The Primitive Assessment of the Wooden Church in Topla: A Study Based on the Comprehensive Survey and Analysis

Yudai Yazawa[1*)], Shinichi Hamada[2)]

[1*)] Faculty of Architecture, Nagoya Institute of Technology, Gokisocho, Showa-ku, Nagoya, Aichi, Japan, yudaiyazawa@gmail.com
[2)] Faculty of Architecture, Nagoya Institute of Technology, Gokisocho, Showa-ku, Nagoya, Aichi, Japan, hamada.shinichi@nitech.ac.jp

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Abstract

Wooden ecclesiastical architecture, although often overshadowed by Europe's dominant traditions of stone and brick construction, constitutes a vital and distinctive aspect of the cultural heritage across the Carpathian region. This is especially true for western Romania's Banat area, where local communities historically relied on abundant timber resources and developed sophisticated carpentry techniques adapted to their religious and environmental needs. This study focuses on the wooden church of Topla, originally constructed in 1746 in the village of Remetea Luncă (Timiș County), the church embodies centuries-old craftsmanship and vernacular architectural principles characteristic of the Banat region. Its subsequent relocations—first in 1807 to Topla village, and finally in 1987 to the open-air Banat Village Museum in Timișoara—reflect changing sociocultural circumstances and evolving priorities in heritage preservation. Despite its modest size, the church exemplifies sophisticated regional carpentry techniques and vernacular architectural traditions. Prior to its near-total destruction by fire in March 2025, a series of detailed pre-fire surveys—including measured drawings, photogrammetry, and trace analysis—were conducted, followed by post-fire documentation to assess damage and recover architectural data. The research reveals insights into the church's construction methods, historical modifications, and design logic, highlighting an asymmetrical floor plan resulting from 20th-century expansions and adaptations. Analysis of dimensional data suggests that the church's design does not conform to clear geometric or traditional measurement systems commonly found in the region, though sectional proportions demonstrate a coherent proportional logic based on façade width. This mixed-methods investigation integrates archival review and comparative study, contributing new empirical evidence toward understanding wooden church construction in Banat. The findings provide a critical foundation for future reconstruction and conservation efforts, while emphasizing the importance of preserving lesser-studied wooden ecclesiastical heritage beyond the internationally renowned Maramureș and Moldavian churches. This study aims to enrich the broader discourse on vernacular wooden architecture in Eastern Europe and to inform sustainable heritage management strategies.

Keywords: *wooden church, assessment, design methods, measurement survey,*

1. Introduction

While Europe has traditionally been characterized by stone and brick architecture, wooden structures have long been present, particularly around the Carpathian Mountainous which lay among Poland, Slovakia, Ukraine and Romania. In Romania, the wooden churches of Maramureș and Moldavia have gained international recognition, with several inscribed on the UNESCO World Heritage List for their outstanding cultural and architectural value.[1][2] Beyond these regions, there are numerous lesser-known wooden churches are in the country, particularly in areas such as Banat. However, scholarly attention has primarily focused on artistic or regional stylistic aspects, and detailed studies of construction techniques, later modifications, and preservation challenges remain limited.[3][4]

The Banat region, located in western Romania, possesses a significant yet under-researched heritage of wooden ecclesiastical architecture. Among these, the wooden church of Topla—originally built in 1746 in Remetea Luncă (Timiș County)—offers a valuable case for study. The church was relocated to the village of Topla in 1807 and again in 1987 to the Banat Village Museum on the outskirts of Timișoara.[5][6] The structure exhibits modest yet sophisticated carpentry techniques and interior decorative elements representative of the regional vernacular tradition. Despite its importance, historical documentation on the church has been scarce, and no comprehensive architectural or conservation records were available prior to this study.

Considering this, a series of on-site investigations were conducted between November 2024 and January 2025, during which detailed measured drawings, photographic documentation, and trace analyses were carried out to understand the church's construction, material usage, and architectural configuration. These investigations were abruptly given new urgency due to a fire that broke out during the early hours of March 25–26, 2025, caused by an electrical fault, which led to the near-total destruction of the structure.

Following the incident, two additional surveys were carried out between April and May 2025. These included the on-site photography and precise measurements of the previously insufficiently understood areas, and additionally checking the processing and fitting details.

This study offers a preliminary evaluation of the architectural significance of the Topla wooden church based on these surveys and analyses. In doing so, it aims to contribute to the broader understanding of wooden church construction in Banat and proposes a foundation for future reconstruction, documentation, and conservation strategies—both for Topla and for other similar wooden ecclesiastical structures across the region.

2. Methodology

The research was conducted over five separate site visits between November 2024 and May 2025, structured in two phases: pre-fire

documentation and post-fire damage analysis.

Pre-Fire Surveys (November 2024 – January 2025): Three comprehensive surveys were conducted prior to the fire, during which detailed measurements of the church's structure were recorded using both traditional manual techniques and photogrammetry. Scaled architectural drawings, including floor plans, elevations, and sections were produced. Photographic documentation of both exterior and interior elements was systematically performed to capture construction joints, carpentry methods, and decorative motifs. Trace analysis was employed to identify modifications in the joinery and wall surfaces.

Post-Fire Surveys (April – May 2025): Following the fire, two additional surveys were carried out to assess the extent of the damage and recover remaining architectural information. On-site photography and measurements focused on areas previously inaccessible or undocumented. Particular attention was paid to burn patterns, collapsed elements, and surviving joinery fragments, allowing for further understanding of the material's fittings and structural connections.

3D Documentation and Analysis: Data from all five surveys were synthesized into a digital 3D model using photogrammetry and CAD software. This model served as a key tool for visualizing the church's architectural configuration, both before and after the fire. The 3D reconstruction was also used to simulate possible original assembly methods and to hypothesize the chronology of construction phases and later alterations. The reason for conducting both manual measurement and digital surveying is that it is difficult to capture the full dimensions of the building through manual measurement alone, while digital surveying alone cannot adequately record fine traces or construction details. Moreover, since this research focuses specifically on construction techniques, relying solely on digital surveying would be insufficient. Traditional manual measurement also serves as preparation for a detailed investigation of traces and specifications, which are essential for understanding the technical aspects of the architecture. (Fig.1)

Archival Review and Comparative Study: Although historical records on the Topla church were limited, available documentation from the Banat Village Museum and regional church surveys were reviewed to contextualize findings.

This mixed-methods approach allowed for a multi-layered evaluation of the Topla wooden church's constructional logic, historical development, and architectural significance—despite its physical loss—thus laying a foundation for informed reconstruction and future conservation planning.

Fig. 1. Measurement and 3D model of the wooden church in Topla.

3. Results

This section presents the results of the five field investigations and subsequent analyses conducted on the Topla wooden church, with a focus on its historical development, structural configuration, and surviving physical evidence. The findings are organized into four main categories: (1) historical chronology, (2) construction specifications and techniques, (3) architectural drawings, and (4) trace analysis. Each category contributes to a more comprehensive understanding of the building's original design, its later modifications, and the knowledge required for potential reconstruction or conservation planning.

First, the chronological outline summarizes the documented relocations and major interventions based on available historical references. Second, the construction specifications detail the structure's typology, log stacking technique, framing methods, design motifs, and joinery traces. Third, architectural drawings derived from measured surveys provide scaled representations of the church in plan, section, and elevation. Lastly, the trace analysis reveals evidence of past alterations, including notches, beam sockets, and joint profiles—many of which became visible or verifiable only through on-site investigations and post-fire inspection.

Together, these results provide the empirical basis for evaluating the architectural significance of the Topla church and inform broader discussions on wooden ecclesiastical heritage in the Banat region.

3.1 Organizing the documents

The wooden church in Topla was originally built in 1746 in Remetea Luncă and was relocated to the village of Topla in 1807.[5][6] During this relocation or a subsequent renovation, murals were painted on the interior walls, and the ceiling was also decorated in 1854, 47 years later. It has been reported that the roof was replaced either in 1842 or 1942, possibly switching to galvanized or ceramic tiles, although specific details remain unclear. [6]

In the 20th century, a broader movement advocating for the preservation of historic buildings gained momentum, and in 1928, it was said by oral that the first formal assessment of the historical value of the Topla church was conducted. However, no documentation from this evaluation has survived, and the original appearance of the church remains unknown. That said, considering the roof was replaced with ceramic tiles in 1942 and later with shingles in 1969, it is likely that the ceramic tiles were chosen in 1942 due to limited financial resources, while the 1969 re-roofing with shingles may have been an intentional attempt to reflect the findings or memory of the 1928 assessment, made possible by the availability of sufficient funding at that time. According to oral tradition, in the 20th century, at the request of the priest at the time, part of the apse was expanded, resulting in its current asymmetrical floor plan. [6]

By the mid-20th century, a declining local population made maintenance increasingly difficult, and the idea of relocating the church to Timișoara was proposed. In 1975, correspondence was exchanged between the Archdioceses of Caransebeș and Timișoara regarding the future of the church. A formal survey was conducted in August 1976, during which drawings and records were compiled.[6] Based on this survey, the church was officially designated a national cultural monument in 1980.[7] It was dismantled in 1987 and subsequently reassembled between 1994 and 1996 at the Banat Village Museum in Timișoara.[5][6] Around the year 2000, a severe storm damaged the

tower and roof, prompting repairs including ceiling reinforcement and the reconstruction of the tower. [8] Also, the manager of the museum said that the roof was replaced again in 2012. However, on March 26, 2025, an electrical malfunction caused a fire that destroyed the roof and tower and inflicted significant damage on the interior.

Tab. 1. Tim line of the wooden church in Topla by organizing the documents.

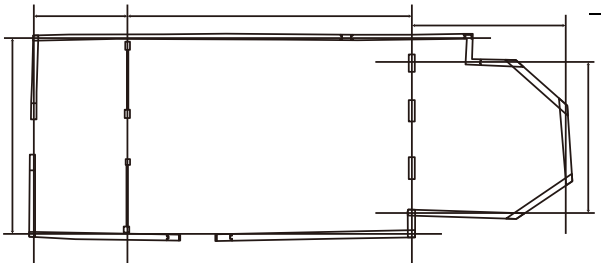
Date	
1746	built in Remetea-Lunca
1807	moved to Topla and the wall was painted
1854	The ceiling was painted
20th century	Expand the apse by the request of the priest
1928	Primitive assessment
1942	the roof was covered with ceramic tiles
1969	back to shingles made of fir tree
1980	designated as national cultural heritage
1987	dismantled to move to Vanat Village Museum
1995	assembled and displayed
1998	broke due to the strong storm and then added support to the vault
2012	re-roofing
2025	burned out (caused by accidental fire of electrical equipment)

3.2 Specifications

This section details the architectural and structural characteristics of the Topla wooden church, as documented during pre- and post-fire field surveys. The specifications are organized according to major architectural elements, including the floor plan, wall structure, roof assembly, joinery techniques, and interior finishes. These observations not only reveal the sophistication of local carpentry traditions but also serve as critical references for any future reconstruction or conservation efforts.

3.2.1 Building scale

This section describes the overall dimensions of this church. All measurements were taken as the unit of centimeter, from center to center of the walls; for example, the depth of the naos is measured from the center of the iconostasis beam to the center of the partition beam. And from the following figure, there is a difference of about 15 cm between the north and south sides, most of which occurs in the apse. (Fig.2)



Name	Width	Direction	Depth
Pronaos	454.0cm	North	279.0cm
	-	South	279.0cm
Naos	454.0cm	North	595.0cm
	-	South	599.0cm
Apse	357.0cm	North	351.5cm
	-	South	366.0cm
Total	454.0cm	North	1225.0cm
	-	South	1241.0cm

Fig. 2. The overall dimensions of this church.

3.2.2 Structural Forms

This section outlines the structural system and architectural features of the Topla wooden church based on field surveys conducted between 2024 and 2025. (Fig.3)

Floor Plan Configuration: The church follows the traditional Orthodox tripartite layout of the pronaos, naos, and apse. The apse is separated from the naos by an iconostasis, while the pronaos and naos are divided by a wooden partition. The apse is narrower in width compared to the naos and pronaos and features a polygonal rear extension. Notably, the northern side of the apse extends further than the southern side, resulting in an asymmetrical floor plan.

Wall Structure and Framing: The walls are constructed using horizontally stacked beams. At the corners, flush joints are formed using dovetail joints. Some columns are put in part of the northern wall and make the wall beams connected and help bear the load of the timber wall. A flat, plate-like timber beam is placed on top of the wall beams, around which the girder and beam system is laid out.

Eaves Structure: The rafters lay on the flat plate beams which are the top of the wall and are fixed with wooden nails, forming a truss. The eaves are finished with exposed boarding, serving hiding the fittings.

Roof Framing (Trusses): The bell tower is erected above the pronaos and is supported by beams that span from the partition between the naos and pronaos to the main entrance frame. Over the naos, large trusses are constructed, within which a vaulted ceiling is inserted. In the apse, vaults and trusses are set atop beams that span rearward from iconostasis. Unlike conventional construction, no roof sheathing boards are placed over the rafters; instead, battens for roofing boards are installed directly. There is no ridge beam—the rafters are joined at their apex to form the roof structure.

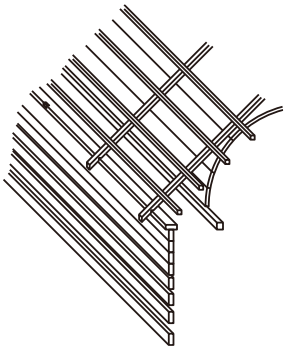
Roofing: The roof is covered with fir wood shingles. The overall shape is a simple rectangle, and the exposed ends of the shingles are tapered to improve water runoff.

Openings (Doorways): Two main entrances are provided: one on the west side (front) and another on the south side, traditionally designated for male and female congregants respectively. The front entrance features rope-like carved ornamentation, while the side entrance lacks such decoration and is also smaller in size.

Flooring: The original floor is believed to have been earthen, but it has since been replaced entirely with wooden planks.

Ceiling: Ceiling treatments vary by space: the pronaos feature a flat ceiling; the naos is fully vaulted; and the apse has a vaulted ceiling only in the central area, with flat ceilings surrounding it.

Floor Plan Configuration

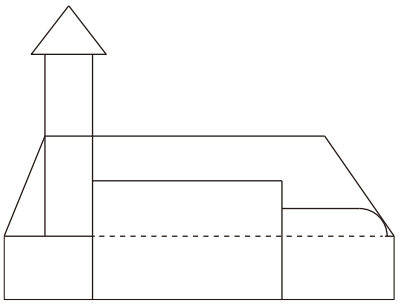


The fittings of structure

Roof framing

Roofing

The doors for male and female



Ceiling

Fig. 3. Structural forms.

3.2.3 Detailed specifications

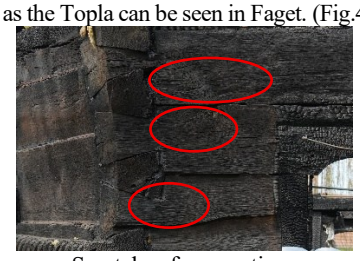
The way of stacking the wall beams: The wall of Topla was composed by stacking seven planks which have the dovetail called “Flush joint” on the corner and the method of building walls using dovetail is called “Block Bau system.” Also, the planks are processed on site to make dovetails, so that is why their height and dovetails are not even, in other words, they are not standardized, but if looking at the horizontal line of the wall, they are aligned at several points. It indicates that this is the way to stack accurately without standardization.

Rope design: A design of a rope around the church on the center of the walls, but it around the back or rear of the apse cannot be seen. Also, regarding the rope design on the north side, where rope design is missing and their beams are shorter than others. The rope is mainly a right-hand twist, but some left-hand twists can be seen in the south side. On the left figure, red lines indicate the right-hand twist and blue ones is the left-hand twist, also red dotted lines indicate rope design is missing.

Scratches for counting: There are scratches on the wall and it is considered they were scratched on purpose when the church was dismantled for reassembling accurately. In the Topla, they are just vertical lines, for example, in case of the fifth plank, five vertical lines can be seen there. There is a different scratch system, but scratches for counting which is the same as the Topla can be seen in Faget. (Fig.4)

How to stack the wall beams

The rope design



Scratches for counting

Fig. 4. Detailed specifications.

3.3 Drawings

Floor plan and cross-section plan were produced from measured drawings and 3D models. (Fig.5)

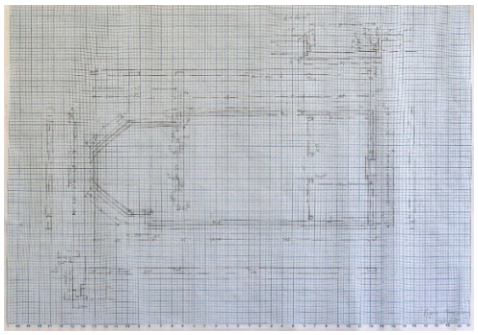


Fig. 5. Hand-drawn drawings and 3D model.

3.3.1 Floor plan

The prepared plan view is shown below. (Fig.6)

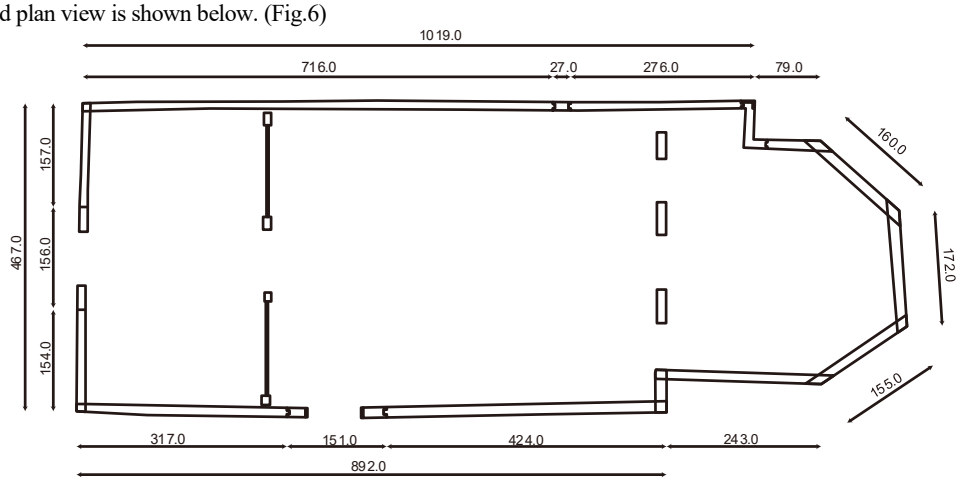


Fig. 6. Floor plan; scale 1:100.

3.3.2 Cross-section plan

The prepared plan view is shown below, however, it's not including the details about the bell tower and measurement values, as the church was burnt down before accurate measurements could be taken of the height relations. Therefore, it can be produced by using only 3D models. (Fig.7)

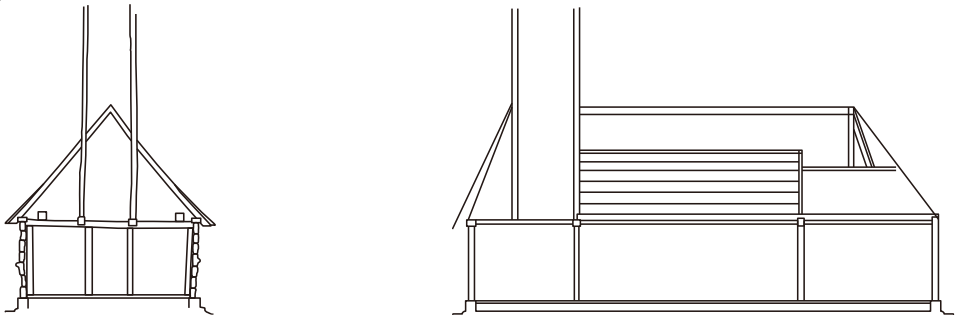


Fig. 7. Cross-section plans; scale 1:200

3.4 Organizing some traces

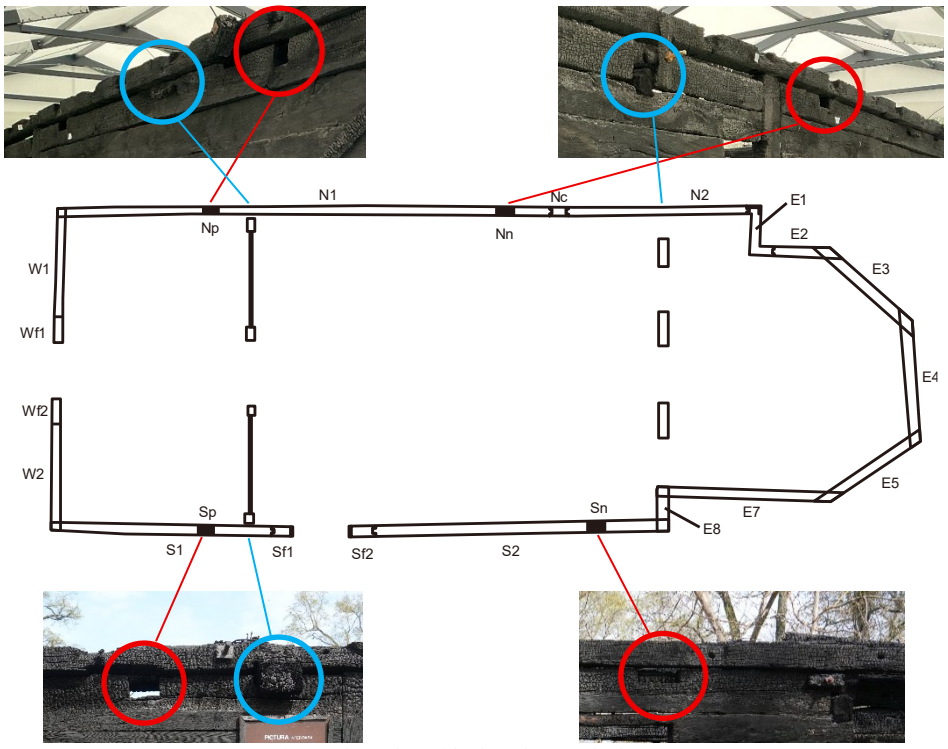


Fig. 8. Floor plan with plotted traces for beams.

Each material is named as directions + parts name or numbers. For example, the column placed in northern side is described Nc and Traces for beams are also named as directions + locations; for example, the trace placed in the northern side at pronaos is designated Np.

Beam traces are color-coded: blue for elements currently in use, and red for historical components no longer present. Notably, red traces such as Np and Sp are symmetrically positioned. Considering the blue traces remaining in the pronaos, it can be inferred that a partition once existed at the Np–Sp line, marking the boundary between the naos and the pronaos. In contrast, the traces remaining in the naos—Nn and Sn-are asymmetrical and lack corresponding counterparts. (Fig. 8)

4. Discussions

This section explores the architectural logic and historical development of the Topla wooden church, based on the results of field surveys, structural analysis, and trace evidence. Particular attention is given to two aspects: first, the design methods employed in the original construction and subsequent modifications; and second, the asymmetry observed in certain structural traces, which may reflect undocumented phases of alteration or reconstruction. Through these perspectives, the discussion aims to provide a deeper understanding of both the planning principles underlying the church's layout and the material history embedded in its surviving elements.

4.1 Design methods

In Romania, wooden churches are generally designed according to geometric principles that reflect both spatial hierarchy and symbolic function. Building on this understanding, this chapter examines the design methods applied in the construction of the Topla wooden church, as revealed through measured surveys and 3D models.

4.1.1 Floor plan

In the case of the wooden church of Topla, the apse appears to have been planned as a square, but the rest of the building does not exhibit clear evidence of geometric planning. The depth of the naos and pronaos suggests a possible attempt to apply the diagonal of the golden ratio; however, there are no architectural elements corresponding to this proportion, and such a planning approach is not observed in other churches of the Banat region. Examining the individual units further, the proportions of the pronaos come closest to the inverse golden ratio, yet this also lacks precedent in the region and appears coincidental. The naos, on the other hand, shows no indication of having been designed according to any consistent proportional system. In summary, the floor plan of the Topla wooden church cannot be confidently described as geometrically conceived. This suggests that an alternative planning rationale may have guided its layout. (Fig.9)

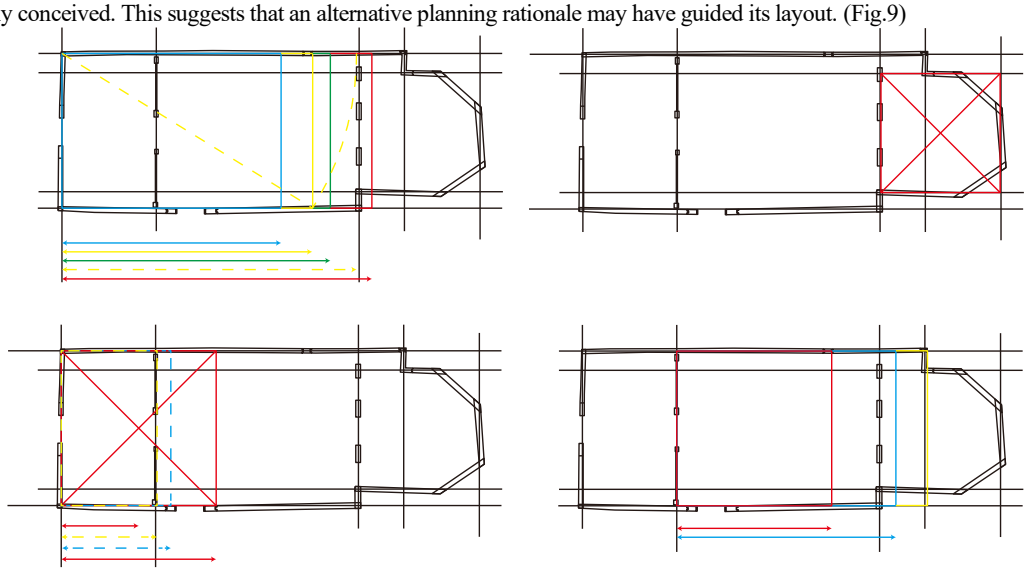


Fig. 9. Examining the proportions in the floor plan.

Next, this section considers the possible use of the feet-based measurement system. The Banat region was historically under the control of the Austro-Hungarian Empire, during which the Austrian fathom served as the standard unit of measurement. Based on this unit, other measurements such as the feet and hand were derived and especially, Western Romania used fathom and the feet spready.

Regarding the relations between fathom and feet, while in most parts of Europe 1fathom is usually divided into 6feet, in this region it was commonly divided into 10feet. Even after the introduction of the metric system in 1874, the Austrian-based measurement system—particularly the feet—remained strongly rooted and continued to be widely used in western Romania, including the Banat region.

Although the length of a fathom varied over time, the specific standard applied in the Banat region remains unclear. Therefore, this study adopted 11 historical fathom standards, used between the 16th and 19th centuries, and applied their corresponding feet values to the floor plan in order to investigate possible planning logic. All measurements were taken as the unit of centimeter, from center to center of the walls; for example, the depth of the naos is measured from the center of the iconostasis beam to the center of the partition beam. The following table presents the church's principal dimensions converted into various feet units for comparative analysis.

Tab. 2a. Examining the feet system applied to the floor plan.

Name	Width	Direction	Depth	28.8cm(w/d)	28.96cm(w/d)	29.49cm(w/d)	29.76cm(w/d)
Pronaos	454.0	North	279.0	15.76/9.688	15.68/9.634	15.40/9.461	15.26/9.375
	-	South	279.0	15.76/9.688	15.68/9.634	15.40/9.461	15.26/9.375
Naos	454.0	North	595.0	15.76/20.66	15.68/20.55	15.40/20.18	15.26/19.99
	-	South	599.0	15.76/20.80	15.68/20.68	15.40/20.31	15.26/20.13
Apse	357.0	North	351.5	12.40/12.20	12.33/12.14	12.11/11.92	12.00/11.81
	-	South	366.0	12.40/12.71	12.33/12.64	12.11/12.41	12.00/12.30
Total	454.0	North	1225.0	15.76/42.53	15.68/42.30	15.40/41.54	15.26/41.16
	-	South	1241.0	15.76/43.09	15.68/42.85	15.40/42.08	15.26/41.70

Tab. 2b. Examining the feet system applied to the floor plan.

29.79cm(w/d)	29.92cm(w/d)	30.39cm(w/d)	30.4cm(w/d)	30.56cm(w/d)	30.8cm(w/d)	31.6cm(w/d)
15.24/9.366	15.17/9.325	14.94/9.181	14.93/9.177	14.86/9.130	14.74/9.058	14.37/8.829
15.24/9.366	15.17/9.325	14.94/9.181	14.93/9.177	14.86/9.130	14.74/9.058	14.37/8.829
15.24/19.97	15.17/19.89	14.94/19.58	14.93/19.57	14.86/19.47	14.74/19.32	14.37/18.83
15.24/20.11	15.17/20.02	14.94/19.71	14.93/19.70	14.86/19.60	14.74/19.45	14.37/18.96
11.98/11.80	11.93/11.75	11.75/11.57	11.74/11.56	11.68/11.50	11.59/11.41	11.30/11.12
11.98/12.29	11.93/12.23	11.75/12.04	11.74/12.04	11.68/11.98	11.59/11.88	11.30/11.58
15.24/41.12	15.17/40.94	14.94/40.31	14.93/40.30	14.86/40.09	14.74/39.77	14.37/38.77
15.24/41.66	15.17/41.48	14.94/40.84	14.93/40.82	14.86/40.61	14.74/40.29	14.37/39.27

Some of the values can be expressed as whole numbers using certain feet system, and the smallest margin of error occurs when 1 feet is equal to 30.39 or 30.4 cm. However, not all dimensions align perfectly with whole numbers. Furthermore, none of the other feet standards yield consistent integer-based feet system. Therefore, based on the current analysis, it is difficult to conclude that the wooden church at Topla was designed using a feet system.

4.1.2 Cross-section plan

Next, regarding the design planning in the sectional view: since most of the Topla wooden church, except for the walls, was destroyed by fire, the analysis focuses on the remaining components and photographic records to identify proportional relationships. While no clear proportionality is observed in the floor plan, such relationships become apparent in the sectional view. Dr. Alexandru Baboș mentioned in his thesis that many wooden churches were designed by first determining the width of the façade, with the rest of the structure planned in proportion to that width. Similarly, in the case of the Topla wooden church, it was found that many elements were geometrically planned based on the width of the front. Below is this design scheme. (Fig.10)

1. Determine the width and 1/2 of the width as the height (from the bottom of the foundation to the upper of the beam for the partition).
2. The door is 1/3 of its width and the girder is bridged to its outer frame.
3. Centered on the upper end of the beam, the lower end of the door outer frame and the truss ridge are on the same circumference.
4. The center of the vault is planned to be at the upper of the beam and inscribed with the truss.
5. The upper end of the beam and the lower end of the roof of the bell tower are on the same circumference, centred on the truss ridge.
6. The truss ridge is at 1/2 of the total length.

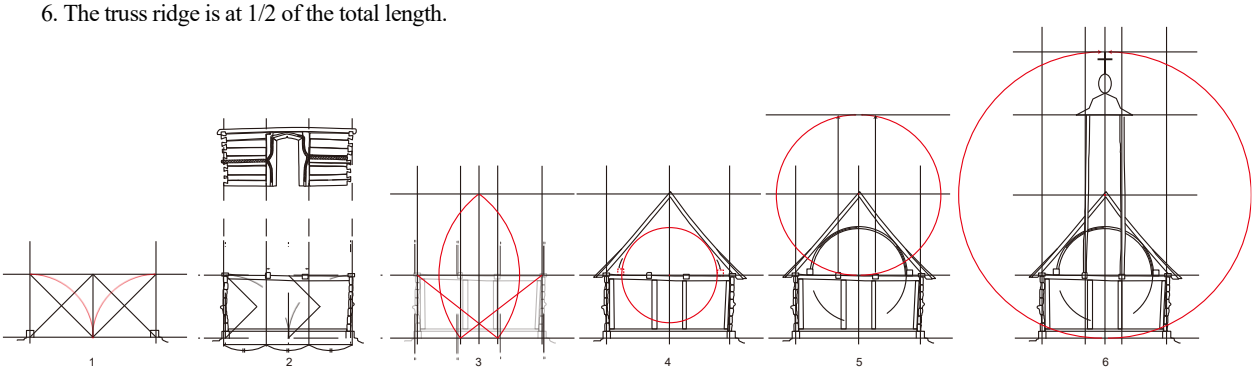
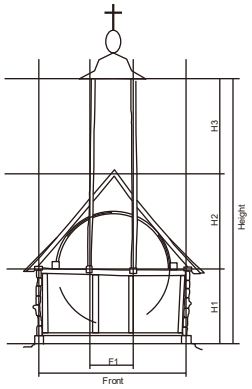


Fig. 10. The design scheme of the cross-section.

The next step is to examine the feet system, but as the building was burnt down before accurate measurements could be taken of the height relations, this is done using figures obtained from the 3D model. Therefore, errors with the actual measurements are included. In addition, as nothing remains above the roof of the bell tower, the study will focus on the area below that. (Fig.11)



	Front	F1	Height	H1	H2	H3
Length	457.80	135.35	828.03	234.24	300.47	293.32
28.8cm	15.90	4.700	28.75	8.133	10.43	10.18
28.96cm	15.81	4.674	28.59	8.088	10.38	10.13
29.49cm	15.52	4.590	28.08	7.943	10.19	9.946
29.76cm	15.38	4.548	27.82	7.871	10.10	9.856
29.79cm	15.37	4.543	27.80	7.863	10.09	9.846
29.92cm	15.30	4.524	27.67	7.829	10.04	9.803
30.39cm	15.06	4.454	27.25	7.708	9.887	9.652
30.4cm	15.06	4.452	27.24	7.705	9.884	9.649
30.56cm	15.98	4.429	27.10	7.665	9.832	9.598
30.8cm	14.86	4.394	26.88	7.605	9.756	9.523
31.6cm	14.49	4.283	26.20	7.413	9.509	9.282

Fig. 11. Examining the feet system in height relations

As with the study of floor plan, 11 different types of feet were used in the study, but none were calculated as whole numbers, so it is difficult to say that this was also planned in the feet system.

4.2 Asymmetry of traces

This section focuses on the fact that Nn and Sn do not correspond to each other and explores the possible purpose and reasoning behind the remaining traces. Neither Nn nor Sn have corresponding beam marks, and their function remains unclear. Focusing on the age of the materials, it is assumed that S2 is an original component, as it contains a window believed to date from the initial construction. Additionally, since the beam marks on N1 and S1 align, these two members can be considered contemporaneous. However, the absence of a corresponding mark for Nn on S2 indicates a discrepancy in age between S2 and N1/S1, suggesting that N1 and S1 are not original materials. If that is the case, then S2 would have already been in place at the time when Nn was used and this makes it difficult to explain why there is no corresponding trace to Nn on S2, even though it would have coexisted with it.

Next, in the case that Nn and Sn correspond to each other, in wooden churches of the Banat region, the naos ceiling is typically vaulted, making it unlikely that diagonal beams were installed between the current positions of Nn and Sn. Therefore, it is likely that a beam was placed parallel between Nn and Sn. For such a parallel configuration, S2 would have needed to be set back toward the west. Considering that the gap between Nn and Sn is approximately 130 cm—nearly identical to the width of the women's entrance on the south side—it can be inferred that the church was originally shorter and lacked this entrance. Furthermore, regarding the function of Nn and Sn, considering the current beam traces of the iconostasis in the naos, it is likely that Nn and Sn mark the position of a previous iconostasis. At this point, the architectural transformations of this church can be summarized. (Fig.12)

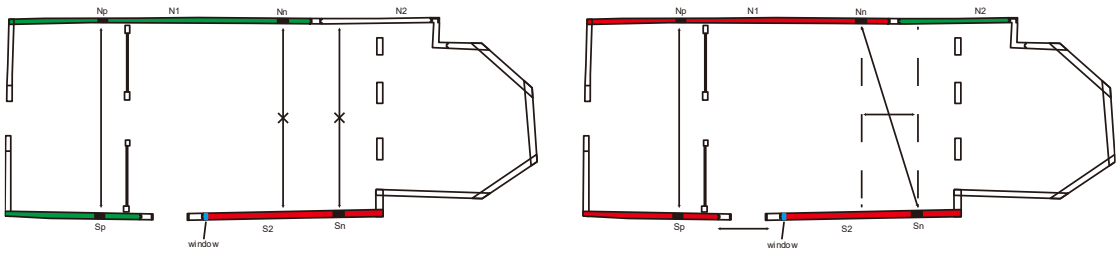


Fig. 12. Examining the correspondence between traces of beams.

It is considered that, originally, there was no women's entrance, and the overall structure was more compact. The iconostasis was likely located at the positions marked by Nn and Sn, and the partition was positioned accordingly at Np and Sp to match this reduced layout. While the exact configuration of N2, E1 and E2 remains unclear, the fact that other wooden churches in the Banat region typically feature symmetrical floor plans suggests that the Topla wooden church also originally had a symmetrical layout. (Fig.13) It has been confirmed that the absence of a women's entrance in the original design is also observed in the wooden church in Bătești.[9]

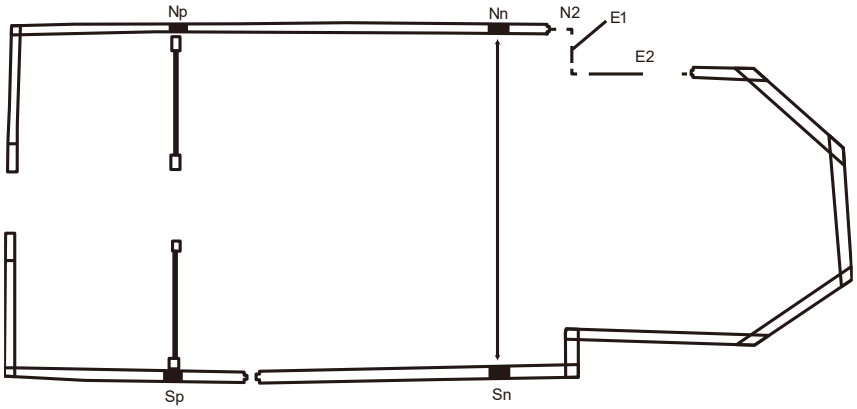


Fig. 13. Estimated original floor plan; scale1:100

Regarding the current positions of the partition and the iconostasis after the expansion, it is evident that all structural components, including the flat beam resting on top of the wall, were constructed as single pieces adjusted to the expanded size. Additionally, since the iconostasis is integrated with E8—a configuration that would have required the wall to be reassembled—these elements were likely repositioned during the expansion. Furthermore, in N2 and E1,2, which are believed to have been added in the 20th century, structural framework that remains today exhibit a symmetrical. This suggests that, at the time of expansion, the northern side was completed in a manner symmetrical to the southern side, and the wooden walls likely followed a symmetrical floor plan as well. However, the precise details of this configuration are unclear. (Fig.14)

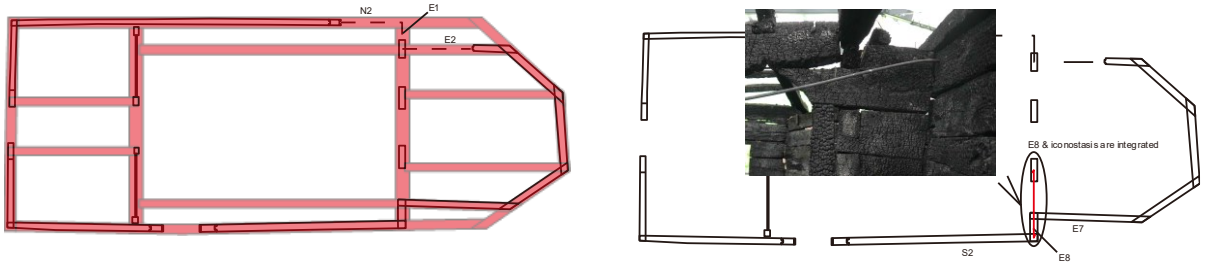


Fig. 14. Relations between the framework and the wall.

Regarding the position of the bell tower, immediately after the expansion to its current size, the bell tower was located a little more to the front side. This can be seen from traces and photographs. (Fig.15)

Fig. 15. Traces for the bell tower indicating the original position.

4.3 Re-examining the design methods in the estimated original plan

The next step is to re-examine the design methods in the estimated original floor plan. Below is the examining the proportions. (Fig.16)

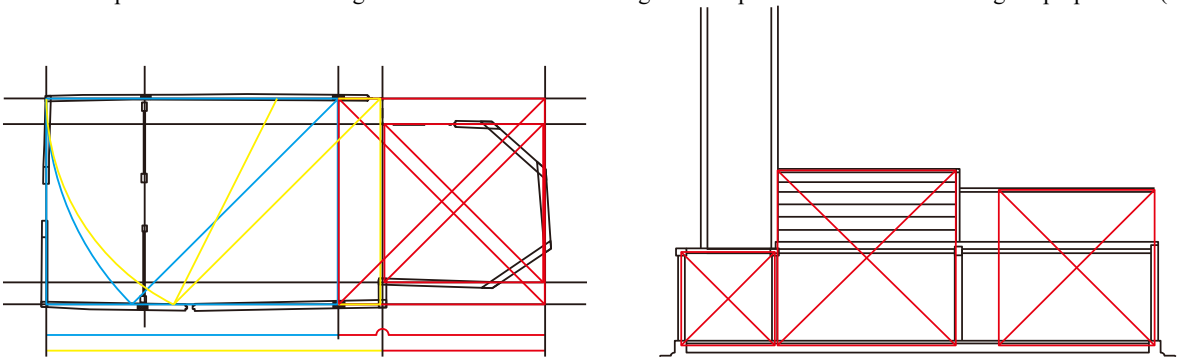


Fig. 16. Examining the proportion in the estimated original plan.

A geometric analysis reveals that the pronaos and naos conform approximately to the silver ratio, while the narrowing section from the front aligns with the golden ratio. The polygonal apse and apse are based on square proportions, and although the naos is not a perfect square, it closely approximates one. In the side elevation, the pronaos, naos, and polygonal apse section each appear to be designed as squares. Furthermore, the naos and the polygonal apse section are nearly cubic in volume, a spatial configuration commonly found in the wooden churches in the Maramureș region.。 (Fig.17)

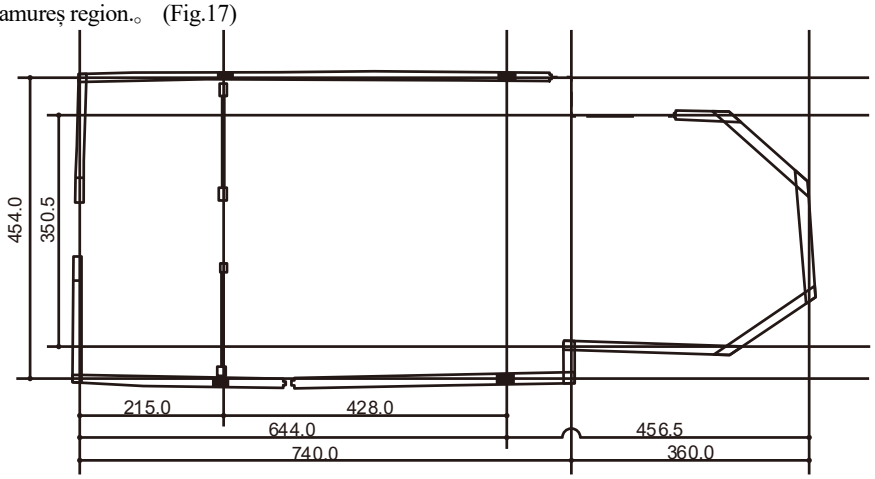


Fig. 17. Examining the feet system in the estimated original floor plan.

The next step involves examining the use of the feet system. Since only the depth appears to have been altered from the original plan, the analysis focuses on this dimension. Assuming that the front was originally planned as whole numbers specifically 15 feet, the study tests seven candidate feet lengths ranging from 29.76 cm to 30.8 cm to assess how well they correspond to the building's depth.

Tab. 3. Examining the feet system applied to the estimated original plan.

	350.5cm	**215.0cm**	**428.0cm**	**644.0cm**	**456.5cm**	**740.0cm**	**360.0cm**	**1100.0cm**
29.76cm	11.78	7.224	14.38	21.64	15.34	24.87	12.10	36.96
29.79cm	11.77	7.217	14.37	21.62	15.32	24.84	12.08	36.93
29.92cm	11.71	7.186	14.30	21.52	15.26	24.73	12.03	36.76
30.39cm	11.53	7.075	14.08	21.19	15.02	24.35	11.85	36.20
30.4cm	11.53	7.072	14.08	21.18	15.02	24.34	11.84	36.18
30.56cm	11.47	7.035	14.01	21.07	14.94	24.21	11.78	35.99
30.8cm	11.38	6.980	13.90	20.91	14.82	24.03	11.69	35.71

The analysis shows that when 1 feet is assumed to equal 30.56 cm, the building's front measures 15 feet and its total length 36 feet. The

depths of each room (pronaos, naos, apse) are calculated as follows: 7 feet for the pronaos, 14 feet for the naos, and 15 feet for the apse—each aligning closely with whole-number values. This suggests that the original floor plan was designed using a combination of proportional logic and the feet system with the intension. However, since the value of 1 feet = 30.56 cm does not result in whole numbers for the building's vertical dimensions, the extent to which the feet system was applied remains uncertain.

5. Conclusion

While the current configuration of the church does not directly reveal a clear design methodology, the analysis of structural and dimensional traces has allowed for a hypothetical reconstruction of the original design intent. Through this reconstruction, underlying proportional relationships and the possible use of a feet-based measurement system (1 feet = 30.56 cm) have become evident. These findings suggest that the initial design may have employed a coherent planning logic based on both geometric proportions and traditional units. To refine and substantiate these insights, further investigations are required—particularly regarding vertical dimensions and structural relationships. This includes not only expanded photogrammetric analysis and detailed documentation of the fire-damaged remains, but also the application of dendrochronology to identify original construction materials. Such multidisciplinary research will be essential to sharpen the current hypotheses and enrich the broader understanding of wooden ecclesiastical architecture in the Banat region.

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Provision of 3D models: Biserica de lemn „Sf. Arhangheli" din Topla (astăzi în cadrul Muzeului Satului Bănățean) TM-II-m-A-06093, autori geog.Adriana Sărășan, geog. Adrian-Cristian Ardelean (Muzeul Național al Banatului, Timișoara).

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