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Reawakening the spirit: St. John's Church of Tartu, Estonia
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ABSTRACT

The strengthening of the foundations of St. John's Church in Tartu Estonia was a measure taken first and foremost to prevent sinking of the edifice caused by the lowering of the ground water table. It consisted in the first phase of the restoration / renovation project that would span more than a decade, and result in the building we know today. Other than the technical aspects involved for this project, the paper examines the history of the building and how the work had implications in the reawakening of the spirit of place for the city of Tartu, and the nation of Estonia.

Introduction

Other than the need to secure the structure physically, strengthening the foundation of such a significant building could also be viewed as symbolic. For the nation of Estonia, it was an affirmation of national pride in its past, as well as the necessity to conserve its built heritage, that prompted this work. To understand all the implications of such an undertaking one had to study the building's history. The overall restoration / renovation project of St. John's Church was as such a re-activation of the spirit of place, which could have been considered dormant, neglected during Soviet times, although history has to be nuanced in regard to this affirmation.

In this particular instance, the spirit of place can be perceived as re-emerging through the physical renewal of the structure and its use. Here the intangible aspect of the renewal was not in question, since the church was to be fully reinstated in its sacral dimension, although some integration of other activities were also to be part of an overall cultural program for the city of Tartu.

The undertaking of such a significant project called for an objective examination of all the layers of history which the church has bear witness too; good and bad, edifying and painful. It was a necessary pilgrimage, so to speak, to understand the spirit of this church through its successive histories, from the emergence of the original settlements in the area as far as archaeological documentation enables us to know, and through the succession of principal events that have determined its faith. Only after such an assessment where the spirit of the building had taken hold in our minds were we able to start our mandate confidently.

Our mandate in this instance was to assess the physical state of the church and its foundations, devise a precise plan of action, and proceed in reinforcing the building as to insure its survival in the long term. The foundations were strengthened between the years 1993 and 1996 and served as a base for the following restoration / renovation work of the church.

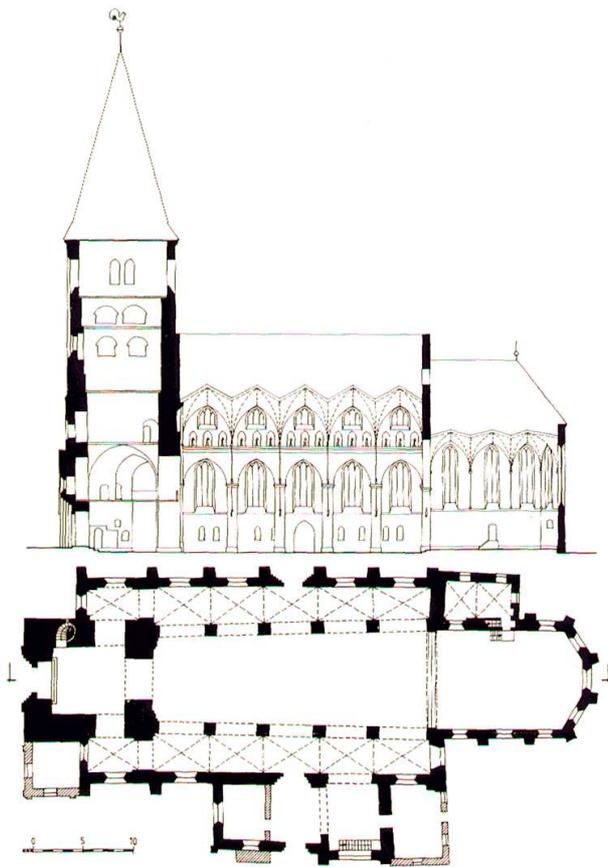
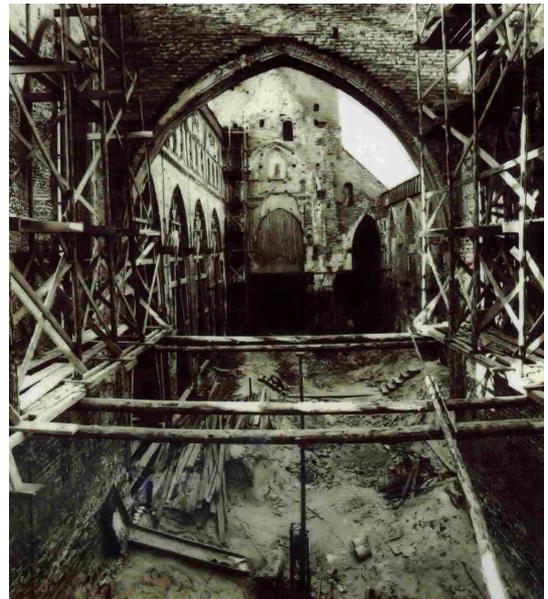


Figure 1. Plan and section of Church.



Picture 1. State of Church before restoration.

St. John's, an historical outline

Amongst the many examples of medieval architecture in Estonia, St. John's Church of Tartu is of special significance (Figure 1). It is the most prominent building of Gothic architecture of the country, and is unique for its terracotta sculptures and decorative details.

It is understood through written records that in 1323 the Church, or to be more precise a congregation was existing, although we know almost nothing of what the church may have looked like. The fragments of wooden buildings found on the site have been considered as the earliest evidence of an existing church. Due to archaeological finds we can firmly situate the building of the stone church at the end of the 13th century or the beginning of the 14th at the latest, with the congregation in existence, as mentioned, since 1323.

The majority of surviving medieval buildings in Estonia are located in the Western and Northern parts of country, i.e. in the regions where limestone served as a main building material. In the Southern part of Estonia limestone cannot be found, so medieval urban and ecclesiastic buildings were made mostly of brick. The know-how to make bricks reached this region of Europe at the beginning of the 13th century along with the Western European crusaders. For Tartu (Dorpat), the city of Lübeck in Northern Germany is understood as a source of these developments. Although the medieval brick-architecture is poorly represented in Estonia, St. John's Church remains an outstanding piece of art in the context of Europe. The variety and artistic quality of the terracotta sculptures as well as their rarity, made this church well-known, even in late-medieval Europe. Originally there were over 2000 terracotta sculptures of which half have been preserved.

Every single piece is different. From 16th century writings one can read “the church of John Baptist, which was built with supreme artistic skill and great expense, and which, among other decorations, boasted the figures of the Saviour and Twelve Apostles“ (Tillemann Bredenbach. Köln, 1558).

Although the church has more than once undergone destruction and reconstruction, its general medieval shape is easily perceived even now. The church was not built according to a single plan and acquired its final medieval shape after several design changes and reconstructions. The basilica’s three-aisled body with a powerful west tower is linked to an elongated choir with a polygonal apse, the vestry being on the north side of choir. On the south side of the nave stood the so-called Lübeck Chapel - a reminder of the times when Tartu as a Hanseatic city was an intermediary in the trade between Lübeck and Russia. The wooden rafts supporting the foundations of the church probably date from the end of the 13th century. The mentioned rafts are below the tower. Other parts of the church also rest on wooden rafts except the choir which is on an island and doesn’t have supporting rafts.

The church tower is built out of bricks, its outside dimensions are 12.5 m by 14 m with a height of 38 m from ground level. The weight of the tower is 5 500 tons which is divided onto four pillars at its base. In modern times a cultural layer of about 3.5 meters accumulated in the surrounding the church. It contains mainly cemetery material. The burials in churches, and in the city as it was then, were stopped in 1783.

The archaeological excavations of the 1980’s have revealed that before the church was built, there were some wooden buildings on this site. Other excavations between 1993 and 1996 near the western walls of the church, revealed evidence of two layers of wooden buildings, the older one showing signs of having been destroyed in a fire. After the destruction of the buildings the site was turned into a graveyard, on which the church was later erected. Evidence of human activity can be found around the whole territory, although most of the older cultural layers were destroyed by the subsequent burials.

The church was erected over a burial ground. The oldest layers of the church yard contain burials not typical of Estonian ones. Besides this, the anthropological type of the buried is partly alien to Estonia. In light of these facts , the participation of German (West-European) immigrants (colonialists) in the town formation seems evident. As such, this population group can be considered the original founders of St. John’s of Tartu.

In the first stage of building, the choir of the church was established on a foundation of sand and granite stones. Initially the choir possessed a straight apse, which after subsequent re-buildings has become an octagonal one. During the next stage the central nave and the tower were added. Since Tartu is located on a relatively soft ground, stability of the building was achieved by placing wooden rafts underneath the stone foundations.

The dominating feature of the building is a massive western tower. According to its plan, St. John’s in Tartu (Dorpat) resembles the St. Jacob’s Church in Torun (Thorn), Poland. Both buildings possess a central nave which is not rectangular but trapezoid. Relative to this fact, it is important to stress that both churches belonged to the Diocese of Riga, and both were built with the involvement of the Teutonic Order.

The story of the church in the post-medieval period is a history of multiple destruction and rebuilding, loosing many of the original features through the process. During World War II, in 1944, the church burned down and remained in ruins for the whole period of Soviet occupation (Picture 1).

Previous interventions and organization of restoration

Prior to our intervention at the site, it must be noted for the record, and to be fair to our predecessors, that already in the late Soviet era some interest in the church had been demonstrated. Indeed, some surveying of the building was done in the 70’s and in 1989 a polish company was given the mandate to study and implement measures for some structural restoration. The work however was laborious and did not actually come to term, interrupted by technical difficulties as well as the political turmoil of the times.

After the re-establishment of the Republic of Estonia, the restoration continued under the command and financial support of the Ministry of Culture. Other Important supporters have been the Church of North-Elbe and the City of Lüneburg. To improve and quicken the restoration process the Tartu St. John’s Church Foundation was established in 1998.

Strengthening of the foundations

In 1991, our mandate was prompted by the will of the newly independent country, to provide basic repairs and restoration work to the structure as a basis for furthering the renovation / restoration before the church could be put into use again.

Before the strengthening of the foundations was realised the church was resting on massive stones which themselves were set over wooden rafts; the top layer of stones joined with mortar, and the lower part filled with sand. During recent decades the building had begun to sink because of a gradual lowering of the ground water table. Before the work started the water level had dropped significantly, to the level of the wooden drafts. As a result the wood began to rot, thus accelerating the sinking process. Without implementing the strengthening of these foundations, the overall structure would have been threatened with serious damage over the coming years.

The foundations of St. John's Church were strengthened by method of underpinning, using jacked steel piles and spiral drilled piles. In its actual state, the building could not tolerate the vibrations caused by driven piles. The top layer of the compact silty sands which begins at 6 meters below of the existing foundation was chosen as the bearing stratum. The reason for this choice was simply that the loose silt of the first 6 meters did not have the needed bearing capacity and is technically still settling. Furthermore jacking piles through the silty sand would have necessitated forces beyond the capacity of the old block foundation.

A simple and practical technique was devised to screw the spiral drilled piles in a very confined working space. Steel tube piles were jacked down under the existing structure, using it as a counterweight. Spiral drilled piles were used in those walls without a counterweight condition. The underpinning of the tower proceeded step by step while concrete was poured to make a monolithic floating pile raft foundation (Figure 3). Reinforced beams were also constructed on both sides of the wall foundations, and pressed with post-tensioned anchorage against the structure. A field load test was performed on all piles and the rate of settlement measured. Between the old stone and new concrete structure, a viewing space was kept to give archaeologists and engineers the opportunity to study the foundation "in situ" in the future (Picture 2).

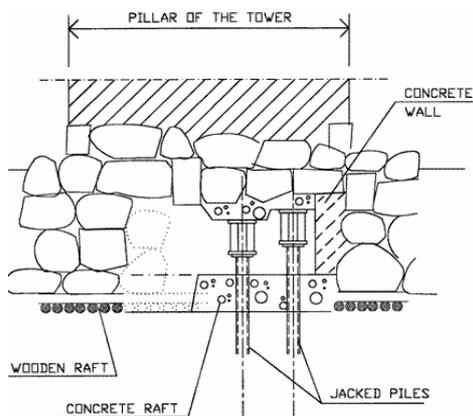


Figure 3. Monolithic floating pile raft foundation.

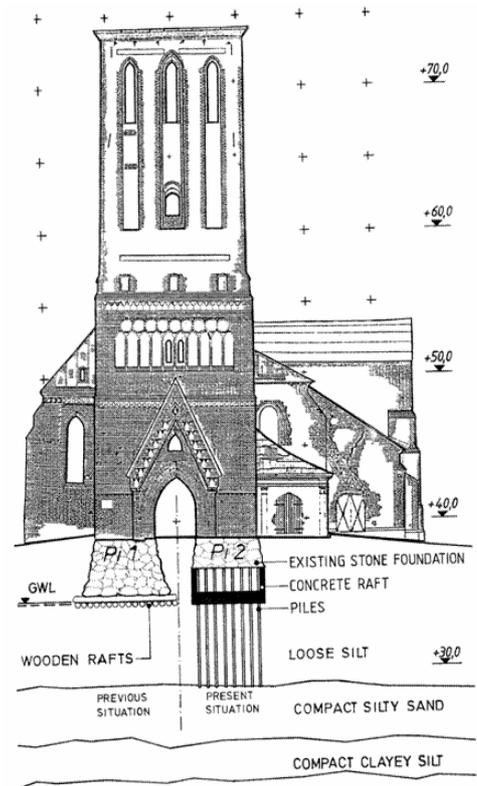


Figure 2. Underpinning of Tower.



Picture 2. Viewing space.

Spirit of the tower

The rate of settlement and horizontal displacements, particularly of the tower, were measured throughout the process. Due to the construction technique, the overall settlement of the tower was only 18 to 20 mm. The horizontal displacement was registered at a maximum of 50 mm during work, and measured at 20 mm after the work completion (Figure 4).

The spirit of the place by way of the church tower had slightly waddled, if only to be registered by sophisticated surveying instruments, perhaps emerging from a deep sleep and reawakened by our work. This is our interpretation of it, and how we might have made a contribution to the spirit of place. It was for other actors in the process to further implement measures to reinstate the spirit of place in its full form.

In this regard, placing the rooster on top of the tower, and the lamb on the hip of the central nave were very meaningful symbols for the people of Tartu.

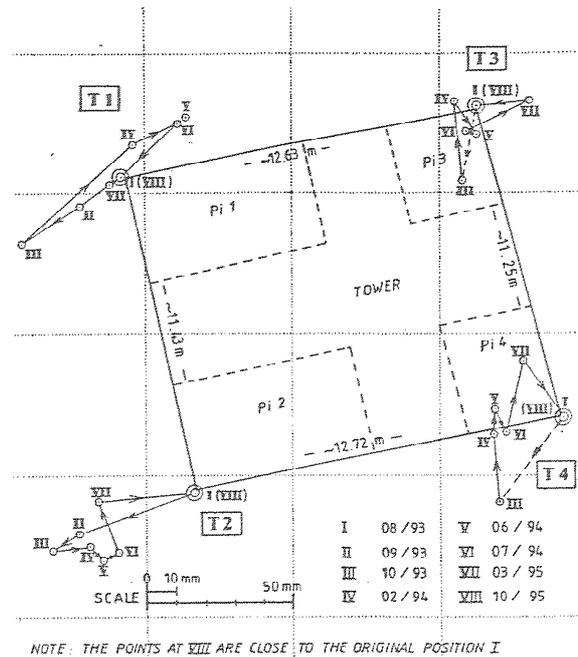


Figure 4. Horizontal displacements of Tower.

Conclusion

It was a privilege for KAREG Consulting Engineers to be involved in such an endeavour. The restoration work of the church which had been in ruins for 55 years became visible to the people of Tartu, when in 1999 the new spire of the church was put into place. The roof of both the spire and the central nave had also been covered with copper sheeting.

It was the occasion for celebrations on June 29th 2005, as St. John's of Tartu opened, concluding this long and challenging restoration / renovation process of 16 years in which we were involve from the very beginning. The spirit of place has carried over from Catholicism to Lutheranism, from a German speaking congregation to a Estonian one. It has held for over 700 hundred years, and we hope it will continue to take hold and grow for as many years to come. It is once again a magnificent spiritual symbol for the city of Tartu were the towns people and guests are always most welcome.



Picture 3. Terracotta figures.



Picture 4. St. John's of Tartu today.

Today the church works as a polyfunctional building: the primary function is a working church, the other functions linked to the main use are being a cultural monument open for the public with exhibited terracotta originals (Picture 3) and being a concert hall as well. The association of St. John's Church and the University congregation combined the ecclesiastical spirit with the academic spirit of Tartu University, founded in 1632.

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