Vernacular Heritage

Forget or Reuse, Case Study – Stolac, BiH

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Cultural Heritage without Borders

Abstract

The objective of this case study is to see the ways of proper conservation/restoration/maintenance of the mills and utility objects as well as its integration in sustainable development of the community of Stolac.
The main purpose of the study is a creation of a realistic model for conservation/restoration that the community could use, as well as creating an awareness of the possible potentials of the vernacular heritage, which is currently standing semi-destroyed on the riverbanks of Stolac in Bosnia and Herzegovina. The model will focus on one mill and one laundry place.
The study will be obtained through:

- Research / documentation phase
    - historical review
    - documentation of existing state
    - investigation of cultural values
- Defining the usage
    - Creation of applicable mode
- Restoration proposal for mill
- Recommendation on maintenance program and plan for utility building

Introduction

There are so few studies dealing with vernacular heritage from complex to a simple thought, where the main question might be, why are they so simple in their form? Do they belong to our native built heritage expression, or they are rewritings of other buildings made somewhere else, maybe the river was the one to shape them?

The focus of this work is connected to the acceptible interventions on the buildings, which are a part of vernacular heritage. The specific focus will be their nowadays preservation and future development.

Interventions on the monuments are present in the community where the monument is recognized or through its usage, or through elements that directly affect the development of both city and its social context.

- How to create “appropriate” intervention?
- Where are the boundaries of the intervention?

Recognized by their historic role and historically being a part of everyday life, mills and utility buidlings in Stolac now have became more important for the development

of the community than to the question of heritage protection. With this study I would like to make an introduction towards a sensible balance that needs to be reached in between the heritage protection and needs of the community.

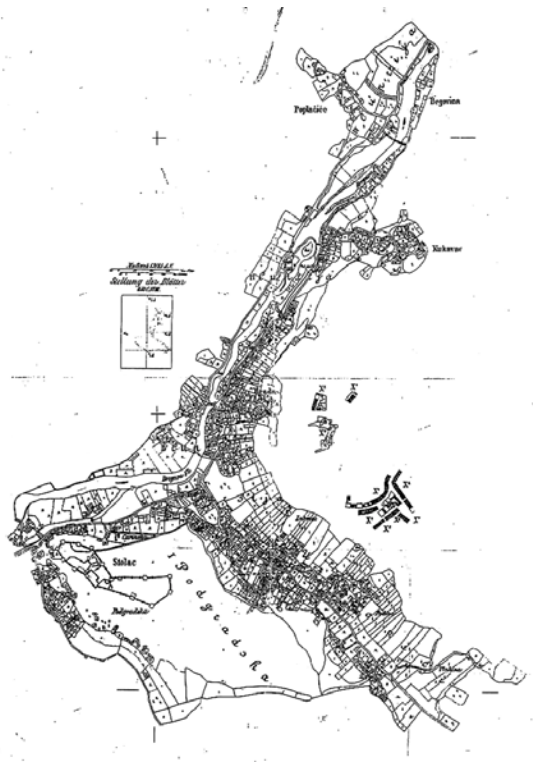
Background

Short History of Stolac

Fig 1

Stolac is located in south east of Bosnia and Herzegovina (Fig.1) and it has been developed throughout different historical periods:

- Palaeolithic, stone age, bronze age
- The oldest monument of art in Bosnia and Herzegovina was found on the Badanj mountain nearby Stolac, a prehistoric drawing of an animal (fig.1)
- Ilyrian age
- Remains of the Ilyric settlement from the 6th century BC, coins from 170 BC were found and were the first written documents in Herzegovina.
- Ancient findings
- Greek and Roman settlements, and from this period a fortification above Stolac originates, as Stolac was a natural point in between the inland and the sea
- Medieval
- Necropolis in Radimlja nearby Stolac
- Ottoman rule
- In 16th century whole Bosnia and Herzegovina came under Ottoman rule. It can be referred to the Ottoman period, as a period when Stolac had its golden age of development. The city got its first urban features, where the economic core is divided from a residential part (Fig. 2)
- Austro-Hungarian rule and in between two wars
- At the end of 19th century Stolac is under Austro-Hungarian rule, that has brought the first destruction of legacy in Stolac, the central market was re-designed and the river was regulated that cause destruction of several mills.
- 1950-1992
- Stolac has lost its role of the city on the main road towards the sea, and its slowly deteriorating.
- 1992-1995
- A war in Bosnia and Herzegovina has escalated causing a vast destruction of Stolac. As the main structure of Stolac originates from Ottoman period, this was recognised as a part of the Muslim culture, where people are expelled and the city entirely destroyed.
- 1995-nowadays
- Stolac is under post-war reconstruction, where some of the most important buildings, mosques, libraries, and museums have been reconstructed.



Short history of mill and utility objects

Mills and washing laundry places in Stolac belong to the specific type of the vakuf[1] property. In the year 1889 in Stolac were eighteen mills, and five places for washing laundry, and they all served to the public benefit. 45 documents "vakufnama[2]" from 1889, and later periods show that benefit gained from the usage of mills and utility buildings was used for a specific cause, e.g. for maintenance of a nearby mosque, for donating goods and helping out the poor. Looking at the different vakufnama from 1889 until 1950 mills were the most common buildings that were used as a part of private property to be given as to serve to public benefits.

Out of eighteen mills and five washing laundry places, nowadays there are eight mills remaining and two of the utility objects. This study will focus on Mehmedbasica mill and one utility object (fig.3). Mehmedbasica mill according to vakufnama nr 7 was built in late 18th century. The mill itself had nine millstones that were shared by three members of Mehmedbasica family.
The utility object was built in the later period, at the beginning of 19th century and there are no specific data on who has donated the funds to build it.

Mill, Building techniques and used materials

General data

Depending on the type of the resources used the wheel could have been run by water, wind or nowadays electricity. In Stolac, a river force powers mills.
The invention of machines set in motion by a hydraulic system has ancient origins. The water wheel, both the horizontal and the vertical one, were already present in the first century B.C. The most ancient water mill employed for grinding was that with the wheel placed horizontally, paddle wheel or "swallow-tailed" wheel where the drive of the motion through the vertical shaft was directed from the wheel to the millstone.
Among the first documents about mills and their working there are Vitruvius' descriptions, in the treatise De Architettura dated 25th B.C., and those of the Greek epigrammatist poet, Antipatro of Thessalonica (40 B.C.-20A.D.), who in one of his epigrams, which belongs to the Greek Antology, describes, the working of a mill, which also in this case, as in Vitruvius' description, has to do with a vertical wheel mill, which is later than the horizontal wheel mill. (fig. 4)

Fig 3

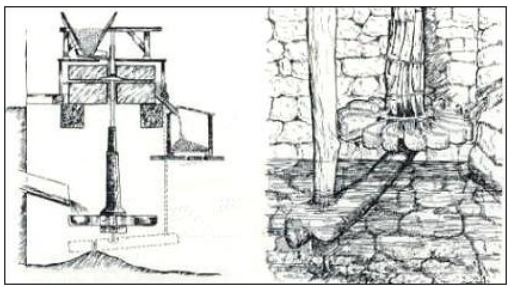


Fig. 4 Drawing of a horizontal water wheel, Marco Vitruvius Pollione "De Architectura Libri decem, Libro X, Capo X"

[1] Vakuf is a property given by the donor to the benefit of the whole community. It can be a religious, residential or a public building where the finances for building it comes from one person after whose death this becomes a legacy of the Vakuf Institution today in Bosnia ad Herzegovina managed by the Islamic Community.

[2] Vakufnama is a document where the donated property is documented

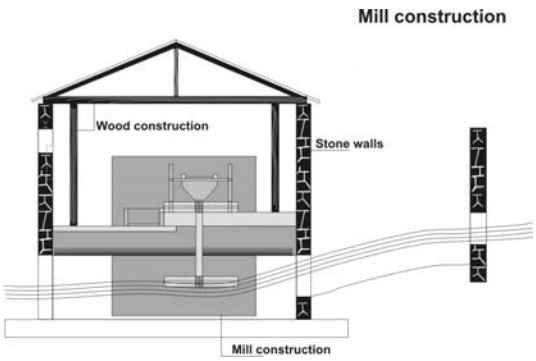


Fig 5. Technological scheme of Stolac mill

Stolac mills

The horizontal wheel mill is placed in the river; they attach paddles to their circumference that are hit by the current of the river thus forcing the wheel to turn. The paddles fill up like buckets and the wheel turns without the effort of man.
The hydraulic millstone turns in the some way. At the head of the axis there is a serrated wheel attached and serves as a knife. Next to this serrated wheel is a smaller one, equally serrated but placed horizontally. At the head of the axis there is an iron ”swallows tail" placed in the millstone. Thus the two serrated wheels turn the millstone; the grain is placed on the millstone and becomes flour. (fig.5)

The space in the mill is usually divided in two rooms, one main room where all the millstones are placed and the secondary room which can be placed at the side of the entrance or at the very back of the building, where all the grain is being stored. Very rarely there is a stable adjacent to the mill.
Mills in Stolac are built out stone, with the roof construction that is wooden and very simple, covered with stone slates cut in thin layers, a very common roof cover in Herzegovina. The floors in the main rooms are made out of thick layer of earth, while in a storage room are made of wood to prevent the humidity getting in the grains. Windows are very small, and they are providing just enough light, and are closed with iron grids. Buildings were plastered with a lime plaster in interior and on the outer side.
All eight still existing mills in Stolac were destroyed in the war 1992-1995. Some were extensively destroyed where nowadays there are only traces of the walls on the level of foundations, while some still have their structure partially existing. The main damage was done to the roof constructions, where the humidity and rainwater then caused the further deterioration.

Utility objects, Building techniques and used materials

There are only two utility buildings in Stolac nowadays. None of the historical description might help to explain the origin of these buildings. Most probably they appear randomly in a societies where there is a need to either wash and dry the laundry, or do some other specific activity.

The utility buildings in Stolac are very ground floor or one-story buildings where people used to wait until their garments were washed, or would come by to later when the garments have dried. Just like mills they are positioned under the water flow so that the water is guided with a canal system through arches to stone wells, where the laundry has been washed. The water would constantly run throw two-three stone wells that were places just bellow the building.
The existence of the chimney and a wooden stairs, which leads to the first floor, allowed for a small office and waiting premises during bad weather.

Built out of stone, as mills buildings, the utility buildings have a roof construction made of wood simpler then at the mill buildings. The roof tiles are stone slates. Windows are big, with the wooden frame, closed with the iron net. The buildings are plastered both in its exterior and interior with the lime plaster.

Out of two still existing utility objects, both are still in a rather good condition. Semi deteriorated due to lack of maintenance of the roof construction, and the water penetration into wall construction, they are still standing with all its functional elements.

Analysis

Values

The recognized documentation values of the buildings:

- Social value

The buildings in its genuine function are depicting the life of Stolac since 16th century onwards. The underlying factor lies in a fact that those buildings were built to support the community, weather in terms of maintaining more “perfect” buildings in the structure of the city or to help out to the ones in need or to serve to fulfill everyday needs of the family who ones them.

- Architectural value (Naïve vernacular expression)

No evident decoration, these buildings are built following the craftsmen logic. Stone shaped in arches is bridging the river and the building is long as a riverbed. The ideology of the native craftsman was to repeat the same building unit in order to very practically bridge the river and to use its force where is strongest.

Added complementary values:

- Environmental value

These buildings are entirely built to use the natural resources; they are powered by a river flow.

- Economical value

The buildings were and can be utilized for generating profit.

Problems

Mills and utility objects in Stolac are structures occupying the most attractive spots on the riverbanks of Bregava river. But since the last war and due to negligence and lack of maintenance they are more/less completely destroyed. Today those structures are ruins, full of vegetation and garbage.

As the river is a central spine of the city, those structures needs to be affected in a very concrete manner, as some of the remaining eight mills are almost completely destroyed and some are still kept with the visible structure.

The mill, which is a part of this study, is still in a condition where its form can be re-gained.

When discussing with the owners of mill they were very eager to see the mill functioning and with the same outline it had before its destruction.

Proposal or restoration (mill)

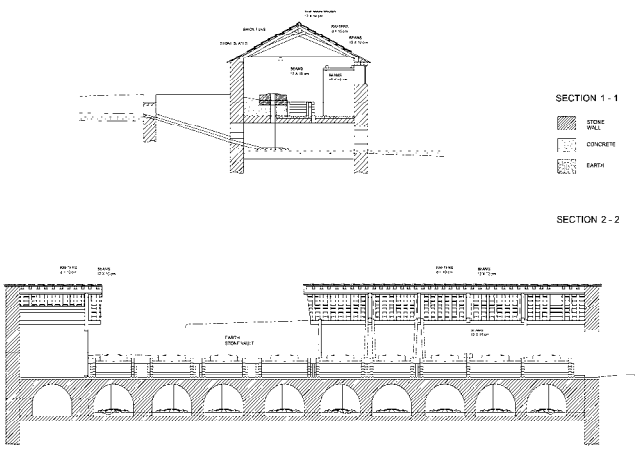
Re-gaining the form of both mill and utility structure should be achieved by restoring both structures to their authentic form, using authentic materials and traditional techniques of building. The original usage of mill should be kept.

Why the owners were so interested in maintaining the original usage of the buildings?
They saw it as:

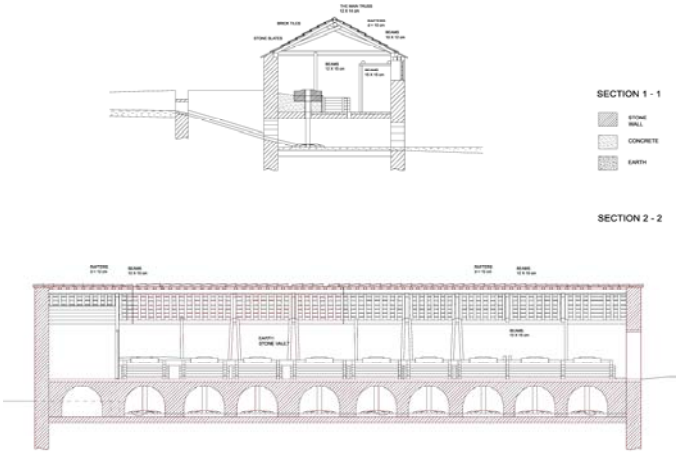
- encouragement for a small scale business development,
- as a potential business within organic production, producing organic grains as well (the only business of that kind in Bosnia and Herzegovina)
- as the possible signal for the Government to recognize the value of these buildings and recognize the importance of the impact that they might have.

Technical comparison, how to reach a desirable result (schemes)

Sections



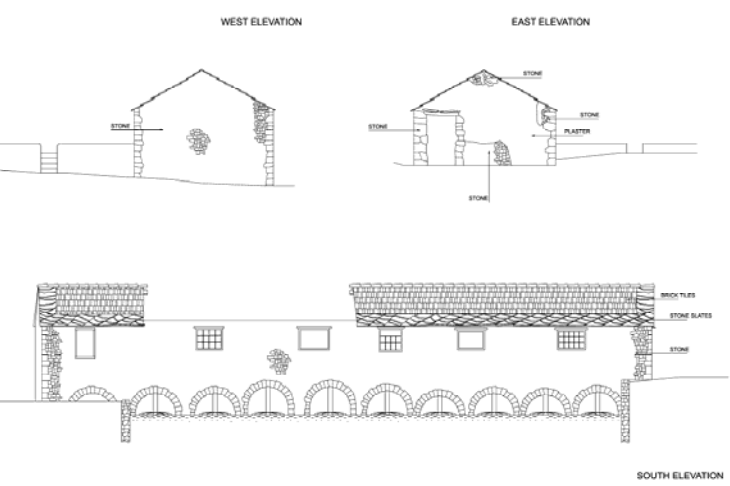
Sections, existing condition



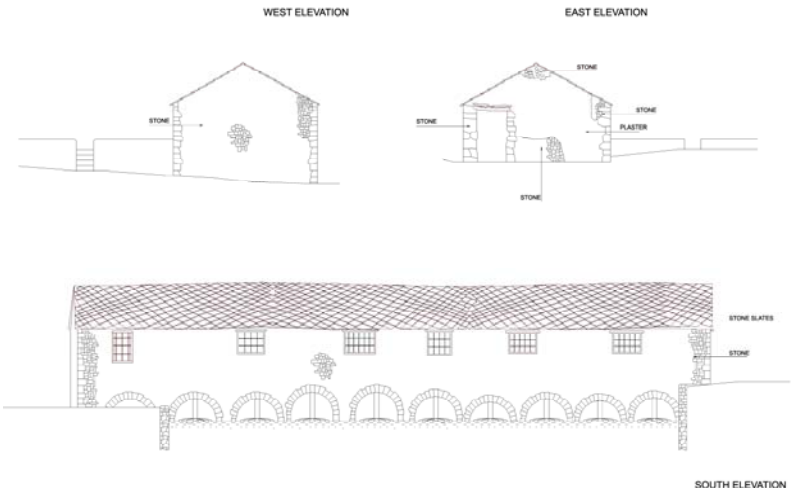
Sections, proposal

- The most important for this specific building would be first to restore the roof. The main damage in the building currently is due to leakage and not existing part of the roof construction. When dismantling the existing construction the parts of the roof in good condition should not be changed, while all the rotten pieces should be exchanged according to the ones on the site.
- The missing part of the construction should be reconstructed, with the specific emphasis on the main trusses on top of the roof and wall, where both of these beams should be done new.
- The whole construction needs to be checked in terms of existing cracks (prepare a simple glass or gypsum piece that would be placed on several cracks in order to see weather the cracks move). While checking the building no major cracks were seen, but still it would be good for this measurement to be undertaken on the existing smaller cracks.

- The millstones and the paddles should be checked as well, and the ones that are suffering major damage should be replaced, by careful dismantling of only damaged mill wheel.
- The wooden construction of the flour plates should be changed as its rotten.



Elevations, existing condition



Elevations, proposal

Elevations

On the elevation of existing state it's visible that part of the existing roof is covered partially with brick tiles and partially with stone slates. Since the complete roof will be re-done, all the brick tiles should be exchanged with the stone slates.

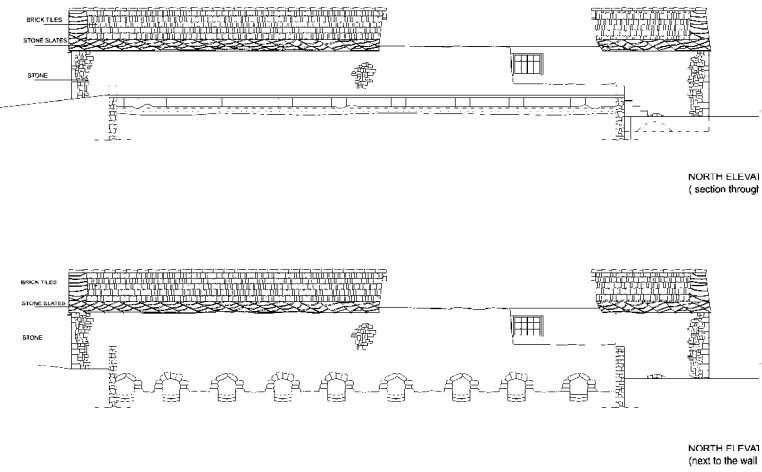
The windows should be checked once more, but while doing the research at the building, only the wooden frames of each window should be replaced with the new ones, and the missing iron nets should be added to three windows completely, while on fourth only upper part of the net is missing.

The facades should be re-plastered. The existing plaster has bulged out, and it needs to knocked down where its loose, and should be left where its standing. The new plaster should be a traditional mixture of lime plaster in two layers:

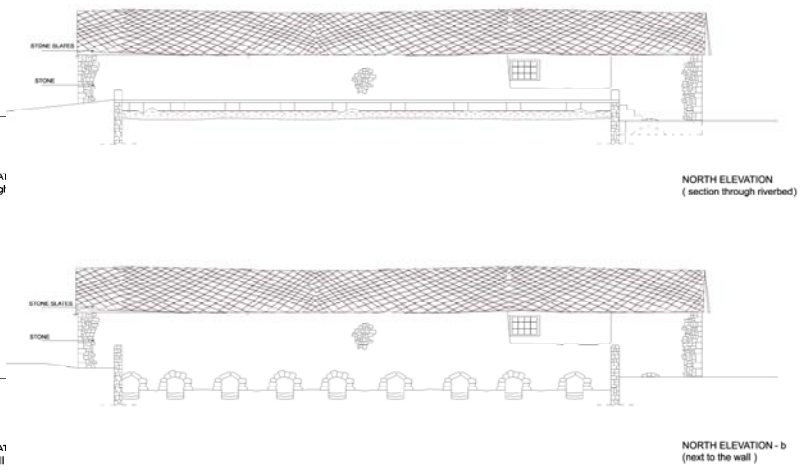
- 1:3 (lime + straw: sand)
- 1:3 (lime + goat hair: sand)

with final coat of lime wash.

The old plaster should be fixed with lime mixture and thread.



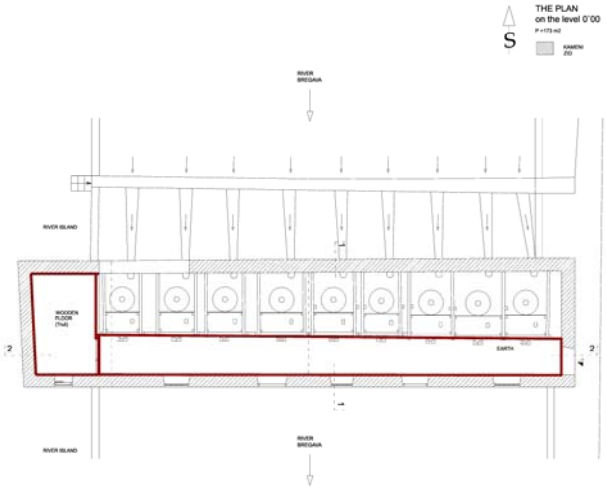
Elevations, existing condition



Elevations, proposal

The very important aspect of the proper work of the millstones is to make sure that the canals that lead the water towards the mill wheel are clean. As it can be seen on the drawings those canals are rather narrow, and nowadays they are full of vegetation and garbage, and this needs to be cleaned.

Plan, existing condition



Plan, proposal

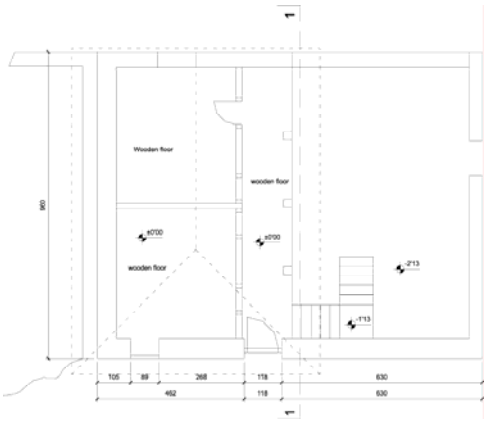
Plans

When taking the drawings of the existing condition of the plan the floors seemed to be in a partially good condition. The complete situation couldn't be assessed due to garbage and vegetation that was present in the both rooms of the building. Therefore it is important to:

- check the floor layers of both wooden floor in the small storage room and the earth floor in the main room with mills.
- In case the wooden floor (most probably) is rotten, it needs to be exchanged with the wood, of the same type as used previously (black pine, most probably)
- In case the earth floor has deteriorated, when making the test pits it could have been concluded that:
    - The mixture of the earth floor was lime and clay mixed and then pressed in several layers on the vaults above the mill wheels.
- therefore the same mixture should be applied

Implementation and Financial plan

Type of work	Duration of works	Price
Cleaning works	1 week	500EUR
Vegetation removal		
Roof works	9 weeks	30.000EUR
Timber		
Stone slates		
Façade works	2 weeks (with prepared lime)	2.500EUR
Plastering		

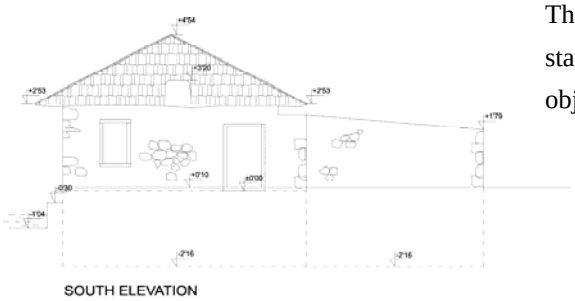


Special requirements		
Interior works	4 weeks	10.000EUR
Plastering		
Windows, iron nets		
Floors		
Mills		
TOTAL + 10% unf.wor.	**16 weeks**	**47.300EUR**

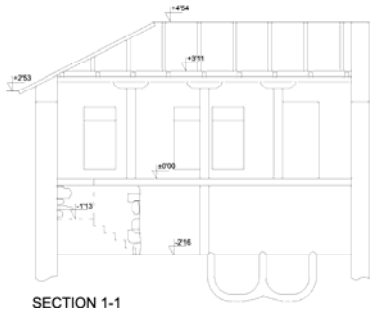
Proposal for maintenance program (utility object)

Since the utility building as a part of this study is in a rather good condition here are proposals for its maintenance.

Goal



SOUTH ELEVATION

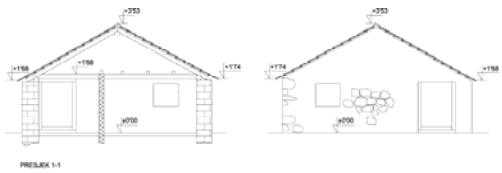


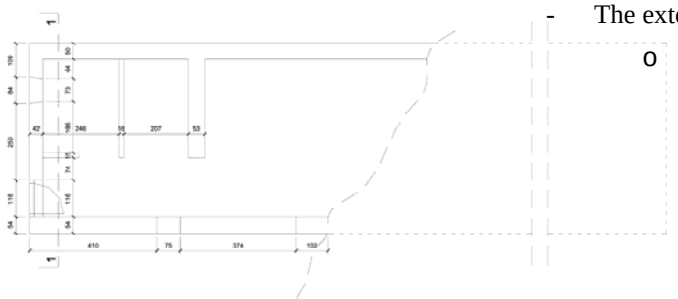
SECTION 1-1

The main goal is to protect the, maintain and develop the cultural historic values stated in the value analysis. The stated goals for safeguarding the values of utility object is as follows:

- Support the social value, in terms of safeguarding the structure that clearly depicts a certain period in development of Stolac
- Support the social aspect of a meeting place that this building always had
- Safeguard the environmental aspect of nature friendly system of washing laundry

The building was obviously altered from its original form, in terms of usage of modern materials as a roof cover, concrete staircases etc. Those changes will be maintained the way they are.





Special Maintenance Requirements / Walls

The maintenance requirements

- The humidity should be checked. Being very close to the river the walls are very sensitive to humidity and they deteriorate very quickly

Portals and reinforcements above the openings

The maintenance requirements

- Cleaning with dry rugs
- These parts cannot be lime washed or painted.

Special Maintenance Requirements / Plasters and Mortars

- The exterior walls are plastered with two different types of plaster:
  - lime cement plaster and lime plaster.
    - Lime cement plaster is applied in ratio 1:1:6 (lime: cement: sand). This ratio was used as a ground on the bottom parts of the walls to prevent washing out of lime plaster.
    - Lime plaster is applied in ratio 1:3 (lime: sand), on every other part of the wall. The lime in both types of plasters is

a naturally slaked lime. The industrially slaked lime shouldn't be used.

- The interior walls are plastered only with lime plaster

The maintenance requirements

- Every repair of the plaster can be made only according to the type of plaster applied on separate parts of the building.

Special Maintenance Requirements / Wood

The maintenance requirements

- Regular check of the tiles on the roof, since a small crack in the tiles will allow the penetration of the water in roof construction, and cause it rotten. As soon as there is a brick tile missing or it has cracked, it needs to be changed
- Regular check of the beams, in order to see if they are bending
- The check should be done, once a year with the horizontal level. The measures should be documented.
- Cleaning with the dry rugs and with water without added detergents
- Repainting (if needed) should be done with the linseed oil.

Proposal for maintenance plan (utility object)

Part of the building	Year 1	Year 2	Year 3	Year 4	Year 5
Plaster on the bottom of the walls	Yearly check in Spring	Yearly check in Spring	Yearly check in Spring	Yearly check in Spring	Re-plastering
The plaster on other parts of the wall	Yearly check in Spring	Yearly check in Spring	Yearly check in Spring	Yearly check in Spring	Lime washing
Horizontal beams at the porch	Yearly check	If the movements are evident, make a support	Yearly check	Change the beam if it still bends	Yearly check
Roof tiles	Check as often especially after storms	Check as often especially after storms	Check as often especially after storms	Check as often especially after storms	Check as often especially after storms
Roof trusses	Check once a year	Check once a year	Check once a year	Check once a year	Check once a year
Iron nets on the windows	Check if they rust once a year	Check if they rust once a year	Check if they rust once a year	Check if they rust once a year	Check if they rust once a year
Repainting the wood	x	x	x	x	Re-paint together with the iron nets
Water canals	Check and clean every couple of months, more often during late Spring and Summer	Check and clean every couple of months, more often during late Spring and Summer	Check and clean every couple of months, more often during late Spring and Summer	Check and clean every couple of months, more often during late Spring and Summer	Check and clean every couple of months, more often during late Spring and Summer

Conclusions

After conducted analysis and research on site, I have tried to obtain simple guidelines for the owners of the both buildings. They have expressed their wish and possible intention in future to face the challenge of restoring a mill, and there the only thing the architect can provide them is a set of practical guides.
Therefore the conclusion is based in two aspects:

Regarding Usage

- Simple guidelines for the owners of the both buildings
- Set of documents as a start for a discussion with responsible authorities in regards to possible funds

Regarding Vernacular heritage in general

- No matter there is no major academic interest for depicting values of vernacular heritage, they still find its usage in every day life
- With minor guidance from an architect the owners could stop their deterioration

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