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Structural Features and Survey Results of the 18th-Century Illinska Church in Korop

Abstract. The article presents the results of a comprehensive study of the 18th-century Illinska Church located in the urban-type settlement of Korop, Chernihiv region, which is a valuable monument of Ukrainian Baroque architecture. The aim of the study was to identify the structural characteristics of the building and to determine the technical condition of its main elements. The research utilized archival materials that made it possible to reconstruct the history of construction and subsequent renovations, as well as data from on-site surveys conducted by the author during field expeditions.The main attention was focused on the analysis of the masonry walls, the wooden floor structure, and the metal tie rods that ensure the spatial rigidity of the building. It was established that the masonry consists of brick laid on a lime mortar and contains areas of material loss and wall cracking. The walls in the northern part of the church are 2 m thick, while those in the southern part are 1 m thick. The wooden structural elements of the floor are almost completely destroyed, with remaining fragments in an emergency condition. The metal tie rods embedded in the masonry are partly cut and are made of square steel bars with a cross-section of 4×4.5 cm, as well as steel strips measuring 7–8×1.0–1.5 cm. The study was carried out with the support of the Department of Urban Planning and Architecture of the Chernihiv Regional State Administration. The obtained results have practical significance for the further development of conservation and restoration guidelines for the church and are of scholarly interest in the context of studying traditional structural systems and their adaptation to modern operating conditions.

Keywords: Illinska Church, brick masonry, metal tie rods, survey, technical condition

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Introduction.

In the southern part of the urban-type settlement of Korop, approximately 1 km south of the central square and outside the boundaries of the former town fortress, stands the Illinska Church – an architectural monument of national significance [1]. A brick Ascension Church (1764) is located across the street. In the second half of the 18th century, both buildings formed a single architectural ensemble, the territory of which was divided in the early 19th century by the newly laid Voznesenska Street. Both churches served as architectural dominants; however, Illinska Church lost its dominant role as a result of destruction in the 1930s.

Mykhailo Tsapenko, in his works from 1967 [2, 3], suggested that the tower-like domed structure contained loopholes and was built in the 15th–16th centuries as a defensive tower–donjon – to which a two-storey building for storing weapons or housing a garrison was added in the 17th–18th centuries. He also assumed that the upper part of the structure was constructed later, forming a belfry, and the building itself was converted into a church. His assumptions were based on the massiveness of the building and the unusually thick walls, approximately 2 m. Nevertheless, Tsapenko noted that the structure had not yet been fully understood.

During the comprehensive research conducted by the UkrNDIproektrestavratsia Institute in 1982, Yu. A. Lifshyts, based on a preliminary visual inspection of the monument [4], questioned the correctness of earlier hypotheses. He noted that the preserved decorative elements, the presence of original internal staircases leading to the tower, the existence of continuous metal tie rods embedded within the walls, and the complete absence of loopholes (given that one of the window openings on the first floor remained unchanged) allow interpreting the structure as purely civil, constructed as a unified whole, with a house church being one of its components. Furthermore, during the building's operation and due to later reconstructions, extensions, and losses, both its exterior appearance and spatial-

planning configuration, as well as its decorative features, underwent changes [4].

In 2008, based on the work of UkrNDIproektrestavratsia, an attempt was made to restore the building. Restoration works began but were never completed.

In 2009, local historian and librarian Valentyna Mykhailenko compiled a publication summarizing materials concerning the history of Korop [5]. According to her work, the presence of a special "hetman's" company in Korop – numbering several hundred Cossacks – necessitated the construction of a unique structure at the western gate of the town fortress: the Illinska Church-fortress, the only one of its kind on the Left Bank. Citing Tsapenko and other sources, she also provided recollections of local residents and quotations from newspapers. For example, she quoted that "*the elderly still remembered that even in the early 20th century cannons placed on the church-fortress were fired during holidays." A detailed description of the structure by V. Kurylenko (1980) emphasized its fortress-like character, thick walls, hidden doors leading to underground passages, a long narrow corridor, and openings unsuitable for window frames – interpreted as loopholes.*

However, she also cited an archival note suggesting that after the fall of the Sich, the artillery yard was abandoned, and following the construction of the Ascension Church, the local architect M. Mostsepanov erected a two-tier superstructure atop the old fortress tower as a memorial to the Cossacks. The belfry was consecrated as Illinska in honor of St. Elijah and Illya, the son of General Quartermaster Petro Yurkevych. Thus, the name "Illinska Church" emerged [5].

In 2019, an archaeological expedition of T. H. Shevchenko National University "Chernihiv Collegium" conducted architectural and archaeological investigations aimed at determining the construction date [6]. A test pit was excavated to examine the foundation structure and to establish the construction period. Researchers also collected brick samples for laboratory analysis. Their findings clarified several issues: Illinska Church was built on a 17th-century cemetery and had undergone no major alterations. The characteristic features confirmed that the building was erected no earlier than the mid-18th century. The study also presented the first written references to the structure and summarized previous research.

In 2005, in the volume Architectural and Urban Planning Monuments of Left-Bank Ukraine [7], researcher Viktor Vechersky, writing prior to the excavations of Olena Chernenko, agreed with Tsapenko and interpreted the building as defensive. However, in 2021, in an online encyclopedia [8], incorporating more recent data, he stated that the exact date and original purpose remain uncertain. He described the church as built in the 1760s simultaneously with the Ascension Church on the site of a 17th-century cemetery. He also noted that the building did not undergo significant alterations, except that in the 19th century the main space was divided into two floors using wooden beam ceilings. In the late 19th century, the church was used as a school. In the 1930s, the belfry and dome were destroyed, and additional damage occurred during World War II. It may be assumed that the author took into account the results of the 2019 archaeological studies.

Local historian Viacheslav Kyryievskyi from Shostka, citing archival documents on the Sumy Historical Portal [9], provides the following information: «*In 1756 construction began on a three-tier stone belfry next to the Ascension Church; it was consecrated in 1764. The belfry contained the Illinska Church with stove heating, functioning as a warm church alongside the unheated Ascension Church.*

Documents from the 1768 General Survey of Left-Bank Ukraine mention a stone fence around the Ascension Church. Across the street, on the site of the former wooden church, lay a cemetery where burials continued.

In 1934 local Komsomol members removed the crosses from the domes of both churches, and the bells were sent for remelting. The school housed a distillery, and the Illinska Church was used to store grain. The belfry suffered heavy wartime damage and became a ruin» [9].

Today the structure is in an emergency condition (Fig. 1). The building has not been used or maintained for an extended period, leading to accelerated physical deterioration. The exterior walls contain numerous cracks and deformation marks caused by environmental exposure. The brick masonry shows mortar loss, weathering, delamination, and local disintegration. Due to the absence of a watertight roof and drainage system, the walls and vaults undergo constant moisture saturation, resulting in dampness, efflorescence, and biological damage (moss, lichens). In areas with prolonged moisture accumulation, corrosion of metal components is observed.

Problem statement.

Despite a number of studies and publications that discuss the possible construction dates of the church, the issues related to its structural features remain unresolved. Researchers emphasize the uniqueness of the building and highlight certain characteristics (wall thickness, loopholes, floor structure, metal tie-rods, staircases embedded in the wall, etc.). Recent architectural and archaeological investigations also lack detailed information on the metal tie-rods and the remains of wooden structural elements. The aim of this study is to identify the structural features of the building and to assess the technical condition of its main components. To achieve this, the analysis of archival materials, findings from recent research, and data from on-site inspections conducted by the author during field expeditions were used.

a) *b)*

c) *d)*

Figure 1 – Illinska Church in Korop:
a) – photograph from 1927, south view; b) – photograph from 2025, south view;
c) – photograph from 1927, east view; d) – photograph from 2025, east view.

Basic Material and Results.

The church is a two-storey, pillarless structure with a rectangular floor plan and a single-apse composition, which is traditionally characteristic of buildings of this type. A two-storey U-shaped volume is attached to its southern part, consisting of elongated rooms oriented along the main longitudinal axis of the building—from east to west. This annexed volume includes two risalits on both sides, functioning as entrance porches that form the main façade entrance.

The second floor of the southern section is a single long space without traces of transverse walls, connected on both sides to the risalits by wide arched openings. Both risalits originally contained staircases leading to the second floor. A wooden staircase has survived to this day in the western risalit. As for the eastern risalit, it currently functions as an independent room; however, the beam sockets preserved in the walls indicate that it also originally served as a staircase.

According to engineering inspection materials from 1986, trial pits were excavated to determine the foundation depth. However, even at a pit depth of 2.0 m, the foundation base level was not reached [10].

Geomorphologically, the study site belongs to the left-bank terrace above the floodplain of the Desna River. The relief is flat.

Within the upper 12 m of the geological profile, Quaternary alluvial sand–clay deposits are present. Groundwater is located at a depth of 2.9–3.0 m, with an aquifer thickness exceeding 15.0 m. The site is subject to groundwater flooding, and the annual groundwater level fluctuation is approximately 1.0 m.

The foundation soil consists of heterogeneous layers. At an estimated foundation depth of 2.7 m, the bearing layers correspond to soils of GEI 2, 3, and 4.

GEI 1 is fill soil—humus-rich sandy loam with up to 15% construction debris, 1.5–1.8 m thick.

GEI 2 consists of silty medium-density sands, moist, with interlayers of sandy loam, 0.5–1.2 m thick, whose bearing capacity significantly decreases when water-saturated.

GEI 3 (plastic sandy loam) has low strength and deformation characteristics and appears as lenses in the fourth layer.
GEI 4 is fine sand, medium density, water-saturated, 5.6–7.0 m thick

GEI 5 is medium sand, medium density, water-saturated.

The foundations are strip-type, made of ochre-coloured brick measuring 31–33 × 14.5–15.0 × 5.5–6.5 cm, laid in lime–sand mortar. They have no step and their width corresponds to the wall thickness.

The plinth is constructed from ochre brick measuring 33.5 × 14 × 7 cm, also laid in lime–sand mortar. Joint thickness ranges from 1.5 to 3.0 cm.

Based on the conducted investigations, it can be assumed that the original plinth level was located 40 cm below ground level (Fig. 2).

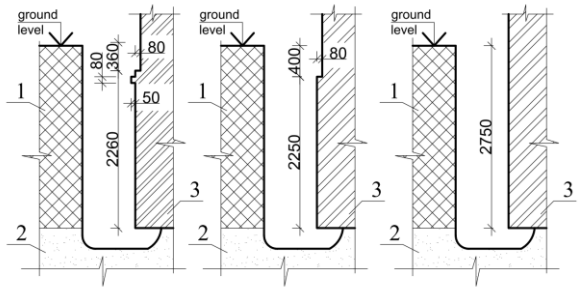


Figure 2 – Plinth level recorded during the test pits:
a) southwest wall;
b) northwest wall of the elongated part of the building;
c) northwest wall of the main part of the building (plinth not recorded)

In 2019, researchers excavated a test pit measuring 2 × 3 m near the apse [11]. The thickness of the cultural layer was approximately 1 m. At a depth of 0.3 m below the present ground surface, a layer of lime mortar mixed with brick fragments was identified. The apse foundation reaches a depth of 1.5 m from the current ground level (1.1 m from the original ground level at the time of construction). The base of the foundation consists of a 0.7 m layer of bedding made of brick rubble, granite stones, and sandstone, bonded with lime mortar [12].

The walls of the monument vary in thickness and are constructed of brick measuring 31–33 × 14.5–15.5 × 5.5–7.5 cm, laid in lime–sand mortar. Joint thickness ranges from 1.5 to 3.0 cm. The masonry system is chain bond.

Built-in wall stairs are preserved inside the longitudinal wall of the second floor; these stairs once led to an upper tier of the tower, now lost.

The arches of the door and window openings are segmental, constructed of brick laid in lime–sand mortar.

Both the external and internal walls at the plinth level, as well as the floor structures above the first and second storeys, contain metal tie rods with cross-sections of 4.0 × 4.5h, 7.0 × 1.5h, and 8.0 × 1.0h cm.

The floor structures above the first storey were originally flat wooden floors, almost completely lost today. The wooden beams forming the continuous subfloor were embedded 30 cm into the masonry. A rough plank flooring of 6.5 cm thick boards was laid over the subfloor beams. The finished floorboards, 4.5 cm thick, were installed perpendicular to the rough boards (Fig. 3).

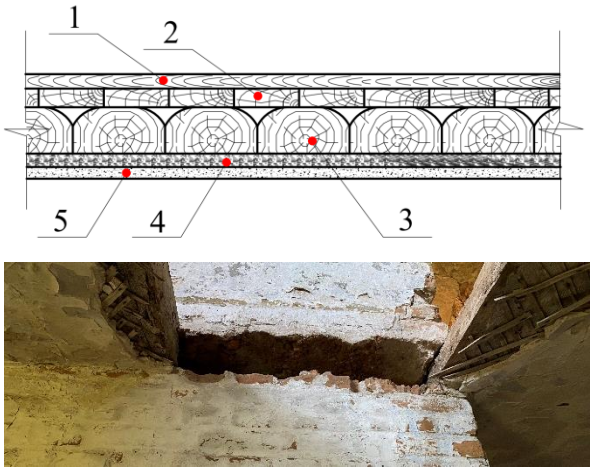


Figure 3 – First floor ceiling:
1 – finish floorboards, 4.5 cm thick;
2 – subfloor boards, 6.5 cm thick;
3 – joists, 30 cm wide, 22 cm high;
4–5 – lime plaster on lath

The floor structure above the second storey consists of cylindrical vaults made of brick laid in lime–sand mortar.

In the eastern and western risalits – the entrance vestibules – staircases were originally located, providing access to the second floor of the building. The wooden steps were embedded into the masonry. The staircase in the eastern risalit has been completely lost, while in the western risalit only partially preserved.

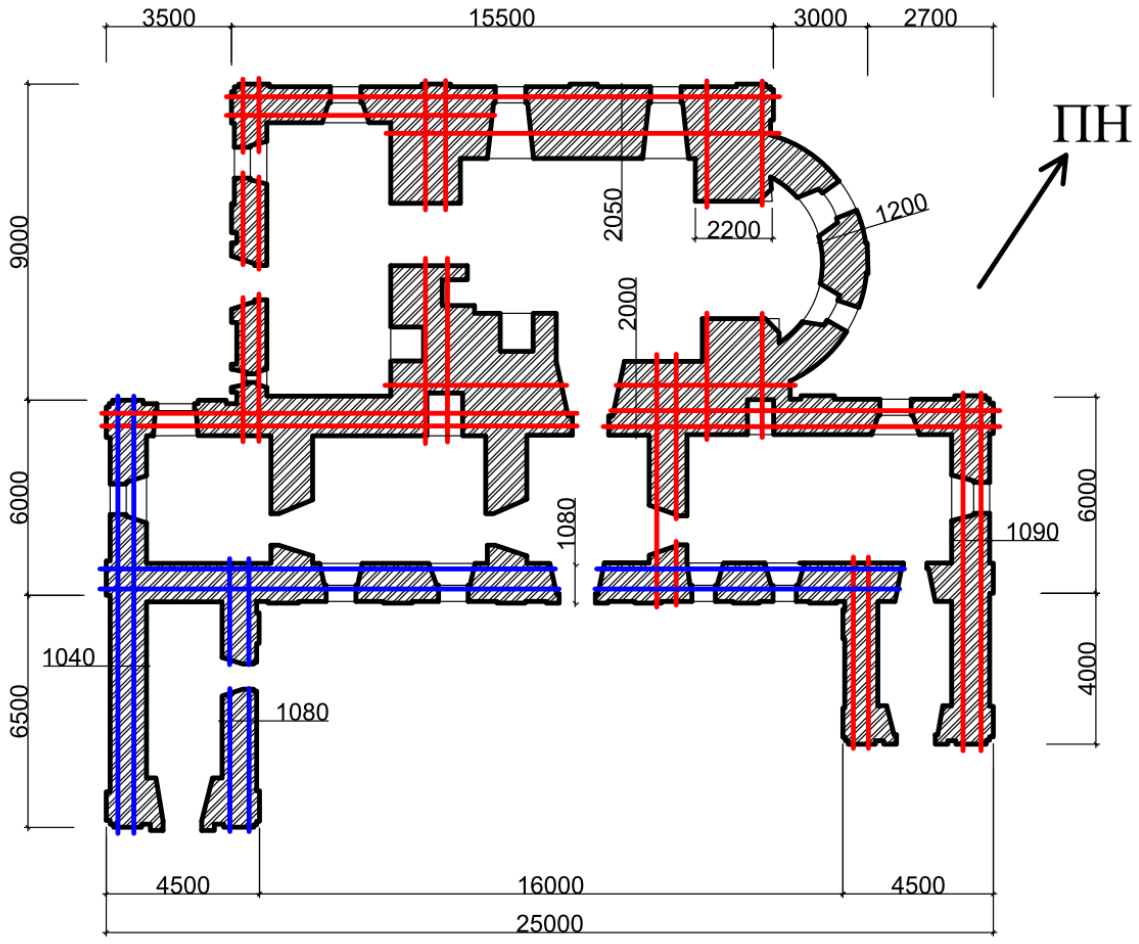
Of particular interest are the metal anchor tie rods embedded in the walls and the significant thickness of the walls themselves (Fig. 4). In some places, the anchor tie rods are cut off, and in certain sections, they pass through window openings.

The location of the anchor ties in the diagram is based on archival data and in-situ surveys; however, in some areas their exact position may remain undetermined. To clarify their placement, more detailed investigations using non-destructive testing instruments are required.

Conclusions.

The architectural monument is in an emergency state. It is necessary to conduct geodetic and geotechnical surveys of the site, carry out architectural and archaeological measurements, document the existing remains, perform a technical inspection of walls and ceilings (examining masonry condition, presence of cracks, displacements, mortar losses), and prepare historical-archival research to determine the original appearance, reconstructions, and decorative elements. A conservation and restoration project, approved by the heritage protection authorities, must be developed.

a) *b)*



c)

Figure 4 – Анкерні тяжі:
***a*) – анкерні тяжі, що виходять на північний кут; b) – анкерні тяжі, що проходять крізь вікно північної стіни; c) – план першого поверху, лініями показані тяжі: червоним кольором – шириною 4 і висотою 4,5 см; синім – шириною 7-8 см, висотою 1,0-1,5 см.**

Urgent emergency measures should include:

- Installing temporary wall reinforcements (metal ties, props, scaffolding);
- Dismantling hazardous sections at risk of collapse;
- Protecting structures from atmospheric precipitation (temporary roofing, covering with polyethylene, tarpaulin, or corrugated sheets);

- Implementing measures to protect the foundation from groundwater, rainwater, and meltwater.

Structural restoration works should include:

- Restoring foundations (reinforcement using injection grouts, bore-injection technologies, reinforced concrete casing);
- Securing and restoring brick masonry of walls (adding authentic bricks according to original samples, restoring metal ties);
- Restoring the first floor, wooden floors, and stairs;
- Restoring inter-floor structures (brick vaults; wooden floors);
- Restoring the tower volume;
- Installing a new roof and covering according to historical examples.

Interior and finishing restoration should include:

- Restoring interior plaster and decorative elements;
- Reproducing original finishing materials;
- Installing windows and doors according to historical forms.
- Site improvement should include:
- Restoring the historical landscape around the church (fence, paths, greenery);
- Ensuring accessibility for visitors (ramps, information boards, etc.).
- The restoration of the monument requires the involvement of foreign investors.

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Конструктивні особливості та результати обстеження Іллінської церкви XVIII ст. у Коропі

Аннотація. У статті представлено результати комплексного дослідження Іллінської церкви XVIII ст., розташованої у смт Короп Чернігівської області, яка є цінною пам'яткою архітектури українського бароко. Метою роботи стало виявлення особливостей конструктивного вирішення споруди та визначення технічного стану її основних елементів. Для цього використано архівні матеріали, що дозволили відтворити історію будівництва та реконструкцій, а також дані натурних обстежень, проведених автором у процесі експедиційних досліджень. Основну увагу приділено аналізу кладки стін, дерев'яного перекриття та металевих тяжів, що виконують функцію просторової жорсткості споруди.
Встановлено, що кладка виготовлена з цегли на вапняному розчині і має місця вивалів та тріщин у стінах. Стіни північної частини мають товщину 2 м, південної – 1м. Дерев'яні елементи перекриття майже повністю знищені, залишки знаходяться в аварійному стані. Металеві тяжі, вмуровані в кладку, місцями обрізані, виконані зі стальних квадратних прутів перерізом 4×4,5 см та сталевих смуг (полос) розмірами 7–8×1,0–1,5 см.
Пам'ятка архітектури знаходиться в аварійному стані. Необхідно провести геодезичні та геотехнічні обстеження території, виконати архітектурно-археологічні обміри та фіксацію наявних залишків, зробити технічне обстеження стін і перекриттів (стан кладки, наявність тріщин, зсувів, втрат розчину) та підготувати історико-архівні дослідження (визначити первісний вигляд, перебудови, декоративні елементи). Потрібно розробити проект консервації й реставрації, погоджений з органами охорони культурної спадщини. Терміново потрібно провести протиаварійні заходи.
Дослідження проведено за сприяння Управління містобудування та архітектури Чернігівської обласної державної адміністрації. Отримані результати мають практичне значення для подальшої розробки рекомендацій із консервації та реставрації храму, а також становлять науковий інтерес у контексті вивчення традиційних конструктивних систем та їх адаптації до сучасних умов експлуатації.

Ключові слова: Іллінська церква, цегляна кладка, металеві тяжі, обстеження, технічний стан.

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