html

III.1.1 Caruso's personality

Caruso is the most important Italian tenor. He's not Renato Carossone. He's not Celentano. He is not singing about pizza and spaghetti, he is popular and elegant too. He is international and local and he is sophisticated, just as his client intended to be his menus. He is a great traveler, an increasingly american, thanks to the Metropolitan contract, after opening the season of 23.11.1903 as the Duke of Rigoletto [3]. "He was the first global superstar of the gramophone era","in his time he was indeed as good as Elvis" [4]. He is not a genius loci, but this street in Timisoara bears his name. And people know this street not because they know who Caruso was, but because of the C.E.C. block on the corner and the former bread store!
I called the client and told him: The restaurant will be called Caruso, from the Caruso Street.

III.1.2 Coincidences

A strange local and temporal vertical co-incidence linking St. George's Square in Timisoara with the New York Metropolitan is the almost simultaneous demolition of two churches for the expansion of the banking financial function.

Fig. 4. The Saint George Jesuits Church and the House of the Jesuits before demolition. Source: https://adevarul.ro/locale/timisoara/foto-biserica-sfgheorghe-cea-mai-veche-piata-publica-timisoara-disparuta-1904-1_52a8efed-c7b855ff56a38845/index.html

Fig. 5. The 1900's photo of the building of the Metropolitan Life Ensurence insurance house in Madison Square appears along with a church before adding the famous tower instead. Source: https://viewing.nyc/vintage-photograph-from-1900s-shows-madison-squares-metropolitan-life-insurance-building-before-tower-addition/

Some resemblance to the atmosphere but also to the stylistics [5] can be found between the old building of the Metropolitan Opera (1883) - an Italian neoreneissance style molded on a steel frame structure [6] - and the building known in Timisoara as "Bega Mică", as it appears in the historical photographs, respecting, of course, the scale differences.

Fig. 6. Arch. Kremer Josef jr., Szana Bank. Source: http://www.opiniatimisoarei.ro/wp-content/uploads/2015/04/piata-sfantu-gheorghe-de-altadata-veche-2.jpg

Fig.7. Arch. J. Cleaveland Candy: Metropolitan opera house 1900. Source: http://2.bp.blogspot.com/-ErPZ0-Xem5Y/T8UAI-QjAlI/AAAAAAAAAmo/3M73TnSuLYA/s1600/4a12413r.jpg

III.1.3 Implementation of the theme

Then came the visual exploitation of everything that Caruso could do: his own photographs, the musical theme (the curtain, the musical staves of the balustrade including the da capo notation, the notes taken over by the suspended luminaires), the swinging between an Italian world with wooden floors and a New York world of the Metropolitan Opera House - the new tenor`s house – made of bolted steel profiles, as they can be seen in the Stanley and Ollie films - , with its apparently brick facade brought into being inside the restaurant by scraping the de-

graded plaster of the existing brick masonry.
And, of course, everything in black and white!

Fig. 8. Historical steel structures. Source: https://www.dailymail.co.uk/news/article-2920453/Laughing-face-death-Incredible-pictures-construction-workers-fooling-built-America-s-iconic-buildings.html

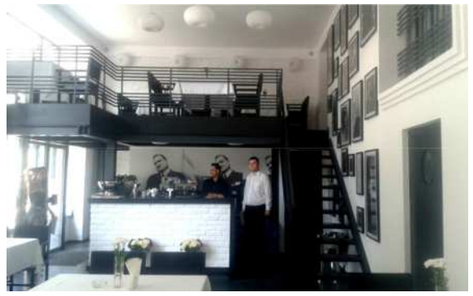

Fig. 9. Caruso Restaurant – Day 1

Fig. 10. Steel, wood and (musical) stave

Fig. 11. The Notes

III.2 The project

III.2.1 The function

Through the proposed re-partitioning and subpante design, with the insertion of the reversible wood and metal structure, the project aimed to provide all the space needed for the new functionality, with its specific destinations.

Fig. 12. 3D draft – the insertion of the partial floor

III.2.2 The restoration

On the outside it was proposed to replace the existing metalwork of the showcase, made of plate and cornices, gray color, and the 3-5 mm glazing, without thermo-insulating characteristics, with a metallic frame made entirely of electrostatically gray painted steel plate, suitable for the contemporary insulating glass system, in congruence with the drawing of the facade in the sense of resuming the compositional symmetry in the case of the glazing from the left side of the facade, asymmetrically forced in the past. The choice of steel structural steel was made to preserve the suppleness of the historic showcase framing and to avoid the undesirable thickening of the carpentry when fully integrated in wood due to the much larger weight of the contemporary thermo-insulating glass.
However, the insertion of a horizontal wooden area was necessary to mask the beams of the sub-floor slab and to accommodate the ventilation installation.

The integral gray anthracite painting aimed at further thinning the joinery elements visually.
Choosing the water jet washing of the exterior finish at the expense of sand blasting has avoided an overt, too new appearance compared to neighborhoods.

Fig. 13. Re-drawing the local symmetry. The façade before and after intervention

Fig. 14. Thr new metal framing

III.2.3 Interior design

The visual exploitation of a mixed wood and metal slab according to the chosen external theme was not considered to be inconsistent with the character of the building, for the very reason that its floors are structured in the same way. At the same time, the ironwork appears visible at the level of the interior stairs of the building, elevator and courtyard railings, but in the formal style specific to the epoch. Avoiding pastiche and false history has been done by refusing to imitate them formally.

Fig. 15. The use of naturally aging materials

The use of the previously described thematic elements related to Caruso and his New York periplus was made by appealing only partially to the musical culture of future clients. The musical theme is not descriptive, there are no musical notes drawn on the sides or floor, there are no musical instruments, but the few graphic elements (the theme of the portativum), volumetric (luminaries suspended at uneven heights, by analogy with the musical notes) or scenographic (curtain) appeal to the two extrinsical laws of vi-

sual perception in gestalist psychology, theorized by Max Wertheimer in 1913 (law of assembly and law of influence of attitude on perception) [7], which relate to the receiver's experience and refers to the specific contribution made by the subject in the organization of the perceptual field, through the memory of the historical form, and to the isomorphism itself [8].
As finishes, triple-layer wood floors were used with a gray-anthracite painted coating, which would age quite quickly over time, even in the absence of intense traffic, instead of some ready-made "antique". The same was done with the wooden stairs, with the bar counter, the wood of the armchairs` arms, the access doors` handles.

IV. FINDINGS AND RESULTS

Following the proposed intervention, the total usable area increased to 155.37 square meters, compared to the initial 98.34 square meters, satisfying the need for the new functionality.
From the point of view of the height of the resulting spaces, in the dining area from the upper level, the positioning of the ceiling at a distance of 2.35 m from the floor elevation generated an atmosphere of intimacy, preferred by couples or small groups of maximum 4 persons.
In the top sanitary groups, the full white of the room finish and the vertical accents of the black frames mirrored the flattening feeling.
Serving spaces below the inserted floor (storage, preparation area and annexes) have relatively small planimetric dimensions and do not have a public character. A higher person may feel some discomfort inside the kitchen.
The metallic frame of the big windows did not deform despite the gray-dark color, although on hot summer days the sun often hits it directly. Due to the low section of the structural elements, the thermal transfer through the windows is insignificant.
The exterior and interior finishes have been beautifully and naturally aged in the four years, without making a discordant note with their neighborhoods. But perhaps because of the too late lightening of the dark gray interior floor that was to warm up the space in time, the initial idea of an exclusive black and white treatment of the interior has encountered some reticence from the clientele, so one year after the restaurant was inaugurated, I was called upon to choose a colorful, warmer idea, darker by mitigating the reflection of light and thus more intimate. This was the first sign that the restaurant began to become more popular, to be endowed with an "elite" less habitual with aesthetic purism. Which, in the end, was a good thing.

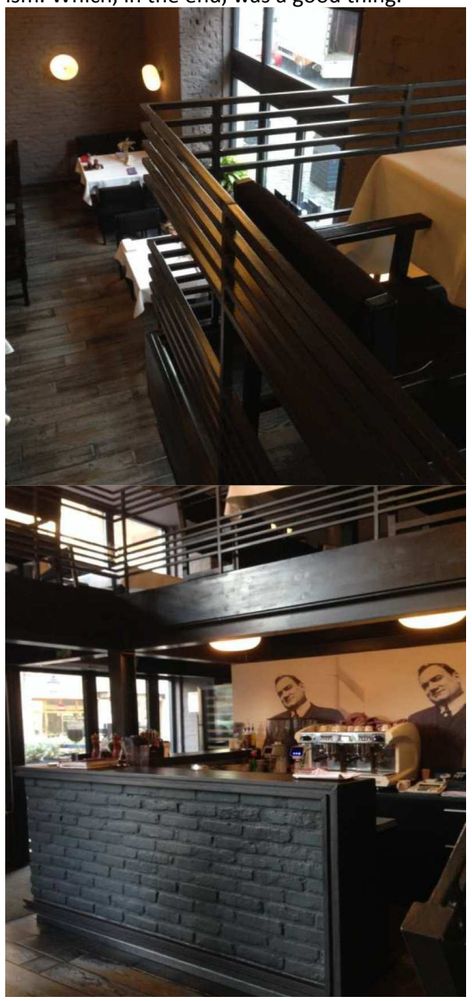

Fig. 16. From black and white to dark warm colours

To what extent has the clientele fully enjoyed tenor Caruso's theme, remains to be discussed.
What is certain is that, to date, no one has asked

to listen to Caruso's music in the restaurant, since the full collection of his records, which I promised the owner to gift at the time a client wants to listen to the great master, is still in my patrimony.

Fig. 17. The Complete Recordings of Enrico Caruso

V. CONCLUSIONS

The use of language elements specific to visual grammar in a syntax specific to the sound composition should not be made by forcing too accurate analogies. Thus, the counterpoint could be summed up at the level of phrasing, the overall dynamics of the composition, overlapping polyrhithmically layers of visual elements whose consonance by vertical incidence is not given by the height of the sound, difficult to translate in the visual field, but by the other characteristics which are common: dimension, intensity, texture. From a dimensional point of view, the achievement of harmony in the game of consonance and dissonance is the choice of correct relations between existing and introduced elements, in this case belonging to different historical layers.
Physical configuration and physical consistency of the subject of intervention give its physicality. This is what is seen as a result of what it was on the site at the moment immediately preceding the contouring of the new project. They represent the result of the passage of time on that space and sum up the totality of natural and anthropic, involuntary or voluntary traces, imprinted on the subject from the moment of its edification to the present.
Choosing an intervention mode to conserve, eliminate, modify, or refresh is a theme in itself. An "inner" theme of the object, which is the restoration of a balance of aesthetic and historical nature, of structural and visual re-integration in the entire edifice and site, in a contemporary context. It is a theme of restoration theory, interpreted every time differently because it depends on local parameters. The intensity, the dominance wherewith one of the themes becomes the main and the other the subordinated, does not only keep on the balance that the designer chooses in his counterpoint composition, but also depends on the strength and the degree of coherence that the pre-existing holds. The interior design and the restoration of the showcases of the newborn "Caruso" restaurant send in a non-mimetic manner from a formal point of view at the age that was the peak of the glory of the known tenor, resorting to the logic of materiality and symbolism. The fact that the theme outside the subject of the intervention did not become the main one is due to the fact that it was not formulated too explicitly, it did not appear too pregnant, it was not sounded strong enough, staying in the background, where it was its place, because the main one was actually the intervention in a historic building and not an abstract visual exercise.

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“Timeline”, between time and space, case study, intervention in a historical building in Elisabetin neighborhood, Timişoara

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ABSTRACT

Most of the historical buildings have attics that have so much architectural and financial potential but they are most of the time forgotten or ignored. This project tries to create a possible example of how to rehabilitate an historical attic.

“Timeline” is an interior design project that represents a space, like a workshop, where old and new clocks are restored/fixed. The proposed project uses only partially the existing roof, carefully chosen because it is more suitable, lighter and the height is more convenient for the function. The main objectives were: saving and highlighting the old wood structure of the roof, combining with new technologies, creating an open functional space and transforming an unused attic in a memorable space. So, “Timeline” is an actual way of describing the space containing old and new elements that create a story of the past and present by using new technologies that make people look also into the future.

The project’s first step was choosing the principles and strategies having in mind the questions “why” and “how”. The main strategy was to create zones that could easily communicate as for the space to logically function. A keyword for the project is contrast. The most important decision was the way it should be intervened in the old space so that the addition would be minimalistic by creating a visual mesh that covers the bottom part of the space communicating well by form with the wooden structure ceiling. Lighting is essential for the old elements to become more visible for the visitors that explore the space, while their precious clocks are brought to life again.

The result is an interesting space with a unique atmosphere that respects the importance of the heritage and the historical value of the building.

Keywords: rehabilitation, intervention, old and new, contrast, minimalism.

I. INTRODUCTION AND HISTORICAL CONTEXT

The building (named Lajos Palace) is located in the center area of Timisoara (UTR 48 Area B) to the south of the citadel neighborhood, replacing the old gardens and being at the border between Elisabetin and Iosefin neighborhood but belonging to the first one. The neighborhood got its name in honor of the empress of Austria on 26 May of 1896 and had a rural appearance until 1892. After abandoning the character of the military fortress of Timisoara, Elisabetin neighborhood developed in density of buildings and surface. The neighborhood developed very fast so it became the favorite residential area for the middle class. The area is characterized by less monumental buildings and less tall but defined by a sober elegance. In the last 20 years, from Elisabetin neighborhood, many typical houses disappeared (houses with only ground floors and located on the long side of the parcel, having a gable on the street facade) being replaced by new building with many floors that gives the area negative characteristics.

Lajos Palace belongs physically to the Elisabetin neighborhood but it has the characteristics of Iosefin buildings, being taller (basement+ ground floor +2 floors), having a slightly monumental appearance and presenting Secession decorative elements (Fig. 1).

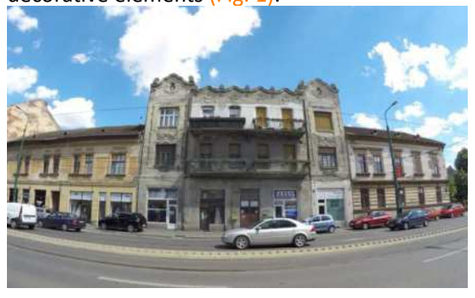

Fig. 1. Lajos Palace, Boulevard 16 Decembrie, number 11, Timisoara

Building authorization for the palace was obtained in 28 October 1911 [1] and even after consulting all the historical sources available, the architect could not be identified. Initially, the palace had one owner and today around 23 families live in the building, forming a united community. The building had, from the beginning, at 1st and 2nd floor the most valuable and spacious apartments with their own balconies at the street. So, the area chosen for the Timeline project is right above them. Lajos Palace is not on the monuments list, but belongs to the historical monument protection area.

Fig. 2. Lajos Palace, situation plan

The urban tissue of the city center of Timisoara was completely restructured after the Austrian Conquest of 1716. It is based on rectangular blocks made of buildings (both public and private houses) with inner courtyards. These constructions have interior courtyards whatever the shape of the building: “L”, “U”, “O” [2]. Although Lajos Palace was built much later, in 1911, it uses an “O” shape with interior courtyard (Fig. 2) which gives it a special atmosphere, typical to the historical buildings. The configuration of the plan is not a completely rectangular one but is perfectly adapted in the context of the parcel.

II. METHODOLOGY

The proposed Interior design intervention is located in the attic of the Palace. Considering the large surface of the attic only a portion of the space was chosen for the project: the one marked by the yellow line in the Fig. 3. The reasons why this portion was chosen is because the height was more convenient, the fact that it has access to the main stair and its location at the facade of the boulevard. (Fig. 4)

After the measurements, the most valuable elements of the space were identified (the plan of the space – Fig. 5). Considering the huge value of those elements, they were all kept intact throughout the new intervention, which had from the beginning the role of highlighting them. The portion of the space contains 10 chimneys, 2 light courtyards and the most important, the

original roof structure. The brick walls are thin because the space is at the highest level of the building.

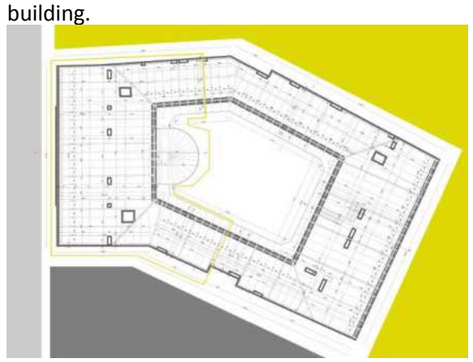

Fig. 3. Lajos Palace, intervention area

Fig. 4. Lajos Palace, the attic, existing situation

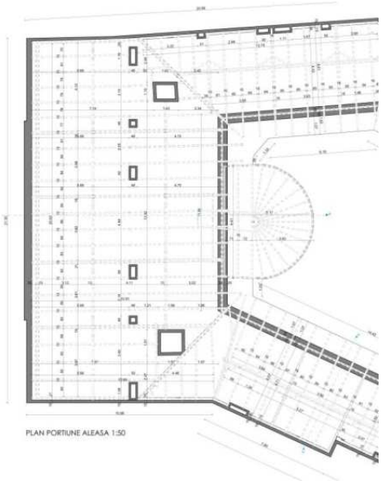

Fig. 5. Lajos Palace, the attic plan of the space

III. PROPOSAL OF "TIMELINE" INTERIOR DESIGN PROJECT

The space is very impressive as can be seen in overall view. The intervention emphasis this characteristic of the space as it can be seen in the figure 6.

Fig. 6. Timeline" project intervention plan

The access in the space can be made through the new metallic stair following the course of the original stair of the palace until this level. Another and much easier way is the elevator with metal and glass structure, and so, the space can be accessible for everybody, especially people with disabilities. The entrance is a new structure made of metal and glass and has a door with a pivot reminding of the clock's hands and mechanisms. The user of the space is welcomed with an exposition of clocks and old objects. After exploring the entrance, the visitors are invited to leave their jackets in the wardrobe and waiting for an expert artisan in the discussion space at a table. The clock is carefully analyzed, finding the solutions and giving price deals. After the owner accepts the price, the expert is taking the clock to its personal work space and eventually start working on it depending on the schedule. The owner is invited to watch the repairing or restoration process or explore the installations and the exposition of the most valuable clocks

that wish to be found and discovered. The space presents 5 workspaces, every expert has a working desk and storage. The level of the floor in the workspaces is lower so there is more usable height and space. In break time, the employees can cook and enjoy a meal in the basic kitchen that is completely visible. The new intervention contains also bathrooms and changing rooms. In the private area is a relaxing area for the employees because the working process is meticulous and requests a lot of concentration. The space also contains storage rooms and technical rooms.

In the sections and elevations in the Fig. 7 are visible the main proportions of the space and the intervention with the furniture. It also presents the yellow line that divides the space in the private and public areas and the way it's following the space and creates the exposition areas. The layers of the floor and the roof as well as the contrast between the old elements and the new intervention is also represented in the sections.

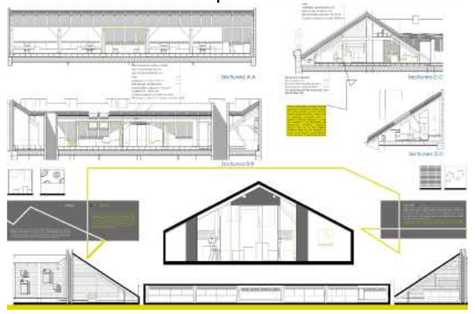

Fig. 7. Timeline" project, sections and elevations

The structural elements of the the roof at the floor level had to be protected, so, the floor has 3 different height levels and the trasition between the levels is made through ramps in order to be easily used by people with disabilities as well. The floor is a raised platform that has an easy wood structure (Fig. 8). The usefull thing about this platform is that it can include the instalations and creates more dimension to the space. The plaform includes the sockets too. Because the space is so large and open, the platform gives the variety that was needed in the space. The plaform is not touching the old structure or the original chimneys which is very important for such an intervention in a historical building. The new and old elements should not be bonded so it can be easy to replace or be identified as a new intervention.The texture of the wood floor is very fine and painted in white so the wood structure is very slightely visible. This whole intervention has this kind of texture so it can be recognized as one "mesh" that covers the bottom part of the space.

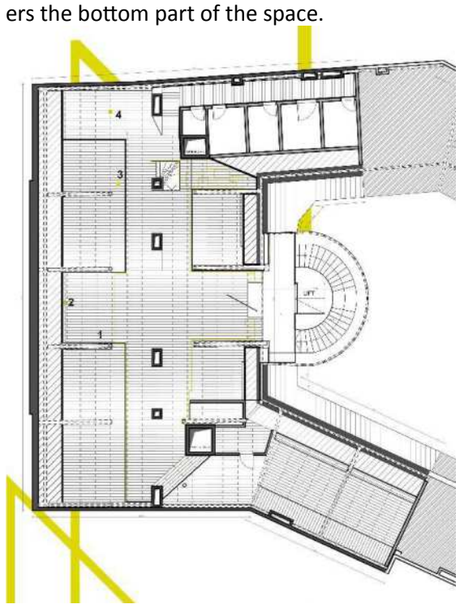

Fig. 8. Timeline" project, raised floor platform

From the lighting point of view (Fig. 9), the space needed natural light as much as artificial light. The natural light was brought in through the new attic windows placed close to the interior courtyard of the building in the main space, relaxing space, bathrooms and changing rooms. The attic windows also contributes with natural ventilation that is very needed in the space. The artificial light is divided in general, local and accent lighting. The general lighting is represented by many small ceiling lights that symbolise sparkly points that gives you company throughout the entire space. The local lighting depends of the functionality of the area so the exposition area has liniar lighting that comunicates with the structure of the exposition furniture. The discution area and the workplaces have lamps

with powerful light. The accent light has the role of helping the division from the new and old elements and also highlights the old textures.

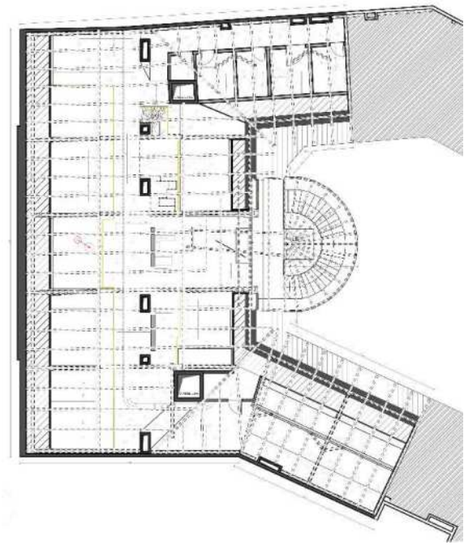

Fig. 9. Timeline" project, light

The intervention has new structures that are independent as is the entrance or the stair to the exposition area (Fig. 10). The details of those structures are very important because the intervention is made carefully taking in consideration the old structural elements. A very important characteristic of the intervention is reversibility, nothing is attached to the original structure so the space can be easily reorganized or the new intervention could be easily replaced, which in a historical building this should be obligatory. The new structures are metallic so they are easy to assemble or remove.

The designed furniture of the workspace desk in the Fig. 11 is made according to the necessities and the tools dimensions also taking in consideration the work process. Because the tools used are quite small, the drawers are not tall so the worker can find and organize them easily. But there are some tool that are mostly used all the time and they have to be very accessible so the worker also has drawers under the working table. On the surface of the table a shield has been designed so the tools and the little clock components to stay safe on the table, and there is still place for attaching a mobile lamp and a mobile magnifying glass that are very necessary for the working process. The panels are transparent so the working process is still visible. The materials used are steel painted in black and beech wood painted in white or yellow.

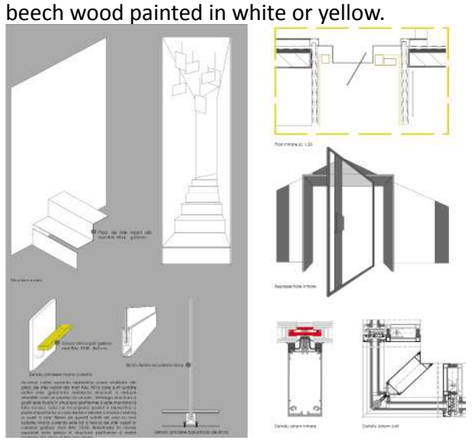

Fig. 10. Timeline" project, entrance details

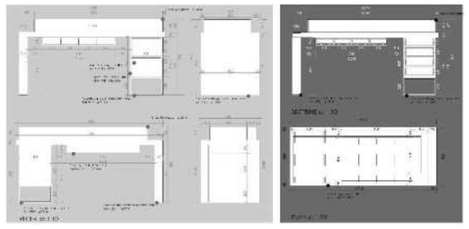

Fig. 11. Timeline" project, furniture details

The installations of the space have the role of creating a new way of connecting with the users and visitors, the installations being interactive. The first one in the Fig. 12 has 2 faces, the first one is the exposition that is welcoming visitors in the space. The exposition is placed in front of a big mirror surface which creates the impression of a larger place and also marks the first impressions of the visitors. The lighting over the exposition area is a linear one and creates a geometric game that communicates well with the structure of the exposition's furniture. The other facade of the installation is facing towards the discussion area and it has a perforated metal panel creating the pattern of the gears of the clock's mechanisms. The pattern is shaped with the help of a string. The installation is an assemblage of 3 independent components but they are so close to one another so that can be considered one whole object. The structure of installation is made out of steel and the colors are black, white and yellow.

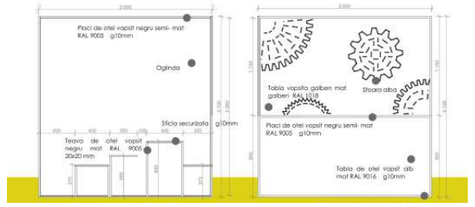

Fig. 12. Timeline" project, installation wall

The second installation represented in Fig. 13 also has 2 facades, the first one being located facing the wardrobe it has 224 LED panels with motion sensors which marks the first steps in the space of the users and visitors and it makes them aware that their presence is important for the space and is going to leave trace in the building's story. The second facade is addressing the sense of hearing, containing colored glass cones with different proportions and a clock mechanism in the middle. So, the different proportions will allow a variation of sounds.

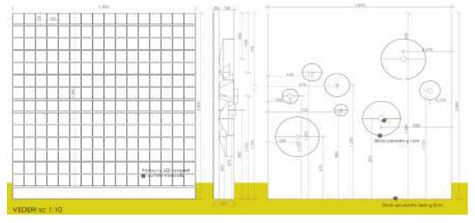

Fig. 13. Timeline" project, second installation wall

On the main facade at the entrance of the building (Fig. 14) is a panel that is not attached to the walls of the building and it has all the names of the commercial stores and spaces. The material for this would be metal and the writing perforated so the light will actually be the key for it to be readable.

On the level of the attic the space is marked with a yellow line that follows the decorative elements.

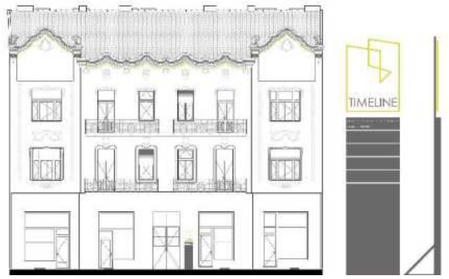

Fig. 14. Lajos Palace, main façade intervention

In the figures 15, 16, 17, 18, 19, 20, 21, 22, 23, 24 ,25, 26 and 27 is represented the unique atmosphere created with all the elements presented before.

Fig. 15. "Timeline" proposal atmosphere

Fig. 16. "Timeline" proposal atmosphere

Fig. 17. "Timeline" proposal atmosphere

Fig. 18. “Timeline” proposal atmosphere

Fig. 19. “Timeline” proposal atmosphere

Fig. 20. “Timeline” proposal atmosphere

Fig. 21. “Timeline” proposal atmosphere

Fig. 22. “Timeline” proposal atmosphere

Fig. 23. “Timeline” proposal atmosphere

Fig. 24. “Timeline” proposal atmosphere

Fig. 25. “Timeline” proposal atmosphere

Fig. 26. “Timeline” proposal atmosphere

Fig. 27. “Timeline” proposal atmosphere

IV. CONCLUSIONS

In conclusion, the space had achieved all the initial goals and it is a confirmation that an attic of a historical building can be transformed because it has special features that gives a lot of character to the atmosphere. Although the space has, at its own, a very long and impressive story that is very valuable, the story will continue and will be rewritten and redesigned by these new proposals made by the new generation.

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Architecture

From Architectural Form to Urban Regeneration
Case Study - THE OFFICE, Cluj-Napoca – 2012-2017

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ABSTRACT
THE OFFICE ensemble recently finalized has begun as an urban regeneration project for the brownfield plot left by the old textile industry “Someșul”, near Cluj-Napoca’s historic center. As in most communist cities, this area became part of the industrial framework of Cluj-Napoca, which even now includes some leftover industries and factories.
The whole ensemble is made of 3 parts developed in successive stages, which form a small coherent city in the shape of a flat, cut-out massive, penetrated by gateway streets, which reinterpret the existing typology of the historic part of the city - that of public gangways. The ground floor offers a multitude of services, ranging from retail, coffee shops, restaurants to fitness spaces, public services and temporary exhibitions and at upper levels, class A offices.
The Office Cluj ensemble, at an urban scale, has evolved into a small “city within the city”, with its three main gateways that connect the interior courtyards and urban plaza, allowing both for a generosity in favor of the public space and an emphasis on semi-public and private spaces. The presence of works of art, public galleries, exhibitions, retail spaces etc. generate an urban attractor which plays a significant role in the process of regeneration of the entire former industrial area.
Another development started last year on the other side of the “Morii Channel” as a natural, organic growth, consequence of the first one, favorized by its overall form and by its main axis of pedestrian movement. In this way, another segment of the channel with its piers become public pedestrian space, a desired strategy by the municipality. A small pedestrian bridge will continue THE OFFICE gangways axis and connect its south area - the 22 December 1989 Boulevard - with the north one, up to Onisifor Ghibu street.
Sometimes an urban design strategy is followed by an architectural form which determines itself a second wave of urban regeneration.

Keywords: urban regeneration, gateway streets, city within the city, typology

I. INTRODUCTION - LOCATION
The Office Cluj, an office building ensemble finalized in 2017, has begun as an urban regeneration project for the brownfield plot left by an old textile industry near Cluj-Napoca’s historic center. As in most socialist cities, this area became part of the industrial framework of the city; it is situated on the northern part of the city which even now includes some leftover industries and factories. On the north of the site exists the old water channel, a small ramification of the Someș river; to the south there is the main boulevard, main connection to the historic city center, to the west (Fig. 1).

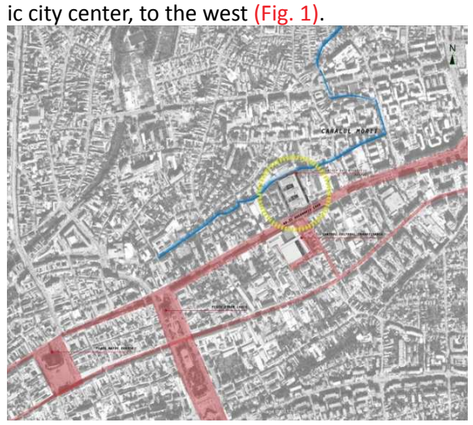

Fig. 1. Site plan THE OFFICE – Cluj-Napoca

II. STRATEGIC BRIEF
- the urban objective was a “city within a city” concept, which, instead of realizing “object”-type buildings, assembled on the basis of a composition rule, or creating a tall object in contrast with its surroundings, it was prefered the idea of an “urban tissue”, a horizontal “solid”, with a pedestrian path and two atriums that are cut out from this large built mass (Fig.2, Fig.3).
- considering in a creative way the spirit of the place, were preferred “successive gates” or “lively gates/gangways” - which reinterpret an existing typology found in the medieval historic center, with deep plots which gave birth to functional gangways followed by courtyards. These gates invite passers-by inside the public courtyards and connects the main entrance with the future pedestrian walkway along the water channel (Fig. 4, Fig. 5, Fig. 6).

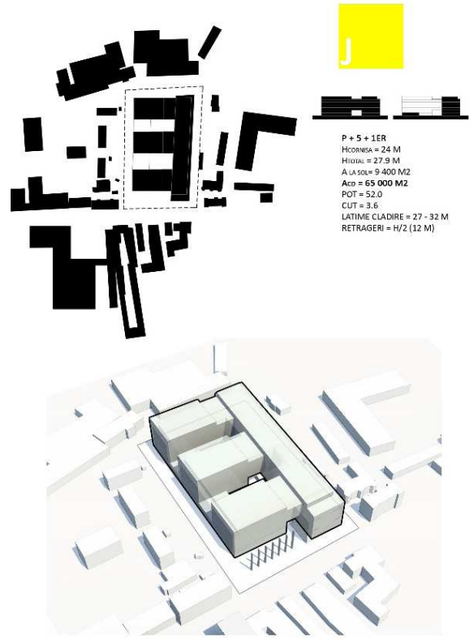

Fig. 2. The horizontal “solid” as urban tissue

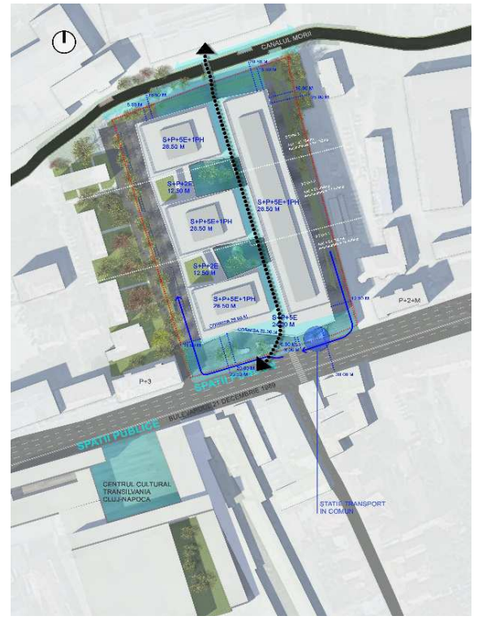

Fig. 3. Circulation arteries and atriums within the volume

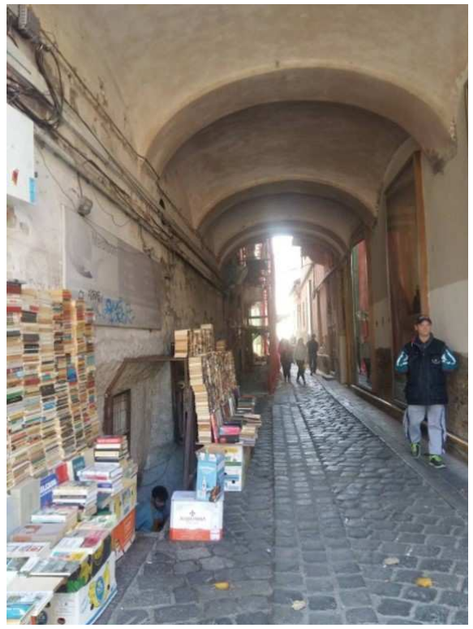

Fig. 4. Traditional gangway

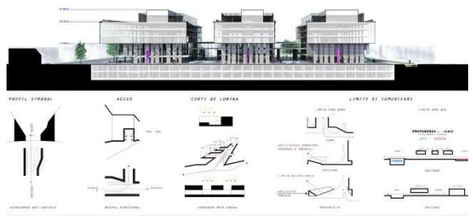

Fig. 5. Section through the main artery THE OFFICE

Fig. 6. Boulevard perspective of the entry in the gangway of THE OFFICE

- the functional brief is generated by the client'sobjectivs: "the corporate dream" as we named it, which is economic in nature and promotes favorable ratios for the whole rentable area. These demands are contained in the extensive design task given by the client. Another aim was the "green building" concept with its sustainability, efficiency and optimization goals for the BREEAM certificate (Fig. 7, Fig. 8).
- instead of a common and banal glass building language typical for office buildings, was preferred a complex pattern of simple and double glazing, integrating white artificial stone elements and corniches and dark grey columns; Cluj is a city where white and light-colored stone is predominant, in this way the ensemble dialogues by contrast and similarity with the context (Fig. 9, Fig. 10).
- there was also the hope of integrating the arts in the public spaces - an old theme, unfortunately most times forgotten. Recent exhibitions, like the SIGMA retrospective, together with a selection of artists from Cluj, have highlighted the ensemble's potential in this regard. The first gang-yard hosted for several months in 2014 "Casa înfrânghiată", a work by well-known artist Mircea Cantor (Fig. 11).

Fig. 7. Floor plan of the 2nd level THE OFFICE

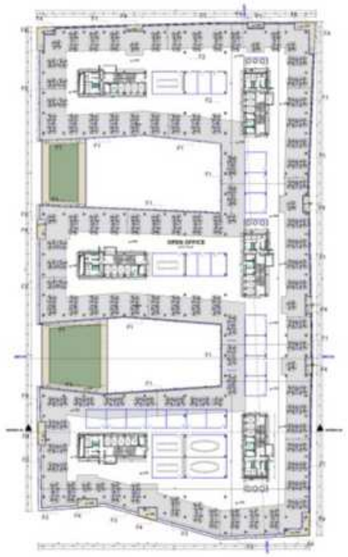

Fig. 8. Floor plans of the 3rd level THE OFFICE

Fig. 9. Materiality - stone and glass THE OFFICE

Fig. 10. Materiality - stone and glass THE OFFICE

Fig. 11. “Casa înfrânghiată”, Mircea Cantor, 2014

III. INTERVENTION IN THREE STAGES

The whole ensemble is made of 3 parts developed in successive stages which form a small coherent ensemble in the shape of a flat, cut out massive, penetrated by gateway streets, which reinterpret the existing typology of the historic part of the city, that of public gangways. The ground floor will offer a multitude of services, ranging from retail, coffee shops, restaurants to fitness spaces, public services and temporary exhibitions. The upper levels accommodate class A offices.

Being an office building, the mandatory conditions for natural light bring up an important topic – the outside skin of the building. The solution for this project was that of an “a-tectonic” architecture of the façade in which the skin covers up the internal structure in a stratified manner. The stratification becomes a dominant musical staff, and follows, with sincerity, the heights of each level, granting the whole ensemble a sense of scale. As in another project developed in Timisoara, City Business Centre, the presence of the loggias, enclosed in ceramic louvers, introduces a rhythmic theme on all sides of the ensemble together with screen printed and colored glass stripes.

The urbanity of this office complex is generated by the interpretation of the pedestrian route on the south/north axis, from the boulevard towards the channel, sequentially emphasized by the alternating 3 gateways and 2 atrium courtyards. Another generator is the public/open nature of the ground floor all along the entire perimeter and the two passages which connect the atriums to the west side. This comb-like solution offers a generous opening to the west side - where the lower parts of the building are - thus allowing a much better lighting from that direction (Fig. 12, Fig. 13).

Fig. 12. First atrium THE OFFICE

Fig. 13. Second atrium THE OFFICE

IV. CONCLUSION

Instead of a brownfield, the development offers public galleries and a plaza, semi-public spaces and courtyards, commerce and public services, temporary exhibitions and retail at the ground floor, and at the upper levels, class A offices.

The Office Cluj ensemble, at an urban scale, has evolved into a small “city within city”, penetrated by three main gateways that connect the interior courtyards and urban plaza, all this allowing both for a generosity in favor of the public space and an emphasis on semi-public and private spaces. The presence of works of art, public galleries, exhibitions, retail spaces etc. generate an urban attractor that already plays a significant role in the process of regeneration of the entire former industrial area. At a larger scale, in which the city of Cluj offers a specific silhouette from the surrounding hills, the ensemble is perceived as a relatively flat landscape unit, with a dominant horizontal stratification.

There is no tradition without innovation and in this case the traditional typology of public and semi-public space in the medieval city center was a lesson for this ensemble; its reinterpretation offered a path for a new development on the other side of the mill channel, starting a second wave of urban regeneration. Another segment of the channel with its piers become public pedestrian space, a desired strategy by the municipality, and a little pedestrian bridge will continue THE OFFICE gangways axis and connect its south area-the 22 December 1989 Boulevard- with the north one, up to Onisifor Ghibu street (Fig. 14, Fig. 15, Fig. 16).

Fig. 14. Future development on the north side of the “Morii Channel”

Fig. 15. Future development on the north side of the “Morii Channel”

Fig. 16. Site plan of the future development on the north side of the ”Morii Channel”

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Preservation and heritage

Diagnosis Methods applied to heraldic signs from ancient monuments

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ABSTRACT
In Cultural Heritage area the most critical technological areas are materials type, diagnostic systems, sensors and implants, building and structural consolidation of the structures, safety and security systems and digital technologies. For an efficient consolidation/restoration of different works of arts and artifacts is necessary to take into account the weathering phenomena. In this paper, an overview is given by the analytical approaches frequently used to resolve cultural heritage related issues. Some diagnosis procedures of stone surfaces from Corvins'Castle monument and the weathering stage of this historically important Romanian building will be discussed in this paper. Specific techniques as microscopy (optical microscopy - OM and scanning electron microscopy with Energy Dispersive Spectroscopy – SEM-EDS), FTIR and Raman spectroscopy methods have been used for weathering diagnosis, followed by some recommendations valuable for the subsequent consolidation procedures will be discussed in this paper, too. Also, for the first time in the literature, ion chromatography technique has been used to identify the anions present inside of the stone surface, and responsible for the degradation processes that occurred at this monument.

Keywords: diagnosis, conservation, restoration, investigations

I. INTRODUCTION

Corvins'Castle is a monument related to the royal descent of John Hunyadi (Corvin), the illegitimate son of Hungary's king, Sigismund of Luxembourg, and Elizabeth Margineanu from Hateg region. The king gives a golden ring to Elizabeth Margineanu, as a present for her unborn child, in order to be recognized by his true father in the royal court. After a time, the ring was stolen by a raven and John has recovers his ring by putting his hand on the bow. Several years after, when John comes at the royal court, the Hunyadi's blazon became the raven with a gold ring in his beak. Both, the family name and the name of the castle come from the Latine "Corvus" which means raven and represents wisdom and longevity.
The Corvinus Basin carries an inscription with a golden beak ring in the beak. Once in the palace, he bravely boasts in front of the king, and he is impressed, decides that the family symbol is the ring with a beak ring [1-5].
In this paper, some analytical techniques have been applied for some small samples detached from one of the blazons located on the right side of the chapel entrance from the castle.
The reason of our studies was to resolve cultural heritage related issues. Some diagnosis procedures of stone surfaces from Corvins'Castle monument and the weathering stage of this historically important Romanian building will be discussed in this paper, by using specific techniques as microscopy (optical microscopy - OM and scanning electron microscopy with Energy Dispersive Spectroscopy – SEM-EDS), FTIR and Raman spectroscopy method. Also, some recommendations necessary for the subsequent consolidation procedures will be discussed in this paper, too. For the first time in the literature, ion chromatography technique has been used in order to identify the anions present inside of the stone surface, and responsible for the degradation processes that occurred at this monument.

I.1. EXPERIMENTAL PART - Materials

The samples that supported the investigations have been prelevated from the exterior at the right side of the chapel entrance, built in the middle of the 15th century, Figure 1. Some very small pieces detached from the blazon have been collected and used in our experiments.

Fig. 1. The photo of the Corvins'Castle Blazon

I.2. Methods

Fourier transformed infrared spectroscopy (ATR-FTIR) has been coupled with a Vertex 80 spectrometer (Bruker Optik GMBH, Germania) in the range of 4000–400 cm−1, equipped with DRIFT accessory.
Raman spectra have been achieved with a portable dual wavelength Raman (Rigaku, USA) analyzer equipped with a standard diode-pumped, air-cooled Nd: YAG laser source (785 nm and 1064 nm) with 252 mW power laser and a resolution of 4 cm-1.
The optical microscopy was achieved with a Primo Star ZEISS microscope that allows investigating the samples at a magnification from 4X and 100X in transmitted light. A digital video camera (Axiocam 105) was attached to the equipment, and the microscope software, allowed real-time data acquisition. Through this software, the resulted images could easily be converted for a better viewing, from 2D in the 3D format.
The Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM-EDS) results were obtained by an SU-70 (Hitachi, Japan) microscope, used for characterization of micro- and nanomaterials qualitative and quantitative analysis of samples and composition of the structure for a sample surface, respectively.
Ion chromatography for anion levels was achieved by using with a Dionex ICS-1000 appa-

ratus and related calibrated standards. All anion levels are reported as mg/kg dry-weight of original soil. An amount of 3 g air-dried soil was combined with 30 mL de-ionized water and allowed to stand in an ultrasonic bath for 30 min, after which filtration was performed using 0.45-µm filters.

II. RESULTS AND DISCUSSIONS

II.1. Short history

The symbols, legends, and heraldry of the Hunyadi are found in Hunedoara Castle, founded mostly by Iancu de Hunedoara, a castle that was home to the Corvinesti family. The family started in 1409 by King Sigismund of Luxembourg, giving him some lands and the castle of Hunedoara as a recognition of the service to the kingdom. In the same year, the family also received the well-known coat of arms depicting the ring with a ring in the beak. With a diploma offered by the King Ladislaus V in 1453, this diploma symbolizes the bravery proven by Iancu de Hunedoara on the battlefield [6,7].

In the Castle there are many blazons, different localized, as some historical sources reported:

• on the tympanum of the portal of the spiral staircase built in 1453. The spiral staircase built in a tower leads upstairs to the “Diet’s Hall”, underneath it being the “Knights Hall”.

• on the courtyard logs of the Matia’s Loggia, the ring with the beak in the beak, standing on a crack, oriented to the right and painted in frescoes. The bird is rendered in the black color of the rabbit.

• The “Knights Hall” is another space for the representation of the Corvins blazon. On the vaults, the rag is depicted in two types of heraldic compositions. In the first of these, the shield contains the ringing ram with a ring sitting on a branch of leafless birch.

• Another remarkable representation is found on the tympanum of the portal of the chapel built in the middle of the 15th century, this coat of arms being presented as follows: shield having in its field the ram with a beak in the beak, with its wings open and standing on a crack; the bent shield on the right is stamped on the left with a medieval helmet with a left-handed visor depicted in the profile and provided in the cinder with a crown with five fleurs from which the raft leaves with the open wings holding a ring in the beak; from below the crown, with the lambskins that fall on both sides of the shield. Corpses are oriented to the right; near the crown, a crescent is represented in the dextra, and under it a star in six corners. The whole composition - in another shield, bigger, sitting straight.

II.2. Scientific investigations

For different ancient monuments, works of arts and artifacts, the material analysis techniques are used to resolve a wide variety of analytical problems, as follows: (a) weathering (or degradation) phenomena due to the pressures exerted by salts when crystallizing inside a porous substrates and chemical reactions at the surface of a CH object; (b) the protective treatments, with a long-term effectiveness on the weathering rate of consolidants or hydrophobic treatments applied on building stones; (c) characterization of the (micro-) environment that affects the objects (analysis of atmospheric particulate matter which is deposited on the objects); and archaeometry, for diagnosis and authentication of CH objects or studying correlations between archaeological finds [8,9].

The most proper analytical techniques proper for cultural heritage monuments are: ATR-FTIR as an imprint of the composition and weathering products; optical microscopy (at a magnification between 4X and 100X) and SEM-EDS results, used to quantify the decay mechanisms that attack historical building stones, and to appreciate which factors are relevant for their degradation structure for a sample surface, including the chemical analysis, to calculate the material loss or to evaluate the treatments applied to historic building stones, the composition of individual micrometer-sized particles deposited onto works [10,11].

The natural stones used for facades of the buildings support some degradation processes in time, due to the exposure to meteorological agents and atmospheric pollutants. Air pollution caused black soiling that results in the darkening of exposed surfaces, due to attack by atmospheric sulfur in various forms [12]. The calcareous stone, as it is predominantly in Hunedoara

area [13], are among those at high risk, which may suffer the direct action of winds, sunlight, and rain, and can be extremely damaging, mostly due to salt crystallization. The soluble salts are usually effervesce at the surface and can be removed, while the insoluble salts stay either on or underneath the surface [14]. Damage may occur by the accumulation of the soluble salts that penetrate the stone and thus cannot be washed away. The patina consists mainly on both monohydrated whewellite and dehydrated weddellite forms of calcium oxalate [15], chemically pure, although impurities are found in the crust during their formation. Although calcium oxalate is colorless, the patina can have a dark brown color when organic fragments (mainly lichen), and inorganic fragments (quartz, feldspar and other minerals) are present. Calcium oxalate formed naturally on calcareous stone can penetrate deeply along microfractures or into intergranular zones.

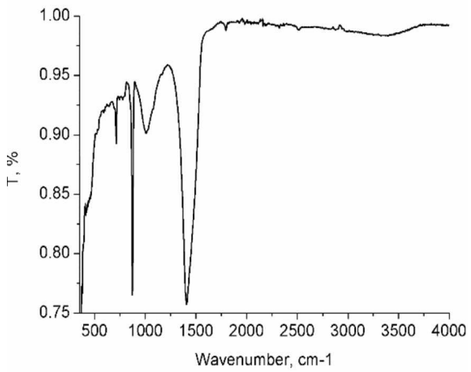


Fig. 2. FTIR spectrum of the sample

Raman spectroscopy evidenced the presence of characteristic minerals, especially haematite α-Fe2O3, which confers a dark shade on the sample material. The Raman spectrum of hematite (α-Fe2O3) is here identified at 660 cm-1, being different for different mineralogical composition [19]. The intense band at 674 cm-1 is given by the colored iron-rich silicates. In the range, 513–514 cm-1, and 450–500 cm-1 region, the bands specific to alkali feldspar spectra, could be observed, Figure 3.

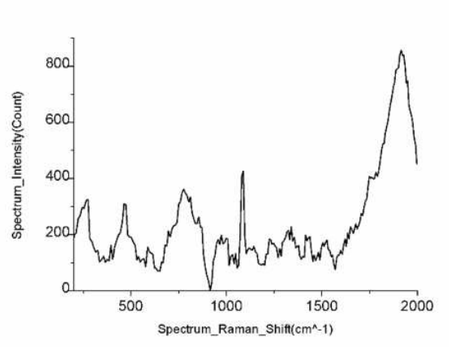


Fig. 3. Raman spectrum of the sample

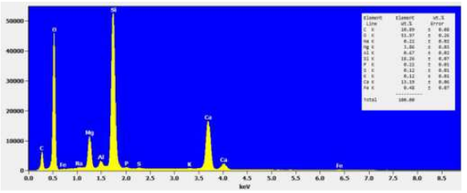


Fig. 4. EDS composition of the blazon

Based on the partial results obtained, we assume that the masonry is made of carbonate stone, the plaster applied on the wall of the house is mostly of lime with the most likely binders of different nature (glue, clay, sand, etc.).

The presence of gypsum is major diminished in all the subsequent layers, and as other mortar layers have been applied over time, new elements specific to building materials that have emerged over time [16].

EDS results (Fig.4) have shown that with the exception of the layers, where are predominant lime and gypsum, in all the other layers, C (40-60 %), O (20-25 %), Si (10 %) are the major constituents of the sample, but also have been recorded elements as: Ca (13.96%), Mg (3.86 %), S(0.12%), P (0.22%).

The FTIR spectral data of the MIR-region of the stucco’s layers samples show only little variation and generally a high absorbance (strong signal) at wavenumbers between 500 and 1500 cm-1. This region of the spectrum is characteristic for CO bonds, such as those originating from carbonates or carboxyl-groups. The richest sulfate layers show the most intense band of 1700-

1600 cm-1, and an increase of this band can be observed for the most degraded surfaces. Practically, calcium sulfate shows more intense bands for the most damaged, a sign that the degradation took time over each layer of plaster without cleaning the previous one, Figure 2. Within the recorded spectra of the samples, a weak absorbance centered on 3600-3700 cm-1 can be attributed to hydroxyl vibrations.

It can be concluded that the chemical composition of the blazon surface is quite similar (hydroxyl, carbonyl, and SiO4 groups) [17].

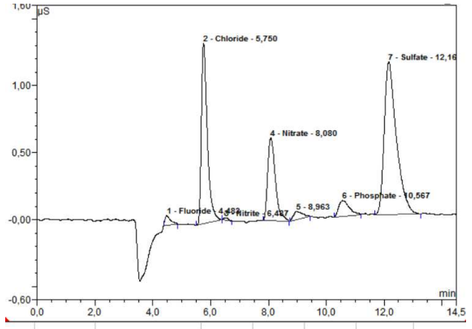
The raw materials consist in clays with small size quartz (sand) particles of 0.02–0.04 mm and feldspar that influence the rheology during thermal processing. Clay minerals like kaolinite ($Al2[Si2O5][OH]4$) formed either by the weathering of igneous rocks under the water influence, dissolved carbon dioxide, and organic acids, or from feldspar ($KAlSi3O8$), which are aluminosilicates that contain sodium (Na), potassium (K), or calcium (Ca) with a composition from $NaAlSi3O8$ and $KAlSi3O8$ to $CaAl2Si2O8$. Feldspar is a fluxing agent that decreases the melting temperatures of the aluminosilicate phases where they are subsequently transformed into clay [18]. Except for feldspar, silica is the second major ingredient, usually added as quartz sand, sandstone, or flint pebbles, which maintains the shape during firing (as filler) or improves the final mechanical properties [6].

The electron microscopy study indicates anorthite $CaAl2Si2O8$, a feldspar mineral, as the main phase, although it was very difficult to verify this point. Anorthite grains contain potassium in significant quantity, confirming in this way its lamellar crystallites cluster structure [19]. Also, could be presumed that some phosphate species could be formed here (apatite derivatives) with a long stability, the obtained results by ion-chromatography being a proof under this context, Fig.5.

Recommendations: For a proper and longer conservative preservation of any artifacts or works of art from an ancient monument is absolutely necessary to obey the following rules;

1. To investigate the structural, compositional and morphological characteristics of them;
2. To evaluate the soil and water composition from the immediate vicinity of the monument;
3. To evaluate the possible pigments present there;
4. To evaluate the previous restoration works and the materials used;
5. To observe the compatibility between the ancient and new materials used for restoration.

Fig. 4. SEM image of the stone identified in the blazon



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Amount mg/l	Type
1	4,48	Fluoride	0,070	0,016	1,43	0,051	BMB*
2	5,75	Chloride	1,346	0,319	27,76	1,286	BMB*
3	6,49	Nitrite	0,015	0,003	0,26	0,019	BMB*
4	8,08	Nitrate	0,615	0,189	16,45	1,579	BMBA
5	8,96	n.a.	0,064	0,023	1,97	n.a.	BMB*
6	10,57	Phosphate	0,115	0,048	4,19	0,720	BMB
7	12,16	Sulfate	1,140	0,552	47,95	3,118	BMB
Total:			3,366	1,151	100,00	6,773	

Fig. 5. The ion-chromatogram of the sample prelevated from the blazon

III. CONCLUSIONS

The archaeometric study of blazon from the Chapel Entrance of the Corvins' Castle, is presented in this paper; raw materials provenance is essential for collecting data about the exploitation of natural resources and to better understand the manufacturing and processes such as weathering and deterioration of these artifacts. Modern and performance analytical techniques, as FTIR, SEM-EDS and Raman investigations, and ion-chromatography are used and the results are discussed too.

ACKNOWLEDGMENTS

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Assessment methodology for historic timber roof structures

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ABSTRACT

Historic timber roof structures are complex systems with a close connection to the building they belong to and to their context. The shape of the roof, the importance of the building in the surrounding area, urban planning principles from the period in which the building was built, architectural and structural features and ultimately the knowledge of the craftsman, all influence the choice of structural type and the complexity of the structure.

However, recent assessment methodologies developed for historic timber roof structures evaluate them strictly from a structural point of view, by taking only their state of conservation and structural behavior into consideration, without evaluating also the link between the structure and all surrounding elements.

Therefore, based on historic roof structures from Timisoara, the study aims to provide a more complex assessment methodology which can be used to evaluate roof structures from a multidisciplinary point of view.

Keywords: assessment methodology, heritage timber structures, roof structures, multidisciplinary assessment

I. INTRODUCTION

In recent years, various studies on roof structures have been carried out in different cities across Europe to better understand historic roof structures [1–3]. The primary objective of the studies was to find a way to understand them and ultimately preserve them. In the same time, assessment guidelines have been developed in order to simplify the assessment of historic roof structures [4,5], which highlight criteria that have to be considered in order to adequately assess them.

II. CRITERIONS FOR ROOF STRUCTURE ASSESSMENT METHOLOGYS

The study of historic timber structures from Timisoara, has shown that roof structures have a significant value that is not always associated with their structural features. The position of the building in the city [6], the architectural value of the building, the link between the roof and its context [7] and complex details and proportions [8,9] can influence the features and ultimately the value of a roof structure. In the same time the influence of the roof structure on the behavior of the building during seismic events [10,11] and the state of conservation of the timber elements composing the roof structure, should also be considered (Fig. 1). Therefore, a complex assessment procedure for timber roof structures has been developed, which takes all these factors into account.

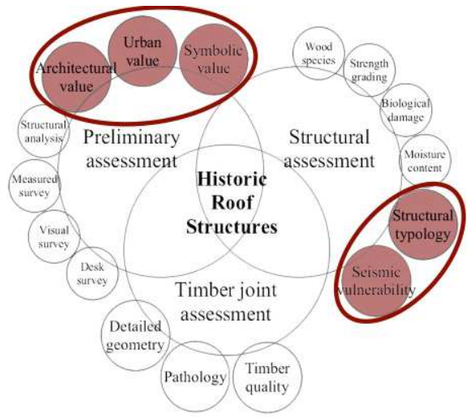

Fig. 1. Proposed assessment methodology features (after [7])

II.1. Urban planning principles

The evolution of urban planning principles in time led to different relations between the building and surrounding urban space. In Timisoara, in the historic part of the city, buildings are placed on a rectangular grid of narrow streets which makes the perception of roofs almost impossible.

Still, in the main squares of the historic city, roof have a more important role. At the beginning of the 20th century, after the old fortress was destroyed, urban planning principles strongly influenced the architecture of the new buildings. In this period, roofs have a significant height and are meant to highlight the building and increase its monumentality (Fig. 2) which is ultimately raising importance of the roof in defining urban space [6]. These roofs create a strong link between the building and the street, highlighting the fact that urban planning principles were of great importance in the shaping of roofs and roof structures.

Fig. 2. Roof structure with a significant role in defining the urban context

II.2. Architectural principles

Architectural principles, styles and functional features also play a significant role in defining the shape of the roof and the relation between the building and the roof. Complex shapes of the building or additional special needs like introducing natural lighting in the attic can lead to changes of the roof structure (Fig. 3). In the same time, imposing roof structures were used for buildings which should have a monumental appearance, highlighting the importance of the building and making it look more imposing.

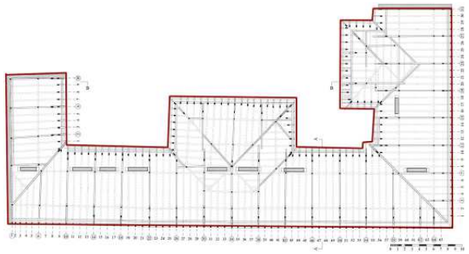

Fig. 3. Complex roof structure influenced by the geometry of the building

II.3. Symbolic elements

Harmonic ratios play a significant role in defining architecture and the surrounding space of buildings. According to assessed case studies in Timisoara [8,9] harmonic principles were used to define the height of the roof in relation to the height of the building as well as the position of main structural joints.

The studies also show that the used ratios change in time from complex ones, mainly golden ratios, used in the 18th century, to dynamic ones (√2, √3 and √5) in the 19th century and ultimately to static ones (1/1, 1/2, 2/3, …) and mix of ratios in the 20th century (Fig. 4).

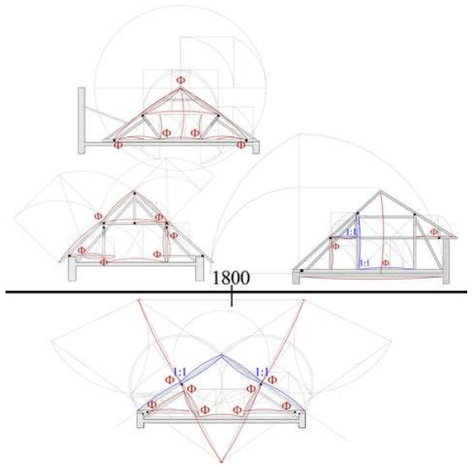

Fig. 4. Harmonic ratios analysis of 18th an beginning of 19th century roof structures

II.4. Structural principles

The structural features of roof structures can be linked on one side to the evolution of the urban planning and architectural features which imposed certain shapes of the roof but also to the continuous search to develop more efficient structures (both technical and economical), suitable to cover buildings and protect them from environmental factors.

Starting with the tent-like roofs, roof structures got in time more and more complex, being able to cover larger spans, gaining significant height during the gothic period and becoming more structurally-efficient towards the 20th century. Since the architectural styles of the beginning of the 20th century imposed monumental roofs, complex new structural types were developed, composed of a mix of previous styles (Fig. 5).

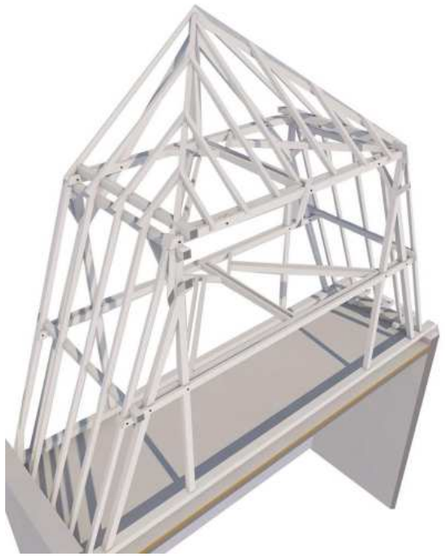

Fig. 5. Complex roof structure made of multiple typologies

II.5. Influence on the seismic behavior of masonry structures

During the study, finite element simulations were performed, using SCIA Engineer, on a 18th century building from the city center of Timisoara with and without roof structure in order to better understand the influence of the roof structure on the behavior of the masonry building during seismic events [10,11]. The performed simulations supposed placing 3 different types of roof structures (form the 18th, 19th and 20th century) on the masonry building. Connected subsequently hinged, rigid or sliding to the masonry walls, the simulations showed that the presence of the 18th century roof structure can reduce to top horizontal displacement with up to 40%, while 19th century ones reduce it with 30% and 20th century roof structure with up to 20%.

In the same time, it was observed that the roof structure not only influences the top horizontal behavior of the masonry building, but also changes the displacement of every floor (Fig. 6) and reduces the damage level of the masonry structure after the seismic event.

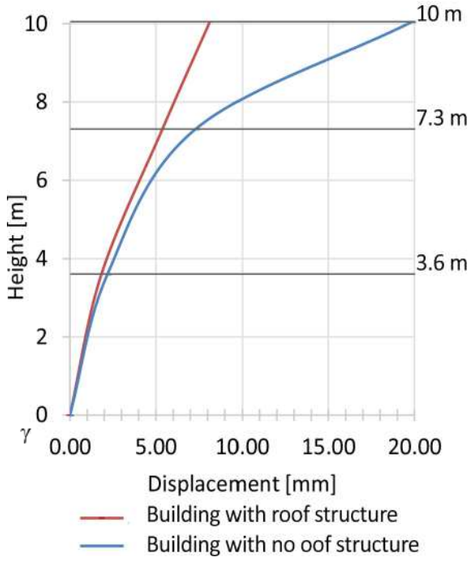

Fig. 6. Horizontal displacement of a 18th century building during seismic events with and without roof structure

II.6. Climate change

Changing climatic factors are significantly influencing the state of conservation of roof envelopes and timber structures.

High wind velocities (Fig. 7) and hail stones are some of the most serious threats for the exterior appearance of roofs, being able to cause extensive damage to the roof coverings and even the entire roof structures [12,13]. These exterior climatic threats affect the aesthetic and historical value of historic structures.

Humidity on the other hand is a threat for the timber elements of the roof structures, influencing the mechanical properties of the timber and the state of conservation of the entire structure.

Fig. 7. Roof structure damaged by wind ([14])

III. THE PROCEDURE

Starting from the identified features influencing historic roof structures an assessment procedure was developed. It was divided into 5 assessment levels: “Urban value of roof structures”, “Architectural value of roof structures”, “Symbolic value of roof structures”, “Structural value of roof structures” and “State of conservation of roof structures” (Table 1).

Table 1. Assessed criteria of the assessment methodology

I. Urban value **(25%)**	1. Value of the urban area
	2. Urban analysis
	3. Geometry
II. Architectural value **(25%)**	4. Historic analysis of the building
	5. Building analysis
	6. Functional analysis
	7. Aesthetic analysis
	8. Geometry of the roof structure
	9.Exterior appearance
III. Symbolic value **(15%)**	10. Ratio between the roof and the building
	11. Ratio between structural elements
	12. Symbolic aesthetics
IV. Structural value **(35%)**	13. Roof structure
	14.Structural elements
	15. Joint typology
V. Value reduction **(-15%)**	16. Decay visible from the outside
	17. Decay of the roof structure

Each level was subsequently divided into a tree of key features and a list of possible answers for each level provided, based on the observation made during the study. In order to simplify the procedure, for each answer a certain score was assigned, which automatically increases the objectivity of the evaluation [2].
By using this procedure, it is possible to assess the roof structure as a whole, based on a visual inspection of the structure, the building, its urban surrounding and a historical analysis of the context in which the building was built and how it evolved in time.

IV. RESULTS

After completing the form and choosing all the answers to every assessed feature, the procedure offers information about:

• The main valuable feature of the roof and roof structure; whether the roof plays part in shaping the urban context, if it is rather influenced by architectural principles, if the symbolic elements are predominant or if it is a complex structure (Fig. 8).

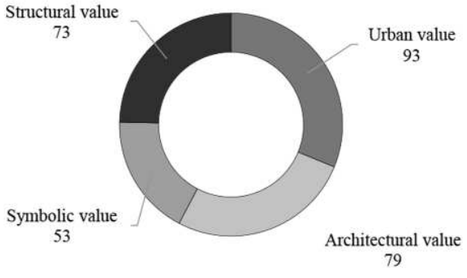

Fig. 8. Predominant value chart of a roof structure (example)

• The ideal value of the roof structure by making a weighted sum of all the main assessed criterions, without taking the decay into consideration, or any other vulnerability:
$V_{ideal}=0.25*V_{Urban}+0.25*V_{Architectural}+0.15*V_{Symbolic}+0.35*V_{Structural}$
• The real value of the roof structure is considering the ideal value of the roof structure, but this time is subtracting 15% of the obtained "value reducing factors" score.
• The vulnerability of the roof structure which considers the ideal value of the roof structure and is subtracting the decay and the seismic and climate change vulnerability (see Fig. 9).
$V_{Vulnerability}=0.65*V_{ideal}+0.20*D_{Decay}+0.10*S_{Seism}+0.05*C_{Climate}$

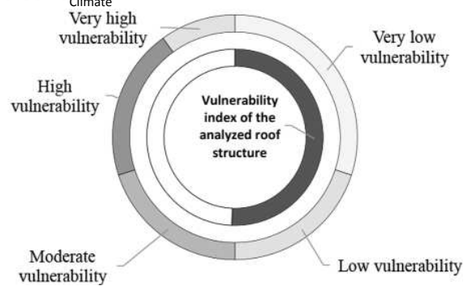

Fig. 9. Vulnerability chart of a roof structure (example)

V. CONCLUSIONS

The study presents an attempt to develop a complex assessment procedure useful to assess historic roof structures from a multidisciplinary point of view based on a preliminary visual survey.
Because the methodology was developed like a form, offering a clear overview of evaluated features and a list of possible answers it represents a fast and easy way to evaluate roof structures from various points of view, starting from their context down to every valuable detail.
Still despite its efficiency, the methodology is a tool useful for a general assessment for roof structures and a guide to prioritize future interventions and should not be considered a tool to evaluate the historic timber structure.

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Scenographic acupuncture in restoration

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ABSTRACT

The paper aims to introduce a new concept in restoration, an intervention strategy on destructured sites, after a substantial research, this theoretical model of strategy being successfully implemented and serves as a final goal for the revitalization of the sites and restoration of some monuments.
This new model created uses an organic network and has its origins in acupuncture, a concept that is found in Chinese medicine and urban acupuncture, an architectural term, as well as in scenography, an artistic concept, using the route, atmosphere and elements of the perception psychology, taking into account the genius loci.
The concept can be implemented both at macro level, on destructured sites and at micro level inside buildings.
The scenographic acupuncture uses an organic network of points (land, buildings, spaces, architectural elements, etc.) requiring interventions and a regulatory route that links these points, both vertical and horizontal, materialized by means of architectural elements. It allows a phased strategy, at landscape level and an unconditional choice of intervention points according to priorities and budget.
The introduction of this regulatory route will fix the fundamental geometry of the work and give it the rhythm quality, while the use of scenography will contribute to the provision of an atmosphere using contemporary technologies and techniques (light, sound, color, etc.) as well as human senses (visual, olfactory , auditory, tactile, etc.).
For the implementation of the concept and in order to test its truthfulness, I will apply the model on two destructured sites. I will present the implementation of this through an intervention in an industrial site of the XIX-th century: The Govăjdia Furnace and an intervention in a tactical site: The Franciscan Monastery of Arad Fortress.

Keywords: scenographic acupuncture, destructured sites, scenography, atmosphere, route, restoration

I. INTRODUCTION

The intervention consists in introducing a holistic concept, which is based on a substantial research study, ultimately leading to its applicability, to a unitary intervention with well-reasoned choices. This research is based both on studies under the bachelor project and on studies conducted within the dissertation, studies conducted at the Faculty of Architecture and Urbanism of the Polytechnic University from Timisoara.
The approach to the project sets out the parameters that lay the foundation for this work. Thus, the complexity and the problem of destructured sites make single and punctual intervention in such sites insufficient, requiring more interventions, in several points and a holistic strategy at the whole site.
Taking into account the strategy which involves organization, I used the network as a first contact between the site and the intervention, this form of organization being often found in architecture theory, in various ways and meanings. Because network theories reveal only parts of a principle, making them inapplicable, I decided to go further with studying another organizational strategy, an organic network, namely urban acupuncture.
This concept is derived from a reflexo-therapeutic method used in Chinese medicine, which is based on human scale interventions spread around the city's neuralgic points aiming to revitalize a wider area that surrounds each point where interventions have been made. I have come to this theory from the desire to intervene in several points and to restore or create certain links within the destructured site, having a coherent and unitary approach that reactivates this site.
Since urban acupuncture, as it is deduced from the name itself, is applied to an urban context, and in this case it is dealing with some destroyed sites of smaller scale, this concept cannot be taken as such, and consequently I have continued the studies with other concepts. I have examined some types of routes using them as link between the intervention points.
Choosing a regulatory route sets the fundamental geometry of the work and gives it the quality of rhythm. From the desire to introduce an atmosphere that attracts people's will to follow this route, I have continued to study scenography, which includes all the elements, which contribute to providing an atmosphere and a theatrical presentation divided into acts. Contemporaneous scenography, therefore, can be seen as working with simulation, interactivity and introduction to atmosphere, in order to enhance the interest of the recipient (public, user), being found in architecture as well.
In an abandoned building, the concept is applied by introducing a scenic route inside the building using spaces to create the atmosphere, in this context we refer to certain emotions and feelings created by senses (visual, olfactory, auditory, tactile, etc.). This is about genius loci, which represents the spirit of the place, characteristic applicable to each building, and the approach of intervention must consider the time patina, highlighting certain stages of building evolution in time.

II. ACUPUNCTURE AND URBAN ACUPUNCTURE

The concept of acupuncture is derived from Chinese medicine (between 4000 and 3000 BC), the origin being a form of therapy, being the method based on an alternative, complementary one, and consists of stimulating nerve centers by the insertion of needles into skin. Points are not chosen at random, as they are part of a complex energy network, consisting of meridians, lines and points where each element is responsible for a particular condition that can be improved or healed. [1]
Urban acupuncture is an organic network that presents a new theory, put forth as a concept, in 1999, for the first time by Manuel of Sola Morales, an architect of Spanish origin [2], in a paper called "Progettare la citta" , thus being a topographical (landscape) civic intervention, firmly limited and therefore achievable, which is inserted into urban fabric so as to fulfill the dual role of solving certain dysfunctions and discontinuities in its current form , and at the same time to stimulate the growth of similar activities.
This procedure was taken over by the Finnish architect Marco Casagrande [3], who developed it and tinted it later.
The theory of Manuel de la Sola Morales takes

over from the medical field the meaning of the term acupuncture which was put into practice in urban framework. Considering the city as a living organism with painful nerve centers stimulated by acupuncture for healing, so stimulating certain points in the poor areas of the city through urban acupuncture, those areas heal and invigorate by small but effective projects.

III. SCENOGRAPHIC ACUPUNCTURE

This new concept and model is based on an organic network and has its origins in acupuncture (concept of Chinese medicine) and urban acupuncture (a term used in architecture). Taking into consideration that this is about some sites, I have only kept the acupuncture terminology, introducing here the term of route and thematic. By including scenography in the landscape, and using emotions and senses, atmosphere is created.

The term arises from the need to design a theoretical model for interventions in degraded sites and non-functional buildings. Following a substantial research, this theoretical strategy model can be successfully implemented and serves as a final goal for revitalizing sites and restoring monuments. [4]

The implementation of the macro model will be done with the help of the organic network and, respectively, of the intervention points, ie acupuncture, through interventions that materialize at key points. These intervention points can either be abandoned, recycled buildings, new interventions on buildings, or various elements of the site, or new ones created.

The links between the points of intervention can be both vertical and horizontal, materialized with the help of architectural elements.

Points of interest will be set along the route to awaken the visitors' desire to visit and create links between buildings as well as between other elements of the site.

Implementation of the micro-model inside buildings will be done by route and theme. Scenography of the proposed route comprises the scenic motion transposed into several acts, which can also include intersecting secondary trails.

Both the inner and outer routes can be controlled in some directions or left blank depending on the designer's wish, ie the architect. Introducing a regulatory path will set the fundamental geometry of the work and give it the rhythm quality.

A very important element in the interior is the emotion and atmosphere of the spaces. It is introduced the term scenography, including all the elements that contribute to generating an atmosphere and a state for a theatrical presentation divided into acts, which awakens people's desire to get through.

Thus, using contemporary technologies and techniques (light, sound, color, etc.) and human senses (visual, olfactory, auditory, tactile, etc.), it can be generated different atmospheres in spaces, awakening in the visitor various emotions and desires. [4]

The implementation of the scenographic acupuncture was carried out into two projects, an intervention in an industrial site from the 19th century: The Govajdia furnace and an intervention in a tactical site: The Franciscan Monastery of Arad Fortress.

IV. THE IMPLEMENTATION OF SCENOGRAPHIC ACUPUNCTURE ON TWO CASE OF STUDIES

IV.1. Govăjdia furnace – intervention into an industrial site from XIX century

The project follows the restoration and reconversion of the Govăjdia furnace, which is found in Ghelari village, Hunedoara County into a land called Ținutul Pădurenilor. The landscape is filled with history and tradition, with a special industrial and cultural heritage, closely related to iron processing. The industrial site, which we are going to rehabilitate, is a building assembly and ruins from XIX century spread on two land plots located at different levels. [5]

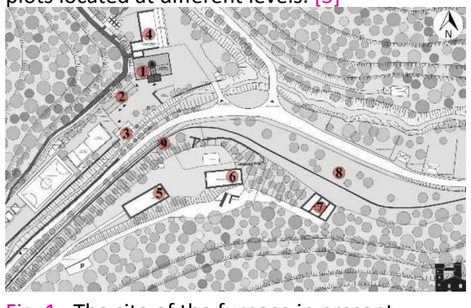

Fig. 1. The site of the furnace in present

The furnace site is a void and unused space separated by the county road 687F into two subdivisions called north parcel and south parcel, which currently don't communicate with each other. [5]

Fig. 2. The furnace in present - exterior and interior view (2016)

The most important building of the site is the furnace itself, which through its traces in time, reveals the memory and history of the place, while giving us, together with the other buildings a complete visual reading of this place. From landscape's point of view, the project requires the regeneration of a destructured territory tissue, applying the theory of acupuncture and using the network as a form and instrument for implementation in the industrial site. [5]

By applying the concept of acupuncture on the industrial site of Govăjdia furnace, the connection between the two sites by creating a bridge and also the link between the buildings and the site ruins are restored. The architectural solution chosen for the project is to form a network tool between the existing buildings, the archaeological sites and the buildings proposed for rehabilitation, so as to be materialized into key points and to be added to the main piece, the building of furnace. [5]

Fig. 3. The proposed project of the furnace – plan of the intervention in the site

Therefore, it is proposed to introduce a scenography in the site landscape, a "blacksmith park" defined by preserving and emphasizing the presence of the furnace, its physical and visual incorporation into the new image of the industrial site, which will contain five buildings, two archaeological sites, a ruin of the unloading bunker, and some contemporary connecting elements linked by a device type route, "a memory of iron processing".[5]

Inside the Furnace, the main theme is the "furnace discovery", therefore I thought of creating a complex scenic route based on the sensory experiences of the visitors, with the possibility to come in direct but subtle contact with the furnace and the elements that describe it. [5]

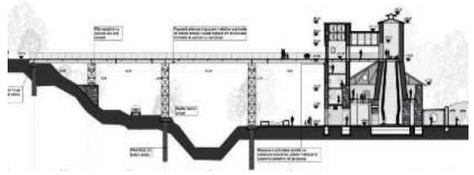

Fig. 4. The proposed project of the furnace – section intervention in site

The furnace building is based on a more conservative way of restoration, on operations that are closer to the traditional restoration concepts. This proposal aims to make a temporal incursion, thus using conservation, restoration, rehabilitation, refunctioning operations to improve the shape of the furnace building and the entire industrial site. The purpose of this project is to preserve and recover the Furnace, thus reinterpreting the existing values, by saving the community symbol and shaping the prerequisites to restore the public access to a recovered space. [5]

The proposed project succeeds with the thematic and acupuncture concepts, the network and the introduction of landscaping to restore the links between the site's buildings. A route called "a memory of iron processing" is formed in the landscape of the site that becomes a "blacksmith park". [5]

The conservation, restoration, refunctioning solutions for improving the site and the furnace building show the visual image and reinvigorate the spirit of the place.

IV.2. The Franciscan Monastery of Arad Fortress - intervention in a tactical site

The project aims at restoring Arad Fortress, which is a bastion fortress built as a Vauban military fortress to secure Habsburg domination in Transylvania, Banat and other territories at the order of Empress Maria Theresa of Austria (1740-1780). [4]

The fortress was built around the Franciscan church and began to materialize in 1763, and completed twenty years later in 1783. The bastion fortress is double star-shaped with six corners irregularly disposed in sharp angles.

Inside the fortress, there are three buildings, adjacent to the Assembly Plateau (Apelplatz), in the center of the structure: the Command Building, the Guard Building and the Monastery including the Franciscan Church (18th century). [4]

During the two years of study, within the Master of Restoration and Patrimony Regeneration, studies and a strategy project for the whole area of the Fortress were carried out. [4]

From the multitude of points in which one can intervene, three representative intervention points for three architectural concepts have been chosen (Franciscan Monastery - traditional restoration, Bastion - reoperation and recycling - space recovery, Amphitheater – re-information and re-programming - new insertion) in three important areas of the Fortress. [4]

By applying the concept in the tactical site of Arad Fortress at the macro level, the relations between the four chosen points of the Citadel (Bastion, Amphitheater, Weapon Square and Franciscan Monastery) were restored, while at the micro level within the Franciscan Monastery, the connections between the existing spaces have been reconstructed. [4]

Fig. 5. Franciscan Monastery of Arad Fortress – section areas

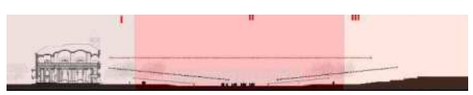

Fig. 6. Intervention areas within Masterplan- section of areas (I. Franciscan Monastery, II. Market, III. Amphitheater)

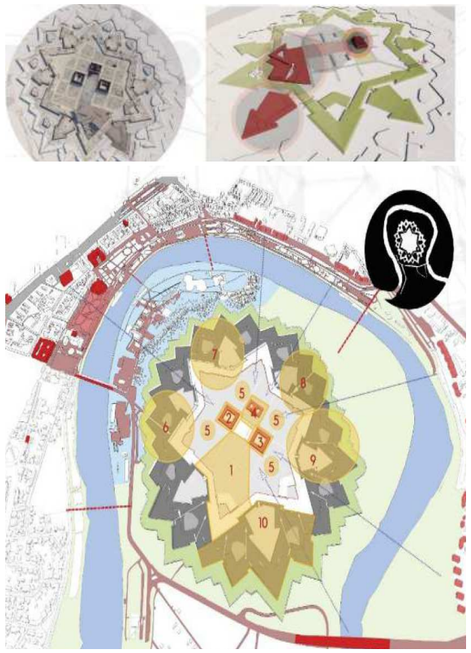

Fig. 7. Franciscan Monastery of Arad Fortress - intervention in a tactical site, Intervention areas within Masterplan- (4. Franciscan Monastery, Market, 1. Amphitheater, 10. Bastion)

The intervention proposal for the Franciscan Monastery involves a step-by-step strategy, based on scenographic acupuncture, and the introduction of a museum route. It is envisaged the restoration, rehabilitation, consolidation, reoperation of the whole structure of the Franciscan Monastery, having a conservative approach, closer to the traditional concepts. [4]

Regarding the architectural concept, I introduced a scenography inside the Monastery Assembly, being helped by the existing interior spaces, belvedere points and thus introducing a museum route that would reveal to us the world of Vauban fortresses and military techniques and strategies. The concept creates an atmosphere generated by spaces and textures, so I have chosen to treat the inner yard from the right wing in relation to the inner spaces, keeping the vegetation in the yard, generating an atmosphere of “green oasis” and marking a stage in the history of the building assembly. [4]

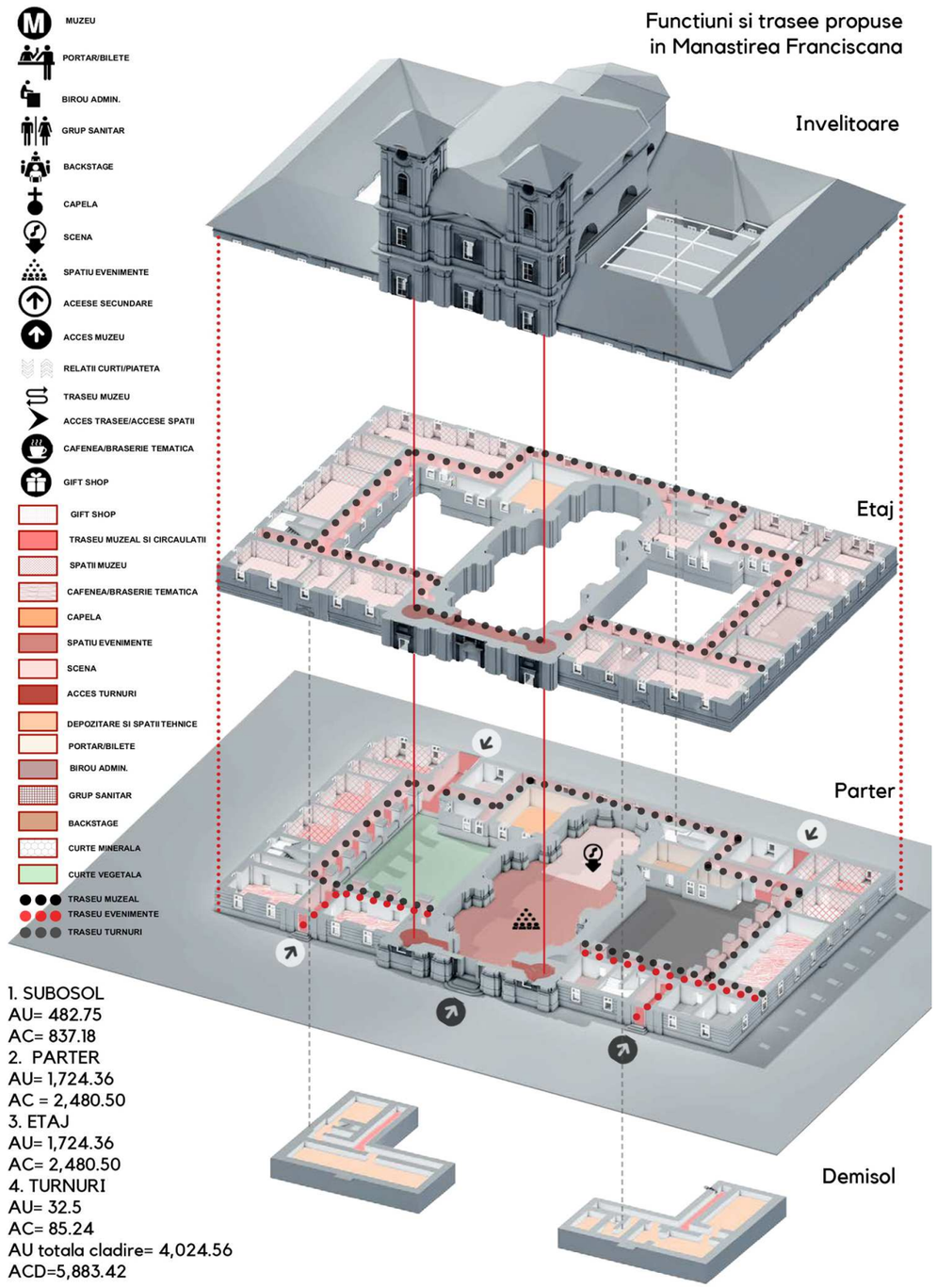

Fig. 8. Franciscan Monastery of Arad Fortress - intervention in the assembly.

V. CONCLUSIONS

The main purpose of the scientific work is to design a solid theoretical support, intervention, in destructured sites for the revitalization of some sites and the restoration of some monuments. This transition, from the site to the implementation strategy, is a complex initiation process and creates a strong link between the concept, the genius loci and the architect.

Scenographic acupuncture, through the use of an organic network and key points, allows for a stepped landscape strategy and the unconditional choice of intervention points according to priorities and budget.

For the implementation of the new concept created and the desire to test its truthfulness, I use both the Master's diploma project, a long-treated subject during the two years of master. - Intervention into a tactical site: Franciscan Monastery from Arad Fortress, as well as the graduation thesis - Intervention into an industrial site of the XIX-th century: Govăjdia furnace. In both sites, it can be seen that the application of the concept of scenographic acupuncture in the restoration allows the choice of some key points of intervention, the choice being according to desire and budget. The step-by-step strategy allows the concept to be implemented over a certain period of time and is suited to solving the problem of communities with diverse budgets.

In scenographic acupuncture, the architect becomes a scenographer, creating his own scenario and having the full scope to decide how free the trails are, what directions to explore, what links they create, what senses it arises, what atmosphere it generates and what emotions it highlights.

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Seismic vulnerability assessment for historical building as isolate/ in aggregate for Timisoara city, Romania

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ABSTRACT

Timisoara is one of the biggest cities of Romania, located in the western part of the country, in Banat seismic area, which is the second most important seismic zone in Romania, characterized by shallow earthquakes with small focal depths. The city has a lot of historical buildings, in Secession, Art Nouveau and Baroque architectural styles, which are mostly located in the three main historical zones, namely Cetate, Iosefin and Fabric.

Several studies had shown the fact that a building which is part of an aggregate has a different structural seismic behavior that when it is considered isolated. Considering the fact that Timisoara has a specific building pattern for historical buildings, which include mostly aggregates, it is important to highlight the differences that might occur in the seismic vulnerability of each building and of the entire aggregate.

Timisoara was selected to be European Capital of Culture for year 2021, which can be translated in many visitors and events that will be organized mostly in main attractive area of the city, which are exactly the historical ones. That is the reason why is very important to have a quick and simplified methodology for assessing the seismic vulnerability of the historical buildings and to understand the way that buildings in aggregate can interfere.

This paper present a study made on a specific historical aggregate located in Fabric historical area, where the seismic vulnerability was determined based on Vulnerability Index Method, both for first 10 parameters (isolated building) and 15 parameters (in aggregate).

Keywords: vulnerability, earthquake, aggregate, history, culture

I. INTRODUCTION

Heritage represents the base of authenticity for each community, making the link between old and new.

Most of the historic building that are present in Romania are exposed to several damaging factors, such as earthquakes [1], extreme winds [2], climate changes [3] and lack of proper maintenance. Most of the decay that appear to be insignificant at first can lead in time to structural problems and even partially or globally collapse. The acknowledgment is the base of each intervention, so assessing the actual level of vulnerability is very important in order to be able to propose a proper restoration project.

II. CASE STUDY SITE. SEISMICITY AND URBAN ANALYSIS

The case study site is located in Timisoara, Romania, in the biggest city of Banat seismic region, which is the second most important seismic area of Romania [4].

Banat area is characterized by shallow earthquakes of crustal type, with small focal depths and a peak ground acceleration of 0.2g [5]. The type of failure in the epicenter specific to Banat seismic area can be seen in Fig. 1 [6], during the earthquake that happened in Banloc region, nearby Timisoara city.

Fig. 1. Damages in the epicenter

Considering the fact that in Timisoara there are two seismic faults in the western part of the city [7] (Fig. 2), there should be considered the probability of occurrence of an earthquake with small epicentral distances.

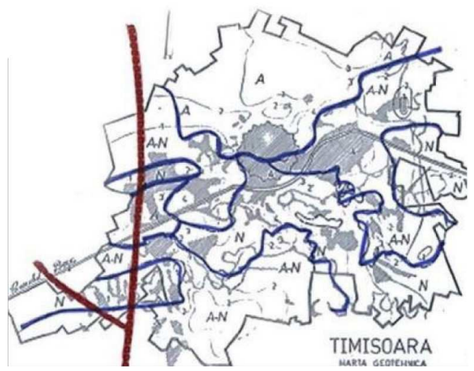


Fig. 2. Seismic faults in Timisoara city

The case study site is represented by Fabric historical area, one of the most important cultural districts of Timisoara city, marked by valuable architectural elements and representative buildings for the city. The localization of the Fabric district can be seen in Fig. 3.

Fig. 3. Localization of Fabric district

In this specific area, there can be seen several buildings in Secession and Art Nouveau, dating from 18th, 19th and 20th Century, made in masonry, with massive masonry longitudinal walls, masonry vaults and wooden floors [7]. The site inspection has shown the fact that the height regime is predominantly basement + ground floor+2 more levels, while the presence of commercial spaces at the ground floor represents a pattern. The biggest problem of the area is the lack of proper maintenance or rehabilitation work, only 10% of the total number of buildings being totally rehabilitated. Partially rehabilitation is present for only 8% of the buildings, while

82% of the buildings are in a low conservation state [8]. The height regime present in the area is illustrated in Fig. 4, while the conservation state of the buildings is presented in Fig. 5 [8].

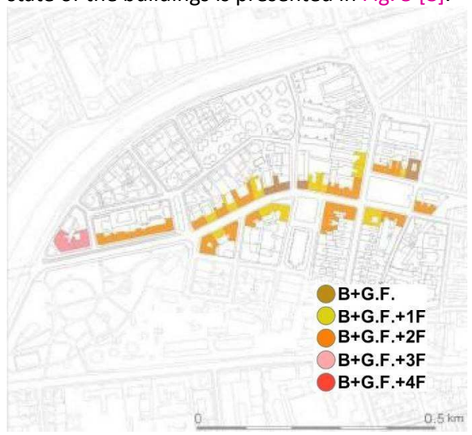


Fig. 4. Height regime in Fabric district

Fig. 5. Conservation state in Fabric district

Based on the height regime, there were determined three building classes, in order to evaluate better the seismic vulnerability of the most representative buildings.

Considering the homogeneity of the area, there can be concluded that the seismic vulnerability of a specific building class could be valid for each individual building that is part of that specific class.

So, the first building class (Type I) was considered for the buildings with basement and ground floor, which represents almost 10% of the total number of buildings.

The buildings with basement, ground floor and one level were classified as second building class (Type II), representing a proportion of 35%.

The third and most common building class (more than 50%) is represented by buildings with basement, ground floor and two or more than two levels and is considered as third building class (Type III), as presented in Fig. 6-8 [7].

Fig. 6. Building class Type I

Fig. 7. Building class Type II

Fig. 8 Building class Type III

III. SEISMIC VULNERABILITY ASSESSMENT

The building typology specific to Fabric district is in aggregate, meaning that buildings have common walls, contouring closed perimeters with interior yards, as presented in Fig. 9. That is why, is very important to assess the seismic vulnerability not only considering the building as isolated, but also considering the influence of the adjacent buildings on the seismic behavior of the building.

Fig. 9. Aggregate building typology specific to Fabric area

The methodology that was used is an Italian methodology, named Vulnerability Index Methodology and was first developed by Benedetti and Petrini [9] for the first 10 parameters that analyze the seismic vulnerability of the building considered as isolated. Later, Mazzolani and Formisano [10] added five more parameters that considers also the influence of the entire aggregate (Fig. 10).

Parameter	Class score (s)				Weight (w)
	A	B	C	D	
1. Organization of vertical structures	0	5	20	45	1
2. Nature of vertical structures	0	5	25	45	0.25
3. Location of the building and type of foundation	0	5	25	45	0.75
4. Distribution of plan resisting elements	0	5	25	45	1.5
5. In-plane regularity	0	5	25	45	0.5
6. Vertical regularity	0	5	25	45	0.5÷1
7. Type of floor	0	5	15	45	0.75÷1
8. Roofing	0	15	25	45	0.75
9. Details	0	0	25	45	0.25
10. Physical conditions	0	5	25	45	1
11. Presence of adjacent buildings with different height	-20	0	15	45	1
12. Position of the building in the aggregate	-45	-25	-15	0	1.5
13. Number of staggered floors	0	15	25	45	0.5
14. Structural or typological heterogeneity among adjacent structural units	-15	-10	0	45	1.2
15. Percentage difference of opening areas among adjacent facades	-20	0	25	45	1

Fig. 10. Seismic vulnerability assessment form

The methodology was applied on the 10 most representative buildings from Fabric district by filling up the vulnerability form, while the vulnerability indexes for each building was determined using Eq.(1) .

$$I_V = \sum_{i=1}^{10/15} S_i x W_i \quad (1)$$

Deriving from the vulnerability index, there was determined a normalized index using Eq. (2) [7].

$$V = 0.46 + 0.0056\, I_V \quad (2)$$

The mean damage was determined using Eq. (3) [7], as a function of the normalized vulnerability index, macroseismic intensity and a specific ductility factor that was assumed to be 2.3 [11] for residential buildings, defining the vulnerability curves and the most probable level of damages (Fig. 11-12).

$$\mu_D = 2.5[1 + \tanh\left(\frac{I+6.25V-13.1}{\Phi}\right)] \quad (2)$$

Mean damage range [μ_D]	Damage state [D_i]
0÷1.5	D1
1.5÷2.5	D2
2.5÷3.5	D3
3.5÷4.5	D4
4.5÷5	D5

Fig. 11. Correspondence of mean damage index and damage state

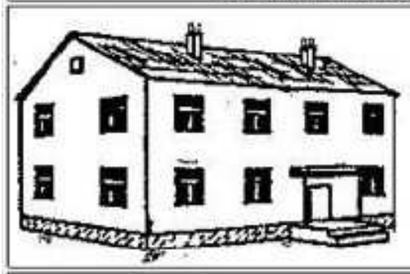
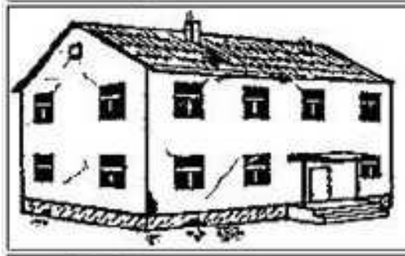
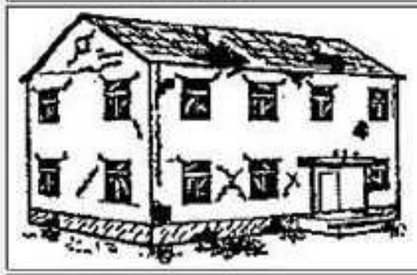
Classification of damage to masonry buildings	
	Grade 1: Negligible to slight damage (no structural damage, slight non-structural damage) Hair-line cracks in very few walls. Fall of small pieces of plaster only. Fall of loose stones from upper parts of buildings in very few cases.
	Grade 2: Moderate damage (slight structural damage, moderate non-structural damage) Cracks in many walls. Fall of fairly large pieces of plaster. Partial collapse of chimneys.
	Grade 3: Substantial to heavy damage (moderate structural damage, heavy non-structural damage) Large and extensive cracks in most walls. Roof tiles detach. Chimneys fracture at the roof line; failure of individual non-structural elements (partitions, gable walls).
	Grade 4: Very heavy damage (heavy structural damage, very heavy non-structural damage) Serious failure of walls; partial structural failure of roofs and floors.
	Grade 5: Destruction (very heavy structural damage) Total or near total collapse.

Fig. 12. Correspondence of damage states and level of damages

The results have shown the fact that, when the only first ten parameters were considered (Fig. 13), there weren't registered much difference between building class Type II and Type III, having almost the same seismic vulnerability. This conclusion is in accordance with the site inspection, because both building classes present significant decay and structural problems.

When there were considered the other 5 parameters also and the buildings were analyzed as part of an aggregate, the results have shown the fact that the building from building class Type III are the most vulnerable (Fig. 14). This results are because of their corner position into the aggregate, which is the most dangerous one.

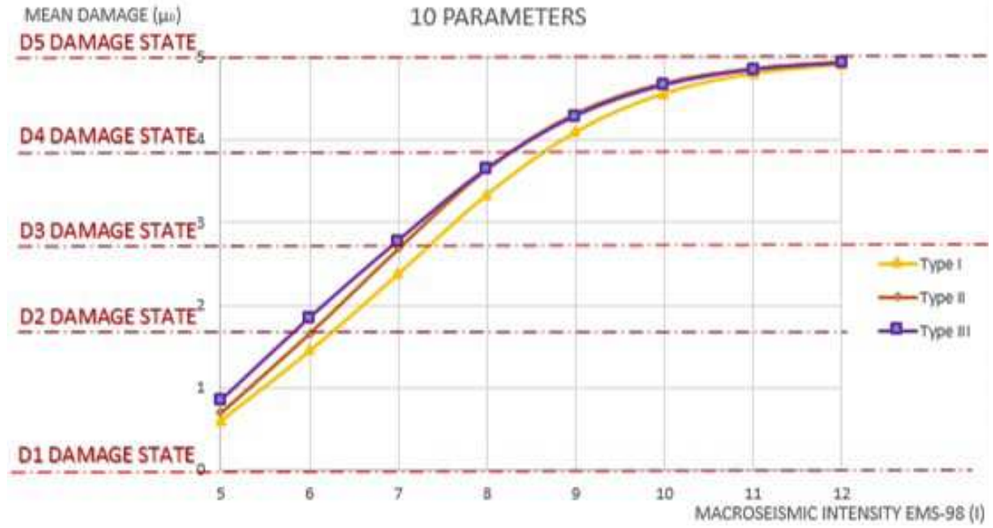


Fig. 13. Vulnerability curves for first 10 parameters

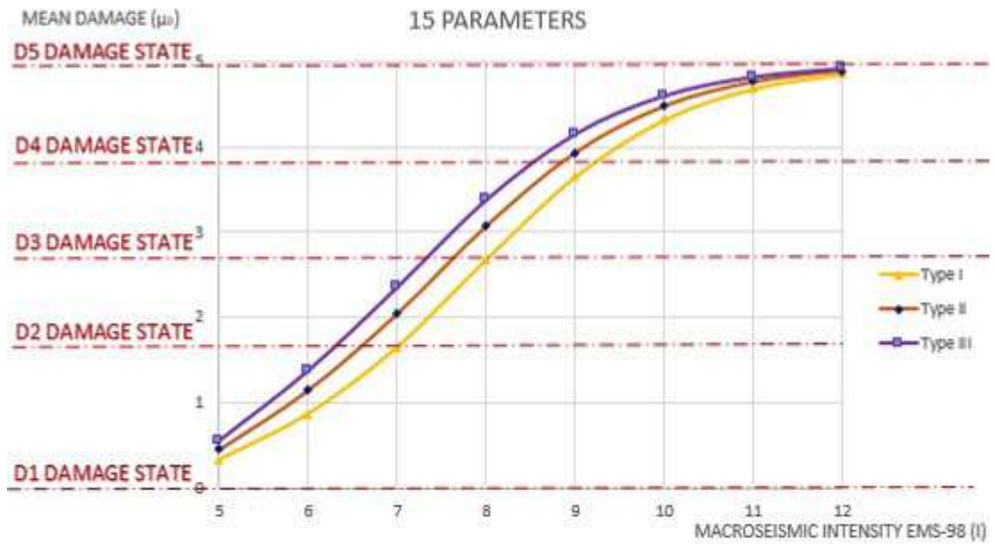


Fig. 14. Vulnerability curves for all 15 parameters

Overall, the average seismic vulnerability of the analyzed buildings is a medium one, as presented in Fig. 15, showing the fact that there are significant chances to have damages to non-structural elements, but small chances of having damages that could affect the bearing capacity of the buildings.

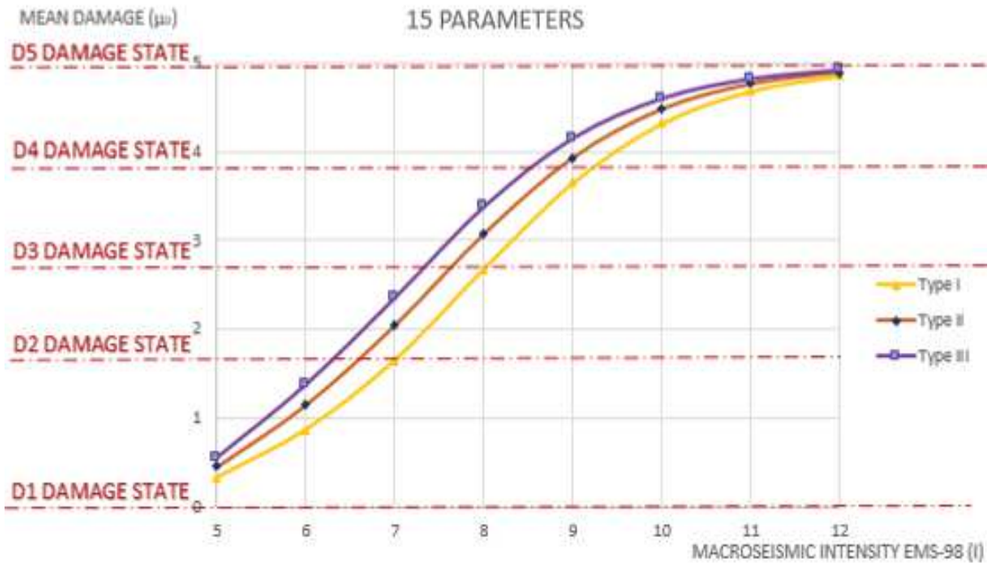


Fig. 15. Medium vulnerability curve for the entire area

IV. CONCLUSIONS

This study have illustrated the fact that the influence of the adjacent buildings is very important in the process of seismic vulnerability assessment, increasing the vulnerability in dependence of the position into the aggregate.

Also, there was highlighted the increased vulnerability for the buildings with a corner position into the aggregate, showing the fact that in case of prioritization list for consolidation work, building class Type III should be considered on top.

The overall medium seismic vulnerability represents a good hint for the level of consolidation that is necessary for the area, meaning basic consolidation work with minimal intervention. Moreover, it suggest the need of proper maintenance for the historical building, because most of the problems appears because of the lack of it.

The seismic vulnerability assessment presented in this paper represents a simplified, quick methodology that can be applied at urban scale. For a detailed assessment, there is highly recommended to perform mechanical and numerical analysis and technical report.

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The Modern Re-enactment of the Transylvanian Salt Road as a Cultural Component

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ABSTRACT
The cultural concept called the salt road is closely related to the connection between salt and salt mining throughout their multimillenary historical development in view of the economic, demographic and territorial impact on the settlements, in comparison with the revenue resulted from the exploited amount of salt and the earned income, to which the hydropathic character is added during the modern period which transforms and freshens the cultural tradition of the use of salt in the development of the settlements.
The need for the protection and conservation of the historical areas has already been internationally advertised for a long time. It is actually the eleventh hour when the indigenous architectural heritage and the hydropathic resorts can be saved and preserved.
I view the study, research and understanding of the past of paramount importance, especially the relationship or the connection with the present. In this respect, the scientific contributions to the study of the Transylvanian hydropathic resorts and the accomplishment of the cultural concept of the salt road are helpful tools that may be used in setting up development strategic plans of the area and promoting hydropathic tourism. Thus, besides the curative properties of the salt waters and the attractive landscape, local aspects of inter-connected culture and history can be turned to good account by means of a cultural and touristic concept. The awareness and deep insight into the past through the promotion and presentation of its golden age image are intended, not only in order to protect the originality and peculiarity of the cultural and historical site, but also to inspire future generations.

Keywords: salt, salt mining, salt road, Transylvania, hydropathic baths, resorts, settlement growth, cultural identity, local and regional heritage, history, vernacular architecture

I. INTRODUCTION

The need for the protection and conservation of the historical areas has already been internationally advertised for a long time. It is actually the eleventh hour when the vernacular architectural heritage and the hydropathic resorts can be saved and preserved.
The importance of the natural salt resources in the development of the settlements is greater even though nowadays salt is viewed as a common, ordinary element.
The Romanian research still lacks a detailed analysis of the historical and indigenous architectural heritage corroborated with the evolution of the Transylvanian habitat space. Ada Hajdu stated that the vernacular architecture in the resorts has never been the topic of any research nor has the Romanian villegiature architecture undergone systematical studies whatsoever. [1]
In addition, there are no studies, as yet, which aim at, not only the relationship between the development of the human settlements and salt exploitation, but also at the balneary and therapeutic recovery of these localities. Furthermore, a systematization of all the apparently dispersed or non-existent cultural elements has never been attempted to be included in a larger concept, so far, in order to facilitate an easier promotion. This cultural concept is intended to assist the protection of these historical sites, since ”the modern times impose on older towns, often through abolishment or alteration measures, yet, always preserving noteworthy older elements” [2]. The extinction of any initial element belonging to any resort results in the extinction of a remarkable ”witness” to the hydropathic resorts of old.

II. THE SALT ROAD IN TRANSYLVANIA

It is common knowledge that the need for salt is physiological, therefore the growth and expansion of the population was determined by the constant supply with this resource. Salt is essential for the human existence. In addition, mystical and supernatural qualities have been attached to it, being one of the key factors of the Neolithic revolution and in the settlement process, since it used to be viewed more precious than gold. There are remarkable salt resources in Transylvania, a “natural fortress” well demarcated on all sides, with few access areas. Evidence of salt mining in Romania is ranked among the earliest in history. This activity favored the development of the settlements in the area, both from an economic point of view and a cultural one since these localities managed the earliest salt roads. [3] This can be seen in Fig. 1 where all roads and rivers go primarily to west and the border to the east and south is filled with passes at high altitudes and narrow paths.
The evidence of salt mining in Romania is among the oldest in the world. The earliest documentary mention of the existence of Sovata and Praid mines dates back in antiquity, when the salt road, which started in these areas, was made reference to. Later on, in the Bronze Age, there is indication of exploitations in Ocna Mureș, Ocna Dej, Turda, Cojocna and Jabenița. The fact that salt used to be easily exploited in Transylvania turned this region into an attractive area for all the peoples, both for the great empires and the migratory peoples.
The fact that the neighbouring territories which border Romania either lack salt or salt resources are scarce, made the resources in our country of vital importance in this part of Europe, since it has been used throughout the centuries, not only for local necessities, but also for the demand of the nearer or farther communities. [4]
According to the experts, salt was the second mineral, after the flintstone, which contributed to the earliest form of trade [5], consequently to the emergence of the salt road within a general context.
That is how the ancient salt roads developed. They would run from the Carpathian region and diverge radially in all directions. New settlements developed along these roads, gradually farther and farther from the salt resources. [6]
As a result of the insight into the economic, cultural and social importance of the salt in different periods, a new criterion might be established, when a reconsideration of the regional history is taken into account. [3]
The concept of salt road includes not only its historical and geographical route, but also the impact on the settlements it would crossed. Salt is the main factor around which this concept revolves.[3]

During my PhD research I discovered that the importance of salt, both economically or socially, as well as from a medical point of view, has diminished in modern times, despite the fact that certain articles and thesis, which were meant to revive the importance of this mineral in the world history, have been written lately.
Salt exploitation has had along time an important role, both in trade and settlement development. Moreover, in the areas where salt and natural water sources meet, therapy baths emerge that serve the need of the patients and attract numerous tourists.
Following the trends of the age in Europe, some areas, having balneary potential, had been turned to good account by mid-19th century. They became famous at the turn of the 20th century, when the early accommodation (guest houses and hotels) and treatment buildings were erected. The popularity the baths used to have in their golden age turned them into important resorts in Transylvania since they were able to emulate celebrated resorts in Europe, as well. [7]
The architecture plans and programs, reflected in the aspect of the buildings from that period, provide valuable information about the many concepts of the age. [3]
The constructive and artistic experience acquired within such programs becomes an earned asset to all architecture and, subsequently, it is endowed with a greater role in the history of architecture. [8]
The cultural concept called the salt road is closely related to the connection between salt and salt mining throughout their multimillenary historical development in view of the economic, demographic and territorial impact on the settlements in comparison with the revenue resulted from the exploited amount and the earned income, to which the hydropathic character is added during the modern period that transforms and freshens the cultural tradition of the use of salt in the evolution of the settlements. [3]
The map of the Salt Road and the extend of the directly influenced settlements and territories are visible in Fig. 1. The map contains the roads, water flows, settlements with salt exploitations, salt baths, directions of salt shipment, administrative borders, ports and fortifications that were important in the history of the Salt Road.

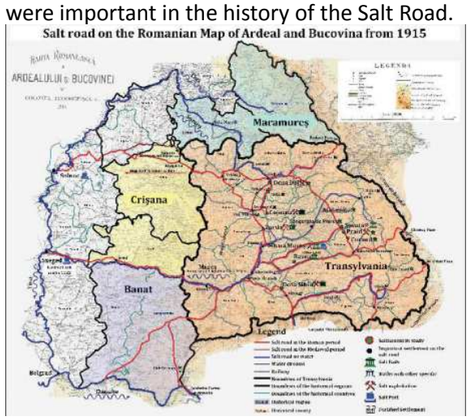

Fig. 1. The Salt Road

The centuries of exploitation brought about, besides the numerous economic advantages, a less intended element, namely, the salt lakes. In the resorts, which were subjected to research, the number of naturally-formed lakes is smaller than the lakes that emerged on former exploitation sites. There has been a continuous process of transformation of the former exploitations into salt lakes. consequently, the hydropathic resorts existence is largely connected with the industrial salt exploitation area.
There is a close connection between salt landforms and health-care tourism, which turns out to be in a special way a form of valorisation of the natural resources and of the anthropic heritage of a certain area. The landforms as main part of the natural environment are the most diverse and available resource on Earth and the attractiveness of the landscape have always drawn people to it.
The baths contributed to the emergence and development of the settlements in the form of the buildings for accommodation and for running treatments, of the bath pavilions and of the constructions around the mineral water springs. [9]
Considering the 11 researched resorts and the evolution of the number of visitors, it can be stated that the highlight of the spas (the golden age proper) took place between 1890 and 1914. Despite the fact that this period overlaps the second town-planning and industrialization stage, the demographic growth during the golden age is largely due to the existent spas in the localities. [3]
This flourishing age stands out and is marked in history due to the international situation in the following decades. Thus, because of World War I, the population was deprived of the financial resources and the spare time needed to spend their holidays in spas. [10]
During the inter-war period, although the modernization process continued, some resorts were in decline, becoming only locally popular, whereas others, such as Sovata or Bazna, lost little of their attractiveness. After 1945 this development becomes even more unequal; despite building large hotels for health care, the greatest part of the constructions and of the natural landscape were damaged.

II.1 THE SALT ROAD HERITAGE

During the research years, I visited the resorts multiple times, I analyzed the recent online pictures and Google Street View which provided the opportunity to ascertain that the historical heritage has been gradually diminished. [3]
In my opinion, the diminished Romanian touristic potential was caused by the mentality of the generations who chose to ignore or even wipe out the past. Transylvania used to offer high-quality conditions to the tourists, ensured by dedicated specialists, in areas with long-lasting traditions in this field, which, during the golden age, could successfully compete with famous European spas.
I, therefore, consider it is imperative that the past should be researched and understood, especially in connection with the present. In this respect, the scientific contributions to the insight into the Transylvanian hydropathic resorts and to the achievability of the cultural concept, called the salt road, are helpful tools which can be used in setting up the development strategic plans for the area, as well as in promoting balneary tourism. In this way, inter-connected cultural and historical elements, by means of a cultural and touristic concept, can be promoted alongside the curative properties of the salt waters and pleasant landscape. [3]
The culture of baths remains one of the earliest cultural assets and its forms of expression, as far as the historical period and geographical areas are concerned, is extremely varied. In conclusion, the culture of baths is often specific to a certain form of civilization. [9]
The culture of baths is a significant part of the material and non-material cultural history. The evidence is shown in the buildings designed for bath taking, accommodation and socialization used in those times, as well as in the typical social life of the spas. In most places, these showcase elements of identity which are specific to the resorts. A good example, in this respect, is provided by the local craftsmen who managed to combine the decorative elements, used in the embellishment of the villas, in order to create compositional complexes which impress nowadays. Unfortunately, many elements had been destroyed or damaged during wars, economic depression or, simply, because of indifference. [3]
The protection and restoration of certain areas hardly imply their transformation into museums, they are supposed to be reinvigorated through permanent dwelling and social contacts. As a result of the renovation of certain sites, architecture becomes a means through which the characteristics of a generation or age are passed on.
The preservation of this heritage is mandatory since it provides an image of the socio-economic and human development of the local and regional communities. The preservation can be performed by means of sustainable and long-lasting development, within which, the communities tie themselves down to the tradition through programs that view culture as a local resource whose main aim is the quality of life. [11]
At the Conference in Rîmetea it was stated that ”the years spent in conferences and debates considered neither the number of architectural monuments, which could have been effectively saved, nor the buildings count decreased. It has been repeatedly mentioned that it is the last opportunity when action can be taken in order to save the vernacular architectural patrimony. It is also a given fact that vernacular architecture creations are no longer delivered, in the traditional meaning of the term, and saving them

turns out to be an even greater enterprise, since the transformations either alter them constantly or wipe them entirely out from the face of the earth". [11]

This assertion is more relevant than ever for the actual situation of the traditional architecture of the villas belonging to the golden age of Sovata resort.

"The heritage, which was constructed in a vernacular manner, clearly showcases that all the cultures and societies originate in their specific forms of tangible and intangible expressions that create their heritage, therefore these are supposed to be respected". [11]

Within this context, the protection of the multicultural area heritage becomes even more difficult to be undertaken, since once it has been lost, it seems impossible to be re-built. The traditional values which are materialized in the vernacularly constructed heritage must be preserved and this fact should be reflected in the local and regional policies related to social and economic development. [3]

"If we are able to understand the places and if we are in condition to internalize them in a creative manner, then we can say that we are capable of contributing to their History". [12]

III. CONCLUSIONS

As a result of the research undertaken in 11 localities-Turda, Cojocna, Ocna Dej, Ocna Sibiu, Ocna Mureș, Sovata, Praid, Corund, Bazna, Jabenița, Sângeorgiu de Mureș-it has been concluded that not only the mining function generates balneary function, in certain cases, the mere existence of a salt spring suffices. Alongside the functional amenities or curative methods, the popularity of a resort is ensured by both the visiting guests and their number and by the opportunity to experience a different life style. Therefore, the salt exploitations and the balneary properties have a direct influence on city-planning evolution.

Despite the fact that the need of historical areas protection and conservation has been pointed out for decades, no measures have been undertaken in the case of the hydropathic resorts.

The multimillenary quality of the salt road in Transylvania is provided by it having been used since historical times, both on land along the Roman roads and, later, on the waterway of Mureș and Someș rivers, as well as on their tributary streams. The exploitation of salt throughout the centuries ensured the conditions for the development of resorts and spas which deserve to be granted more care and promotion.

I, therefore, consider it is imperative that the past should be researched and understood, especially in connection with the present. In this respect, the scientific contributions to the insight into the Transylvanian hydropathic resorts and to the achievability of the cultural concept, called the salt road, are helpful tools which can be used in setting up the development strategic plans for the area, as well as in promoting balneary tourism. In this way, inter-connected cultural and historical elements, by means of a cultural and touristic concept, can be promoted alongside the curative properties of the salt waters and pleasant landscape.

Considering all the above-mentioned aspects - the importance of the salt in the evolution of the settlements, salt exploitation and its continuous impact on both the mining localities and on all the settlements situated along the Transylvanian "white gold" road, which would have a significant influence on all parts of the social society, on economy, possibly even on the general balance of great regional powers - we think that the salt road is a remarkably valuable economic and cultural factor, not only in the Transylvanian and Romanian history, but also in the history of Hungary and all Central Europe.

ACKNOWLEDGMENTS

This paper comes as a follow up to the conclusions and further deepening of my PhD thesis, expanding it's research.

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Urban design and planning

A new perspective for a promising land in Chișinău: Visterniceni urban regeneration project

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ABSTRACT

The cultural profile of the Republic of Moldova is determined by two influences: Russian and Balkan. In spatial planning, these influences persist as part of an unsteady process that follows the major trends in Europe and Asia. This paper presents the case study of an urban regeneration project regarding a vast surface, close to the historic center of Chișinău: The Circus area. This part of the city is special because it was planned as an area for sports and leisure during the communist times, but only one building managed to be erected in those times, the Circus. After 1990, the prohibition of constructions until the elaboration of an integrated urban plan left the entire site in an intermediate phase that tend to be permanent. The Circus area is a land within the perimeter of the following streets: Renasterii Nationale Boulevard, Moşilor Street, Orhei Street and Tudor Vladimirescu Boulevard, in the Rascani sector and with a total area of 646,159,571 sqm (64,62 hectares). In 2015, this area was the subject of a national contest organized by The Embassy of France in the Republic of Moldova and The Agency for Inspection and Restauration of Monuments. Under the name “Visterniceni”, the proposal draws attention to the historical context of the site and extends the area proposed in the competition to the entire perimeter mentioned above.

The brief follows a holistic study of the integration of the area into the complex urban structure of Chisinau. The solution starts from the finding that one-way solutions can not be solved if the overall problem is not seen. In this context, the study was extended across the entire area between the main boulevards and main streets in the area. The spatial reorganization of the green area near the Circus, on the shores of the Holbocica stream, was proposed to form an anthropic lake with a recreational role. This solution would conserve the green space vocation of this context and limit the uncontrolled expansion of buildings. The green space continues through a green terrace arranged on the Circus annex to the St. Constantine and Elena church, where a new arrangement puts the historical cemetery in the spotlight and leaves the archaeologists free to perform the works when possible. Essential for the development of the Circus and the Renasterii Nationale Boulevard as a connection with the historical area is the elimination of the pressure on it by developing the complex interchange in the area of the Visterniceni railroad station. New buildings for housing and services should be built around it, in a business park with contemporary standards.

The project presented in this paper is one of the most promising in the Republic of Moldova, placing Chisinau in a list of cities that take care of their public space and aim to raise the quality of life of their inhabitants through the raise of the public space quality.

Keywords: Chisinau, Visterniceni, regeneration, bottom-up process, vision

I. URBAN AND HISTORICAL CONTEXT

The Circus in Chișinău is one of the most representative buildings in the capital of the Republic of Moldova, being present in all the tourist promotion materials. The building is of great importance in terms of representativeness for the historical period in which it was built (the communist period), but also due to its integration into an extended territorial context: the USSR program for construction of the Circus buildings in all major cities.

Fig. 1. Picture of the State Circus in Chișinău. Photo: Petru Stariș (2015)

The building was placed in a favorable location, on the promontory of the hill at the base of which the Chișinău townlet was born. This hill is the former village of Visterniceni, still existing today through the organic urban structure of its narrow streets: the current streets of Circului, Carierei, Pietrăriei, Holbocica and Visterniceni.

This position has strengthened the determinant role of the post-war administration in the development of a new city for the new man, neglecting two important landmarks:

- the position of the earth wall that once was a defensive citadel in front of the Turkish attacks of the end of the 18th century
- the identity importance of the Saint Constantine and Helena Greek Orthodox church.

II. THE CURRENT SITUATION

Today, the Circus area, surrounded by the Renașterii Naționale Avenue, Tudor Vladimirescu Street, Orhei Street and Calea Moşilor, is at an intermediate stage. In fact, the Chișinău project of the 1980s provided for the development of a sports and leisure complex in a territory spread over about 65 hectares. Therefore, all the buildings behind the State Circus are in a precarious situation, as an building restricted area until a plan is elaborated for the restructuring of urban tissue (systematization). For this reason, safety, hygiene and urban comfort issues persist in that area.

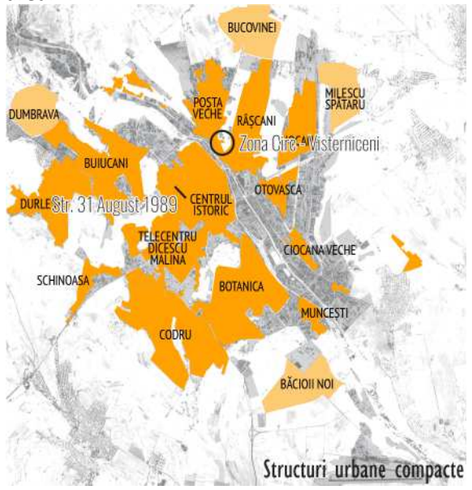

Fig. 2. The Circus-Visterniceni area, between the historical center and two major neighborhoods to the north. The authors (2016)

III. THE VISTERNICENI PROJECT

According to the Visterniceni project, winner of the competition organized by the Agency for Monuments Investigation and Restoration and the Embassy of France, in 2016, the area bounded by the four major streets has the potential to become a vibrant city center that supports the transformation of the central area into a historic center a contemporary character. In order to be organically integrated into the urban area, clear objectives were set for the Circus area, based on the three pillars of sustainability [1]: economic, ecological and social.

Thus, three areas should emerge. The first is the Cultural Quarter [2], a complex with cultural valences on the promontory of Visterniceni hill, encompassing the Circle of State, the square in front of it, the church of Saint Constantine and Helen, the archaeological site of the former Visterniceni fortress and the residential area on the streets of Carierei, 1 and 2 Pietrăriei and Cir-

culul. The second one is CircusPark [3], a large urban park set in English style around the Holbocica anthropic lake, with extensive lawns for a picnic and a grove, featuring functions of public interest: summer theater and a sports arena. The Renasterii Nationale Boulevard becomes a green street. And at last, the third area, Noii Visterniceni [4] is a complex with business, retail and horeca profile, developed along the Calea Orheiului street and its extension via viaduct for public transport to Petru Rares Street, with the reconfiguration of the Visterniceni railway station in a complex interchange exchange node that will connect the entire central area to the airport.

From an ecological point of view, it is necessary to preserve the continuity of the Holbocica stream, to design and protect its banks. In order to strengthen the presence of water in the city, an anthropic lake is proposed, with the significant role of taking over the flow of the Holbocica stream, one of the watercourses contributing to the floods produced in the Bâc-Albişoara area. The unifying element is the large urban park set up in English style around the Holbobica anthropic lake, with extensive lawns for picnic and a grove, featuring public interest functions: a summer theater and a sports arena. The National Renaissance Avenue becomes a green boulevard and thus the entire area between Râşcani,

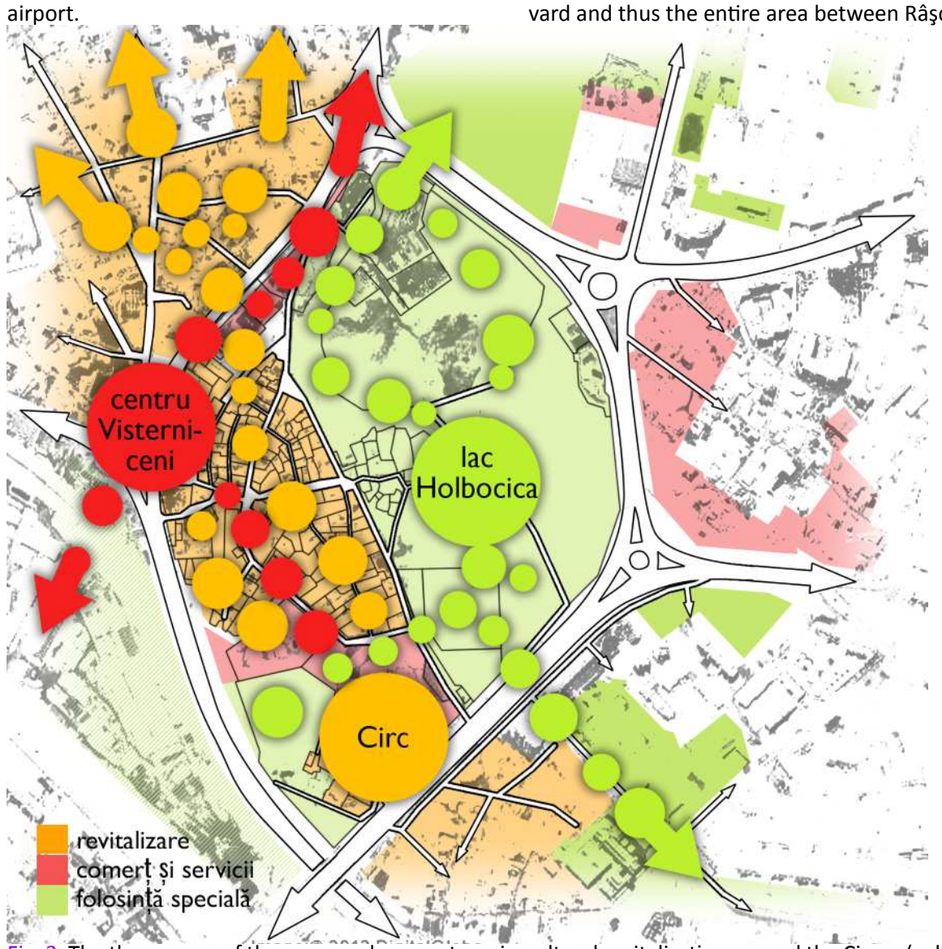

Fig. 3. The three areas of the proposed concept: socio-cultural revitalization around the Circus (yellow), area of offices and business services (red) and large green areas (green).

Poşta Veche and Petricani can benefit from the presence of a green infrastructure. Apart from this project, the Moldovan Government started the building of Chişinău Arena, a sports complex in Stăuceni, outside Chişinău, in total contradiction with the current necessities of the city.

also the problem of setting up a cultural neighborhood, a function that is missing in a city of Chişinău's scale despite an effervescent artistic life. It involves the establishment of a complex with cultural valences on the promontory of Visterniceni hill, encompassing the State

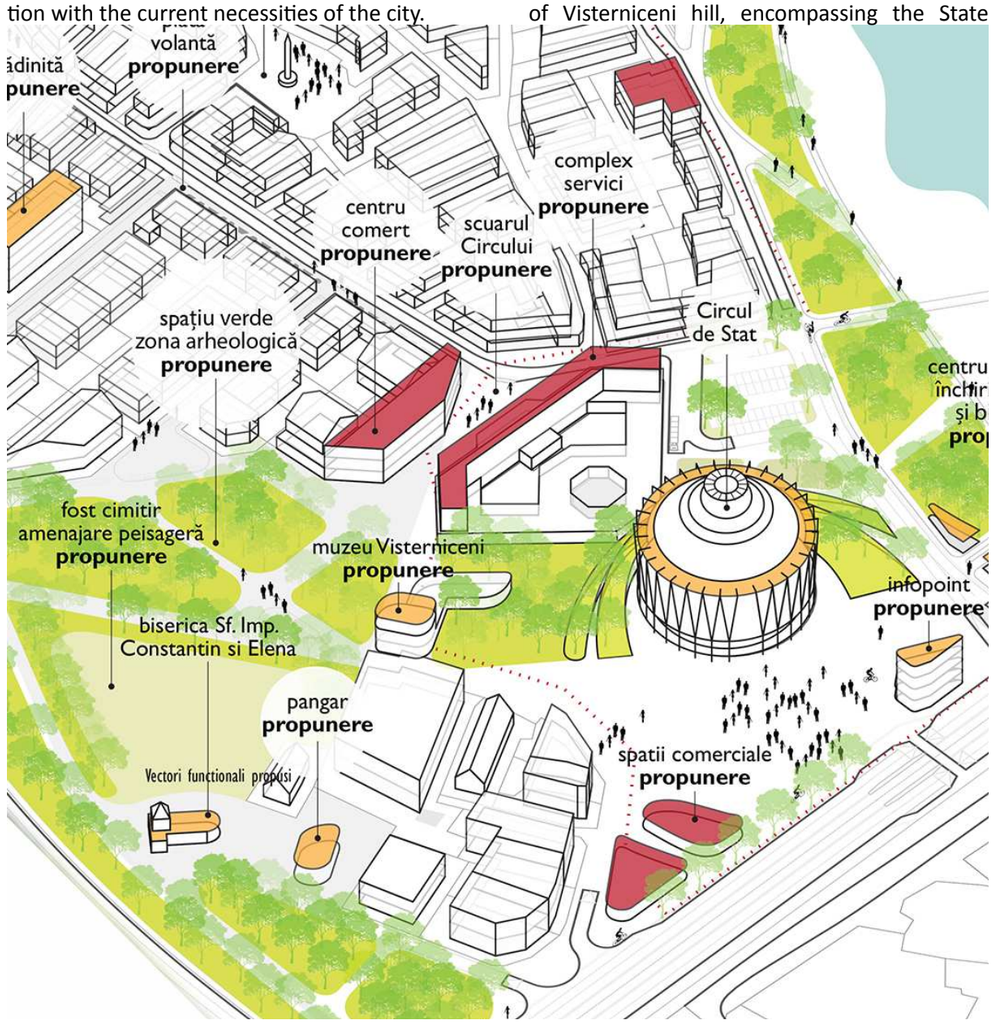

Fig. 4. The socio-cultural area, around the Circus and the historical church.

The social perspective finds the need to strengthen the presence of the Circus in the collective mentality as a representative building for the second half of the 20th century and an example of good practice for the restoration of the iconic buildings of the same period. There is

Circus, the square in front of it, the church of St. Constantine and Helena, the archaeological site of the former Visterniceni fortress and the residential area on the streets of Carierei, 1 and 2 Pietrăriei and Circului.

Fig. 5. The business area, along the Calea Orheiului street and near the Visterniceni urban train station.

The local economy should benefit from an example of a CBD (Central Business District) to relieve pressure on the central area. At present, the main area to build high-rise administrative buildings, offices and hotels is the central or sub-center area (proximity to railway station or Telecentre connection). The feasible area for this type of implant is Calea Orheiului, the street with the status of Boulevard. According to the General Urban Plan of 2007, it is proposed to connect the Petru Rareş Street with Calea Orheiului through an overhead passage dedicated to all means of transport. This proposal is taken over in the Visterniceni project, only allowing access to public transport, bicycles and pedestrians. In this way, on the Calea Orheiului, the whole new business district can be developed, suggestively named New Visterniceni. A significant role is played by the Visterniceni interchange, complementary to a municipal scale proposal, through the railway connection (by tram, train or urban subway) between the station, the central railway station and Chisinau International Airport. The current railway station, currently underused, becomes an interchange capable of regenerating the entire area.

The project is also governed by a triad of transversal principles:

• participation by engaging all public and private actors in a complex urban regeneration project in the most beautiful area of Chișinău [5];

• sustainability by generating an integrated pilot project of integrated sustainable development, including social, ecological and economic components [1];

• equity, by negotiating between the will of all those affected by the project, for the common good of Chișinău and the community directly affected [6].

IV. PERSPECTIVES

After winning the competition, the authors created the visterniceni.com website to promote the project and organized three public consultations in order to respond the needs of the community and get acceptance from all stakeholders. After offering a specification to the Chisinau City Hall for the elaboration of a Zonal Urban Plan that would regulate the area's use, and the authorities' response was completely lacking, the project seemed to enter a shadow cone. The only positive elements were the few concerts sustained in the Circus building. This has happened until recently, because a public consultation event took place at the beginning of 2018:

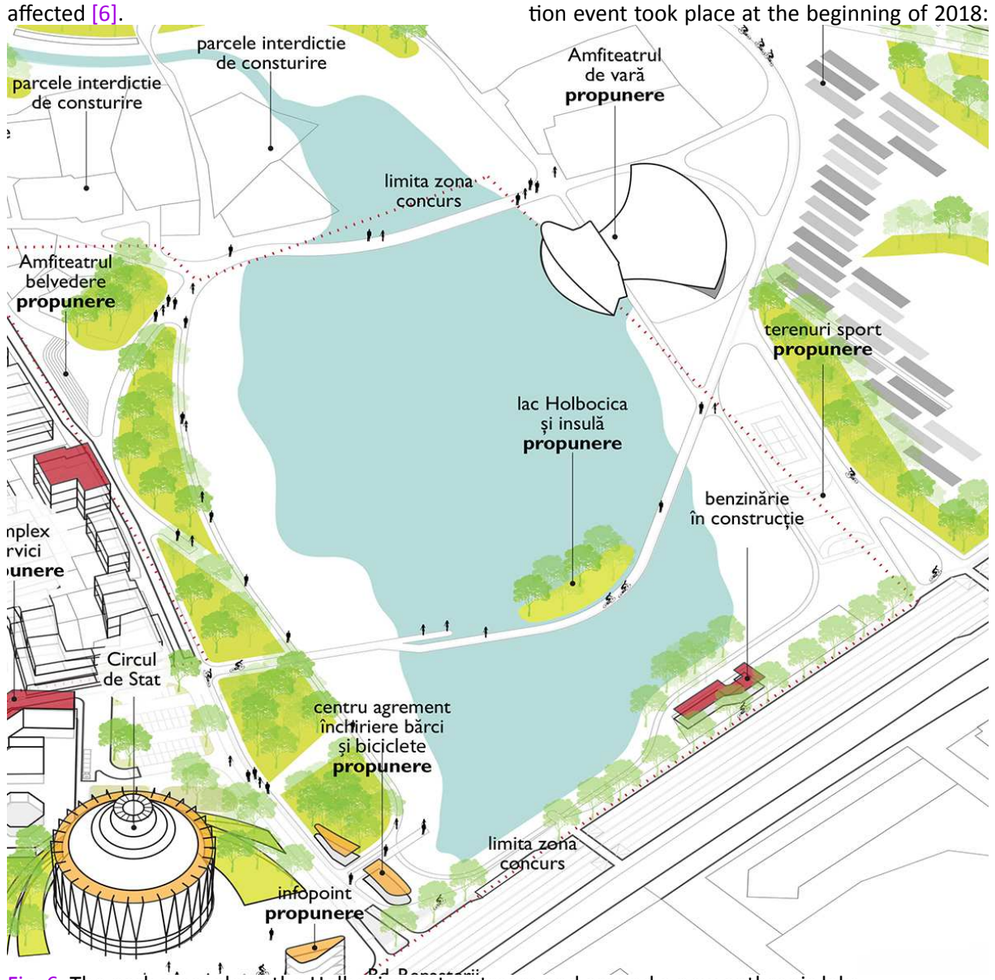

Fig. 6. The park area, along the Holbocica water stream and around a new anthropic lake.

the workshop “The Circus in Chisinau - Participatory Reinvention”, organized in the 3rd edition of the Urbanism Forum. After this, with the support of the public opinion, the building was introduced by Urbanlab Chișinău in the competition for a Getty Foundation Grant. Because of the uncertain status, the request is still pending, but the project qualified for the grant. This is the beginning of a new era for this entire area, as the revitalization of the Circus building will bring the attention towards the Visterniceni visionary project. Even more, another positive aspect is the mention that the building won in an international lighting competition held in Chisinau, making it part of a shortlist of buildings that will bear architectural lighting until 2020.

hind the Circus. All this is done without the development of a Zonal Urban Plan to assess the urban impact of these developments. The specification for the elaboration of an urban planning documentation is still on the table of the Chief Architect.
However, there were favorable prospects for the Circus building but the obstacles to be overcome are administrative, due to the blurring status of this institution that manages the Circus building. Positive proposals were made in the “Circus in Chișinău - Participatory Reinventation” workshop, February 2018, for the conversion of the building into a mixed cultural-economic center that would start the urban regeneration of the area. The process is in full swing, and it is now in the hands of the local administration.

Fig. 7. The Chișinău Circus workshop, in February 2018. Urbanlab Chișinău (2018)

The future of this project depends on the possibility of consolidating a dialogue with the local administration. Real estate pressures are high: after a gas station in 2016, in 2019 two 8-storey buildings and five buildings of 12-15 levels will be put into use, all of them being collective dwellings that do not respect the proximity of individual housing units with only 1-2 levels, be-

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Fortified citadels' rehabilitation and re-functionalization strategy as catalyst for revitalization of historical centers

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ABSTRACT

The necessity to rehabilitate, reinvent and revalue the historical areas within our cities, our cultural heritage, has been stressed upon by numerous academic studies and European Community acts and re-ports. Emphasizing their importance as Europe's research, innovation and economic development engines and their need to become exchange markets of knowledge and social interaction clusters, these areas must be re-functionalized and reintegrated within the strategic urban network. The rehabilitation of the built tissue, a crucial step towards achieving this goal is often carried on, as an end, irrespective of its public, un-built, space and the activities that it houses or its potential to facilitate further conservation measures. Vauban fortifications, built across the Austro-Hungarian Empire during the 18th century, present unique challenges and opportunities. Varying degrees of integration within the surrounding built tissue, value recognition, citizen attachment, local authority's interest and involvement and physical degradation require specific approaches in their restoration and conservation. A multicriterial case study analysis was conducted to establish a methodological strategy of rehabilitation, re-functionalization and integration of fortified ensembles within the built tissue, establishing them as urban poles and catalysts, leading to the preservation of the cites' historical centers. The methodology was tested as part of a collaborative project between the authors and Arad's local authority to revitalize the historical center, re-functionalize the citadel and capitalize on its cultural heritage.
The proposed strategy concentrates not only on the rehabilitation of the historical built tissue, a futile action without a proper regeneration strategy, but also on the revitalization of the public space itself, the whole ensemble and its connection to the historical city center. The fortified citadel of Arad can thus be recuperated and reintegrated, becoming a catalyst for the revitalization of the entire historical center and provide a viable alternative to urban sprawl.

Keywords: Vauban fortifications, rehabilitation, re-functionalization, revitalization, historical areas regeneration strategies

I. INTRODUCTION

Urban sprawl's effects and their repercussion on the historical city centers [1] have left their mark on the urban tissue and lead to the „The Leipzig Charter for Durable European Cities" [2] recognizing the historical centers as Europe's research, innovation, and economic development engines. It lists as a city's necessary goals to attract investments and activities in the cities' centers through citizens' participation and to put an end to the limitless extension of the cities and becoming exchange markets of knowledge and social interaction clusters.
The historical center of Arad, a city in the western part of Romania, formed around a 18th century baroque fortified citadel, is gradually losing its capacity of attracting both activities and investors, who are shifting their interest towards suburban developments. The citadel itself, one of the few entirely preserved Vauban fortifications built across the Austro-Hungarian Empire, has been used for decades by the Army and completely inaccessible to the public. The city has thus developed around it, indifferent to its existence, usually a blank spot on both city maps and in the citizens' minds, a result of their conflictual relationship. Following its completion in 1783 attempts were made to move the city to ensure firing line visibility, and later was used to bomb the city into submission for 9 months during the 1848 Revolution.
Occupying 36% of Arad's protected monuments' area the fortified citadel has a unique character having only three erected buildings, within its 78.5 ha. The nucleus consists of the main square, the commandment headquarters, relatively well maintained, the guard house and the monastery/hospital in a near collapse stage caused by lack of maintenance and use. (Fig. 1,2)

Fig. 1. Monastery

Fig. 2. Commandment headquarters

The study's main research question and a starting point in the collaboration with Arad's local administration was how the citadel could be used as an urban regeneration catalyst, and what are the key principles and steps.

II. MULTICRITERIAL LITERARY REVIEW AND CASE STUDY ANALYSIS

A multicriterial literary review and case study analysis was conducted to establish a methodological strategy of rehabilitation, re-functionalization and integration of fortified ensembles within the built tissue. Similar ensembles from all over Europe were selected for benchmarking, establishing them as urban poles and catalysts, leading to the preservation of the cites' historical centers. The methodology was tested as part of a collaborative project between the authors and Arad's local authority to revitalize the historical center, re-functionalize the citadel and capitalize on its cultural heritage.
The state-of-the-art literature review revealed five key principles of historical areas regeneration strategies, illustrated in Table 1:
1. Accessibility – ease of access is of the utmost importance; therefore, the area needs to be connected to nearby centers through a diverse infrastructure of transportation modes - public transport, pedestrian and bike lanes, encouraging an efficient and sustainable mobility. [3, 4]
2. Restoration – degraded buildings decrease the areas attractiveness and overall perceived safety and need to be restored through easily identifiable, reversible interventions, that take into consideration the building's identity. [5, 6, 7]

Table 1. Five key principles of historical areas regeneration strategies

			Lakatoș A E[5]	Rojas E [11]	Otero-Pailos J [6]	Thordis Arrhenius T [7]	Powell K [12]	Feliciotti, A; Romice, O; Porta, S [10]	Pipa, H; de Brito, J; Cruz, CO [13]	Mehan, A[14]	Uldemolins J. R. [8]	MDLPL [4]	Philip O. [3]	Radoslav R, Branea AM, Gaman MS, [9]
Accessibility	Connections to existing nearby routes and urban centres						x					x		
	Pedestrian lanes								x			x		
	Bicycle lanes											x		
	Public transport										x	x		
	Collective parking										x	x		
Building restoration	Buildings' restoration to improve the area's attractivity		x								x			
	Restoration based on contemporary principles	recognizability of new interventions, new materials, etc.			x	x								
		Interventions' reversibility			x									
		Non-interference with the building's significance	x		x	x								
	Developing a public-private partnership strategy for sustainable economic development		x	x				x			x			
	Staging interventions		x		x									
Re-functionalization	New functions compatible to the existing architecture		x		x	x								
	Function diversity	For both tourists and locals									x			x
		For all ages									x			x
		Daytime and night-time facilities									x			x
		Cultural, public, residential, commercial, employment, education entertainment facilities						x			x			x
	Insertion of several high attractivity functions	Museum	x								x			x
		Public functions												x
Public space	Socialization facilitating public spaces									x		x		
	Diversity of public space typologies	Public squares								x		x		x
		Small parks								x		x		
		Themed green areas								x		x		
		Pedestrian streets								x				x
Events	Diversity of events	For both tourists and locals									x			x
		For all ages												x
		Of various scales local, national and international												x

3. Re-functionalization – high traffic, high attractivity public functions need to be placed in strategic locations within the area to act as activity magnets. [5, 8, 9] Alongside them a public-private intervention strategy needs to be crafted to achieve a high diversity facility mix for all ages, both locals and tourists, including day and night-time facilities. [5, 8-13]

4. Public space rehabilitation – socialization facilitating public spaces need to be planned, both as green areas or public squares and pedestrian routes, while also maintaining their multifunctional, event ready, character. [4, 14]

5. Organizing events – a high diversity of cultural and commercial events - concerts, exhibitions, fairs, etc., is one of the most successful endeavors to promoting and enlivening a newly rehabilitated area. A balanced, year-round, mix of events of different scales, for different age groups and for both locals and tourists is crucial in attracting as many people as possible. [8, 9]

For a balanced overall view of strategies and projects of both academia and practice a benchmarking analysis was conducted of several ensembles from all over Europe with similar characteristic to those of Arad's fortress. The study's aim was to identify the key steps undertaken in implemented projects, completed or still in

development, analyzing the regeneration process, pointing out milestones and the generated effects of each intervention. (Table 2) Karlovac, Osijek, Novi Sad and Alba Iulia were selected as they belong to the same line of defense of the Habsburg Empire as Arad, having been built approximately at the same time, with a similar architectural style and construction technology and fulfilling the same strategic role. Josevov and Terezin fulfilled the same role on the Prussian defense line and have many of the same features.

management strategies. At Naaeden the genuine feel of a fortification was emphasized by recreating the flooded areas and playing upon their relation to the defense walls, creating attracted areas for leisure and tourism. Besançon sets itself apart based on its profitable public-private partnerships. While the fortress has already been converted into a museum, future strategies will be implemented to highlight the relationship between fortifications and surrounding vegetation.

Table 2. Benchmarking analysis of fortified regenerated citadels

			Karlovac, Croația	Osijek, Croația	Petrovaradin, Novi Sad, Serbia	Naarden, Olanda	Besançon, Franța	Alba Iulia, Romînia	Josefov, Cehia	Terezin, Cehia
Accessibility	Connections to existing nearby routes and urban centres			x				x		x
	Pedestrian lanes		x	x	x	x	x	x	x	
	Bicycle lanes					x				
	Public transport				x	x	x	x		
	Collective parking		x			x	x	x	x	x
Building restoration	Buildings' restoration to improve the area's attractivity		x	x	x	x		x	x	x
	Restoration based on contemporary principles	recognizability of new interventions, new materials, etc.	x	x		x		x		x
		Interventions' reversibility	x			x				
		Non-interference with the building's significance	x	x	x	x		x	x	x
	Developing a public-private partnership strategy for sustainable economic development		x		x		x	x		
	Staging interventions		x		x			x		
Re-functionalization	New functions compatible to the existing architecture		x	x	x		x	x	x	x
	Function diversity	For both tourists and locals		x	x	x		x	x	x
		For all ages	x	x	x	x		x	x	x
		Daytime and night-time facilities		x	x	x		x	x	x
		Cultural, public, residential, commercial, employment, education entertainment facilities	x	x	x	x		x	x	x
	Insertion of several high attractivity functions	museum		x	x	x	x	x		x
		Public functions	x	x	x			x	x	x
Public space	Socialization facilitating public spaces		x	x				x		
	Diversity of public space typologies	Public squares	x	x				x		
		Small parks					x	x		x
		Themed green areas					x			x
		Pedestrian streets	x	x	x			x		
Events	Diversity of events	For both tourists and locals		x	x	x		x	x	x
		For all ages	x	x		x		x	x	x
		Of various scales local, national and international			x			x	x	x

The fortifications of Naarden and Besançon were selected as good practices, both from a conservation stand-point but also due to their

Of the five principles identified in the literature review Re-functionalization and Event organizing are com-mon aspects of all analyzed case stud-

ies implemented by most projects. Building restoration according to contemporary principles is similarly a common endeavor yet only half of the projects rely on public private partnerships in their implementation strategies. Public space redevelopment and accessibility are, likewise, only partially achieved. Pedestrian accessibility and collective parking are prioritized over alternative means of transport or public transit and only 3 of the case studies include redeveloped green areas.

III. PROPOSED METHODOLOGICAL STRATEGY

Based on the conducted analysis we propose an urban regeneration strategy to reintegrate the citadel in the urban tissue of Arad, transforming it into an attractive pole within the city.

Before any actual restoration, the usual first go to step of most public administrations, a long-term strategy must be defined. The as main objective should be the revitalization of the fortress, as a self-supporting ensemble in the present-day context. To counter the development pressures of expanding the city outwards, we propose a close-knit cooperation between the citadel and the historical center. Forming a unitary attraction point within the city ensures its ability to compete evenly with the suburban hypermarkets.

The historical area will then become an active point within the city, further attracting investors, events and activities. Becoming self-supporting, even profitable, it can provide the needed funds for the historical buildings' restoration in a public private partnership easing the financial burden on the public administration.

The first steps towards achieving this goal is establishing two promenades. An active commercial one connecting the citadel with the main commercial boulevard and a leisure one following Mureș's riverbanks.

Further on, we propose a short and medium-term strategy, that must comprise all the following stages.

III.1 Accessibility

The current accessibility network is closer to a linear, branching, typology circumventing the citadel and creating unnecessarily long routes. Regenerating the citadel, integrating it within the urban tissue generates a multi-node network with an emphasis on connectivity. (Fig. 3)

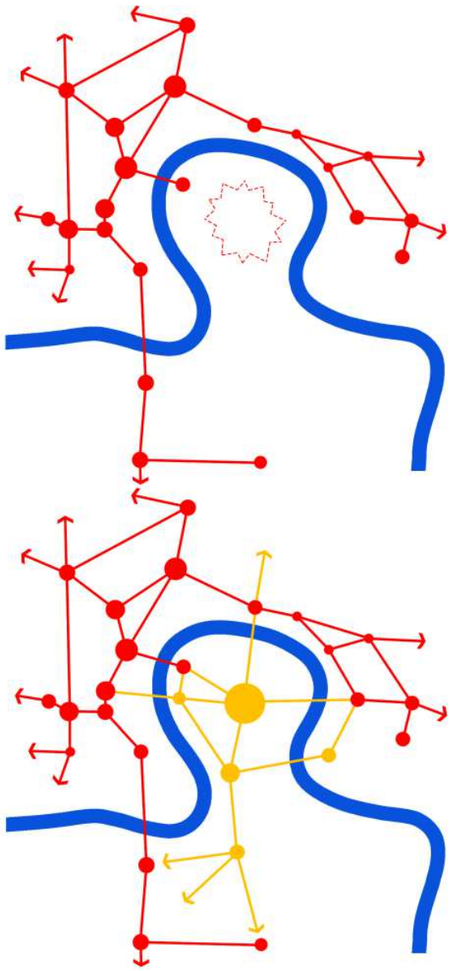

Fig. 3. Urban activity node networks, existing and proposed

The proposed interventions consist of, first, the building of two new pedestrian and bicycle bridges connecting the city's North and East sides to the citadel, establishing shortcuts, facilitating transit and attracting higher foot traffic for the citadel's future facilities. Second, an additional pedestrian and bicycle route alongside Mureș's riverbanks, the green leisure promenade and its extensions beyond the city's outskirts, will connect the citadel to nearby activity nodes and the two natural protected areas, Natura 2000, just outside the city. Third, the creation of two collective parking buildings in the citadel's proximity is critical in facilitating the restriction of car traffic within while the unification of the peripheral tram network with several new stations, the last step, completes the sustainable mobility network. The steps are staged based on costs and impact. (Fig. 4)

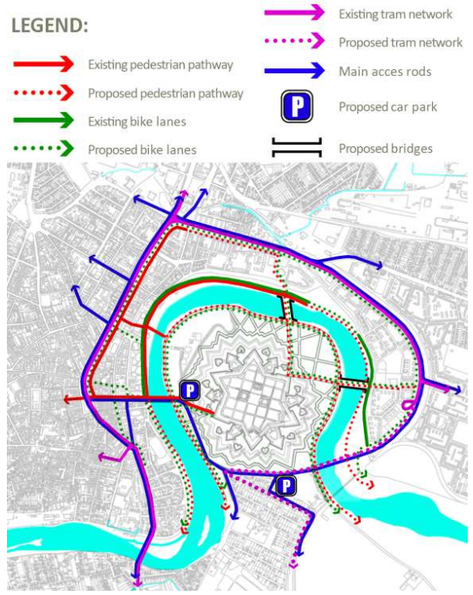

Fig. 4. Proposed accessibility infrastructure

III.2 Restoration

Public-private partnerships are the corners stones of implementing and achieving the citadel's restoration-rehabilitation strategy. Considering the processes' and the ensemble's complexity the necessary funds significantly exceed the local administration's resources. While, its dimensions prohibit the conversion to a public function, unable to capitalize its full potential, public-private partnerships in financing and occupying the available space will ensure the areas sustainability from a financial standpoint, facilitating long term use and maintenance.

Due to the army's maintenance of only one of the three buildings, the resulting advanced degradation state requires immediate restoration. Several portions of the fortifications find themselves in a similar situation.

The ensembles' size calls for a staging of interventions. The central buildings and the two gates, namely the route created to open and connect the fortified citadel to the city, take priority, as first stage. The second stage consists of the fortification walls in the gates' proximity, while the rest are undertaken in the third stage. (Fig. 5)

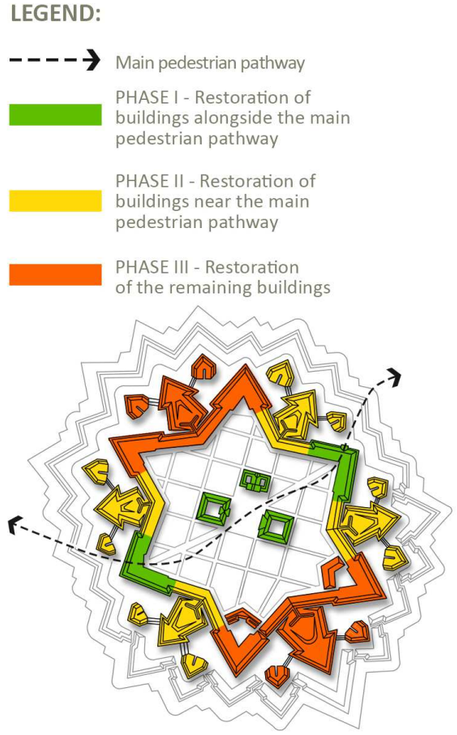

Fig. 5. Intervention staging

III.3 Re-functionalization

The facilities mix is dependent on the public-private partnerships however it should only comprise of functions compatible with the buildings' architecture. A high diversity facility mix, for all ages, both locals and tourists, including day and night-time facilities, and seasonal and permanent ones ensures the area's revitalization.

Possible high attractivity functions, to be placed in strategic locations within the area to act as activity magnets, could consist of museums,

university buildings, some public facilities and commercial areas, balanced by more restrained ones such as office areas, accommodations, etc. Ensuring a sufficient density for the project's sustainability, while maintaining its unique character, of having only three buildings and ample open space, can only be achieved by constructing underground inner courtyard lit buildings, following the project's initial footprints, along the existing underground passages.

III.4 Public space rehabilitation

The proposed socialization facilitating public spaces, aimed at attracting foot traffic are divided into three categories. A peripheral park on the river banks, partially including the aqua park and the green leisure promenade and the proposed reflooded areas through the existing locks and water-gates system. The character of the defense walls is thus emphasized, its genius loci. Between the defense walls a labyrinthine park is proposed, a themed route along a water canal. The citadel's interior will only be landscaped retracing the 1783 routes while the central square will be rehabilitated as a flexible open space suited for large events while giving center stage to the restored historical buildings.

III.5 Organizing events

The city of Arad houses several cultural-artistic events, such as the International festival of classic theatre, the International Euro-marionettes Festival, The Chamber and underground theatre „Arad-Fun", the Traditional craftsmen fair, the Wine festival and so on and so forth, most of local or national importance. By relocating some to the restored fortified citadel these events can transcend to a regional, national or even international level. Completed by a balanced, year-round, mix of events of different scales, for different age groups and for both locals and tourists these can ensure the economic sustainability of the regeneration process, ensuring the conservation of cultural heritage.

IV CONCLUSIONS

The proposed strategy concentrates not only on the rehabilitation of the historical built tissue, a futile action without a proper regeneration strategy, but also on the revitalization of the public space itself, the whole ensemble and its connection to the historical city center. The fortified citadel of Arad can thus be recuperated and reintegrated, becoming a catalyst for the revitalization of the entire historical center and provide a viable alternative to urban sprawl.

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