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The ruins of the castle in Koło in the light of the latest architectural and archaeological research, and their conservation issues

Introduction

The castle in Koło (Wielkopolskie Voivodeship) is one of the best-preserved royal defensive seats in the broadly understood historical province of Wielkopolska. In the light of the current state of research, this stronghold is one of about thirty preserved ruins of the so-called “Kazimierz Wielki castles” in this area. Since the 17th century it has been in a state of ruin. What has survived to this day (Fig. 1) is a prominent corner tower with a fragment of three curtains. However, this structure has not been fully explored so far.

The purpose of this article is to present the results of architectural research carried out by Maciej Prarat and Ulrich Schaaf in 2020 [1] and to outline the archaeological research conducted so far by Artur Róžański and Tomasz Olszacki in the years 2019–2020 [2]–[4]. On the basis of these studies, the concept of making the ruin available to the public and securing a fragment of the northern wall was proposed (design by Beata Piaskowska), which was also performed in 2020 [5].

The state of preservation of the castle

The northern façade is approximately 28 m long and has been preserved up to a height of 7.9–9.6 m from the

foundation level. In its central axis there are relics of a residential tower on a rectangular plan with dimensions of approximately 12 × 15 m. From the outside there are three buttresses, including one on the corner. They have a similar height, except that the southern one is partially forged.

The western and southern curtains connect in the corner with a prominent tower built on a plan similar to a rectangle. It is over 5 m high. Using four corner squinches, it turns into a 9.2 m high cylinder. At a height of about 4 m from its base, there are five forged holes. From the northern and eastern sides, they serve as communication passages, while the three central ones from the south-western side



Fig. 1. Koło, ruins of the castle. View from the south-west (photo by M. Prarat, 2020)

Il. 1. Koło, ruiny zamku. Widok od strony południowo-zachodniej (fot. M. Prarat, 2020)

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Fig. 2. Koło, ruins of the castle.
The interior of the upper level of the tower
(photo by M. Prarat, 2020)

Il. 2. Koło, ruiny zamku. Wnętrze górnego poziomu wieży
(fot. M. Prarat, 2020)

provide additional lighting. In the middle, about 15 layers below these openings, the walls of the tower narrow down (Fig. 2). In the northern part, in the thickness of the wall, there are stairs leading to the highest level. The southern wall has been preserved to a height of just over 1 m above ground level, mostly without a face. At a distance of about 8.8 m from the tower, there are relics of two walls of the gatehouse. The castle was built entirely of brick on a high stone foundation. The crown of the wall was secured with a varied number of layers of contemporary bricks with a liquid ceramic “cap” on top.

Scope of research

Architectural research covered the entire brick structure. All joints, corners, redevelopments and modifications were analyzed, and they were presented on the inventory bases in the form of research nodes. Subsequently, particular parts of the wall were measured, along with the characteristics of the mortars and joints. On this basis, it became possible to determine the number of phases and stages of construction transformations, and then to attempt to reconstruct the original state along with identifying the workshops working on the construction of the castle. The stratigraphic arrangement of the cultural layers was also analyzed. Moreover, studies were undertaken on movable monuments obtained in the course of archaeological research, which is the basis for determining the changes that Koło castle was undergoing through the centuries.

State of research and history of the castle

Koło castle relatively often appears in the literature on the subject. However, the information quoted in most cases is quite general and repeated. The older literature was reviewed by Jarosław Baciński [6]. Tomasz Olszacki [7], [8] spoke directly about the transformations. Together with Artur Różański, he is the author of archaeological research carried out in 2019 and 2020.

These works covered the residential tower and the gatehouse, and the results of the research will be the starting point for determining the time frame of the above-ground transformations of the castle [2]–[4].

Koło was founded by Kazimierz Wielki in 1362. However, the mention of the castle appeared only in 1383. The years of splendor of the town, associated with numerous visits of the kings fall on the 15th century. It was visited by Władysław Jagiełło (7 stays) and Kazimierz Jagiellończyk (14 stays). After granting the Koło starosty to the Duchess of Mazovia, Anna Oleśnicka, the residential tower of the castle became her residence for five years (1476–1481). In 1506, Jarosław Sokołowski from Wrząca contributed 500 florins for the renovation/expansion of the castle. In 1515, Zygmunt Stary stayed in Koło, perhaps also in the castle. At the beginning of the 17th century, 200 florins were allocated for renovation works in the castle. In the mid-17th century, Eryk Dahlberg made a drawing of the castle, signing it as “castellum destructum”. It shows that at that time the castle was already in a state of ruin. Between 1696 and 1763, it was owned by the Bernardines, who used it as demolition material for the needs of the monastery [6]. The first security works were carried out in the interwar period, and in 1953 the ruin was entered in the register of monuments [9]. Since then, security works have also been carried out.

Results of architectural and archaeological research

When trying to place the observed transformations in the chronology of the castle construction, one should refer directly to the latest archaeological research from 2019 and 2020 [3], [4]. These conclusions will therefore be linked to the chronological framework proposed in this documentation. The chronological stratification may be divided into two main medieval phases and three main phases of conservation works in the 20th century, as well as many secondary, undated elements. In this text, a detailed description of individual parts of the walls has been omitted. In the case of medieval stages, a hand-made brick in a Gothic research node of similar dimensions was always used (stretcher length 27–28 cm, head length 12.5–14 cm, height 9–9.5 cm), but with quite a large variation of elaboration of the joint. In some places the overburnt bricks were also used in a decorative arrangement.

Settlement before the construction of the castle (1st half of the 14th century)

The oldest part of the castle in Koło – a residential tower – was built in the place of a sandy dune along the Warta River. In the “pre-castle” phase there was intense settlement there, relics of which were found in the form of a basin-shaped storage or dump pit lined with stones (entering the northern corner of the southern tower room). This cultural layer was then pushed down during the subsequent leveling of the area under the foundation of the eastern main wall of the donjon [2].

*Phase I – construction of a residential tower
(3rd quarter of the 14th century)*

Undoubtedly, the oldest structure of the castle are the relics of the residential tower in the northern part (Fig. 3) [2], [3]. It was founded on a rectangular plan with external dimensions of 12.10 × 15.47 m (187.2 m²). Therefore, it was larger than it was presented in the existing literature on the subject. The main walls of the building were on average about 2.55 m thick in the above-ground part (southern wall: 2.50 m, northern and eastern walls: 2.56 m, western wall: 2.60 m), the interior of the tower was originally planned as a partition wall with a thickness of 0.68 m in the ground section (it was implemented after the outline of the outer walls was erected). It separated two rooms on the lowest floor: the southern one (room A with dimensions of 2.30 × 6.80 m) and the northern one (room B with dimensions of 6.80 × 7.20 m). The building structure of the foundations was quite complex and the same for all the walls of the tower, with minor differences in the height of individual zones (an exception was observed only for the eastern and western faces of the main wall within room A). The construction process began with a layer of “flexible” foundation, made of sand erratic stones arranged in a narrow, tight excavation. Further – also in the excavation, yet widened – there were erratics supplemented with fragments of bricks. In the upper part, wooden framework was used, in which a wall with a face made of erratic stones and rather rarely used sandstone blocks was laid. Above the framework, there were applied sandstone blocks arranged in regular layers

supplemented with toothing. This wall of *opus emplectum* construction was extended higher in the main walls (up to about 2.05 m) and lower in the partition wall, where it was 1.02 m high. The level designated by the offset of the partition wall is also the reconstructed level of the floor of the lowest storey of the donjon, which was characterized by fully brick faces of the partition wall and cut faces of the remaining walls up to a height of about 1.40 m from the floor level, and above (also on the next storeys) probably all brick faces. The last given height most probably also determines the level of the entrance to the room B from the side of the courtyard. The described storey of the building, not even fully preserved, was therefore a basement in relation to the interior of the castle, and a ground floor in relation to the surrounding area.

In both corners, south-east and west one, at the time of construction, outgoing toothing was made, to which the perimeter walls were to be attached. In the case of eastern toothing, the wall was bonded to its planned width, i.e. 1.8 m (Fig. 3, research node 1.5). In the case of the western toothing, the bonded wall turned out to be slightly wider (2.10 m). Hence, at least from the northern side, it slightly overlapped the toothing (Fig. 3, research node no. 1.7). The size of the bricks used in the construction of the tower is similar to the size in the newer parts of phase II. The greatest difference is visible in the joint, slightly darker and undercut on one side vertically and horizontally. The negative imprinted on the wall in the preserved western curtain, which was later added to it, determines the height of this volume at least equal to the preserved section or even much greater (Fig. 4).

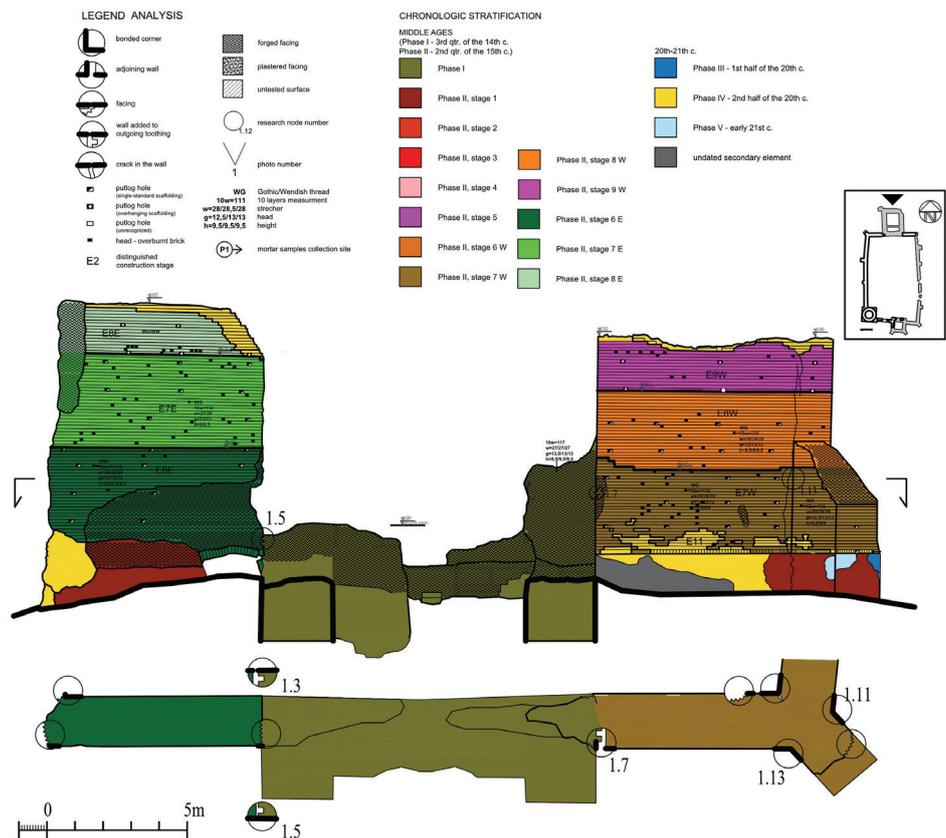


Fig. 3. Kolo, ruins of the castle.
Northern façade.
Results of architectural research
(elaborated by M. Prarat,
U. Schaaf)

Il. 3. Kolo, ruiny zamku.
Elewacja północna,
wyniki badań architektonicznych
(oprac. M. Prarat, U. Schaaf)



Fig. 4. Koło, ruins of the castle. Northern façade.
View of the western wall with the imprint
of the residential tower (photo by M. Prarat, 2020)

Il. 4. Koło, ruiny zamku. Elewacja północna.
Widok na ścianę zachodnią z odciskiem po wieży mieszkalnej
(fot. M. Prarat, 2020)

*Phase II – construction of the defensive wall sections
with a corner tower and a gatehouse
(until the 2nd quarter of the 15th century)*

It should be assumed, in accordance with the logic of the building technique, that the foundations were made first and then the stone foundation was constructed. In chronological stratification, the entire original foundation was assigned to the first stage of the second phase.

The analysis of the junction between the walls and the toothing suggests that the first fragment to be built together with the foundation of the perimeter was the tower in the south-western corner, up to a height of 4.32 m from the foundation level (Figs. 1, 5). Together with it, the part of the western curtain with the southern buttress was constructed, leaving a toothing at the end for further bonding (Fig. 5, research node 1.21, Fig. 6, research node no. 1.23). Bonding of the corners of the southern curtain (Fig. 7, research nodes 1.36, 1.43) suggests that the entire preserved structure, together with the gatehouse, was also made in the first stage. In the next ones (E2), the square structure of the tower with the western wall was raised, squinches were installed and the construction of the cylinder began, while retaining the toothing for attaching the breastwork (E3) (Fig. 5, research node 1.33), the cylinder was pulled out to the level of the inner offset (E4). Subsequently,

a tower was built with window openings, communication passages, a staircase to the upper floor and probably a battlement (E5). There is no direct evidence that the last two stages were completed before the extension of the western curtain. This issue still remains open.

A fragment of the foundations of the curtain on the southern side together with the gatehouse was additionally subjected to archaeological research [4]. Two excavations were made in this place. The first of them (No. 3/2020) covered the western side of the building located in the line of the southern curtain of the castle, most often called the gate (although there have already been suggestions in the literature that it could have been a gatehouse [7]), the northern wall of this building and a small, southern fragment of the castle courtyard. The second excavation (No. 4/2020) was located in front of the gate building, tangential to the southern face of the southern wall of this building and the eastern face of its south-western diagonal buttress. The eastern edge of the excavation was an extension of the eastern edge of excavation No. 3/2020, which made it possible to obtain a full cross-section of this part of the site over a length of 15.70 m.

The gatehouse was erected on a rectangular plan with dimensions of about 8.0 × 9.0 m, with a wall thickness of 1.75 m, and it is closed in the lowest storey by an irregular, trapezoidal chamber limited by slanted offsets, with a side length of about 4.50 m. The southern corners of the building are supported by huge diagonal buttresses. In the light of the earlier archaeological research carried out by the District Museum in Konin, the north-eastern corner of the building was faced with no toothing and in the area of its foundation there was not present any continuation of the wall towards the east. This observation, correlated with the analysis of the northern wall of the building (from the side of the courtyard), in which there was never a wider door opening up to the level of its present crown, makes it possible to conclude that the considered object never contained a gate passage. The latter, which can be concluded from the above-mentioned facing, was located at the junction with the building from the east and was formally (at least in the part erected in durable building material) a simple passage. Therefore, the considered object can be consistently and legitimately referred to as a gatehouse seeing a direct analogy for it in another defensive investment at the end of the reign of Kazimierz Wielki – the castle in Złotoria at the mouth of the Drwęca River to the Vistula River.

The gatehouse building was originally divided in the zone of the use of durable building material (we have no information about another one, yet its existence cannot be ruled out) into at least two storeys. The lower storey was a basement with a paved usable level, about 2.0 m deep in relation to the level of the courtyard. It was surrounded by carefully pointed stone faces of the walls (upper zone of the foundation). It was covered with a flat ceiling, probably with the beams laid on internal offsets and arranged with boards. The total height of the room measured to the base of the beams (offsets) is 1.96 m. The only possible entrance to the basement can be reconstructed as an opening in the ceiling, in which a ladder may



Fig. 5. Kolo, ruins of the castle. Western elevation, view from the outside. Results of architectural research (elaborated by M. Prarat, U. Schaaf)
 Il. 5. Kolo, ruiny zamku. Elewacja zachodnia, widok od strony zewnętrznej. Wyniki badań architektonicznych (oprac. M. Prarat, U. Schaaf)



Fig. 6. Kolo, ruins of the castle. Western elevation, view from the courtyard. Results of architectural research (elaborated by M. Prarat, U. Schaaf)
 II. 6. Kolo, ruiny zamku. Elewacja zachodnia, widok od strony dziedzińca. Wyniki badań architektonicznych (oprac. M. Prarat, U. Schaaf)

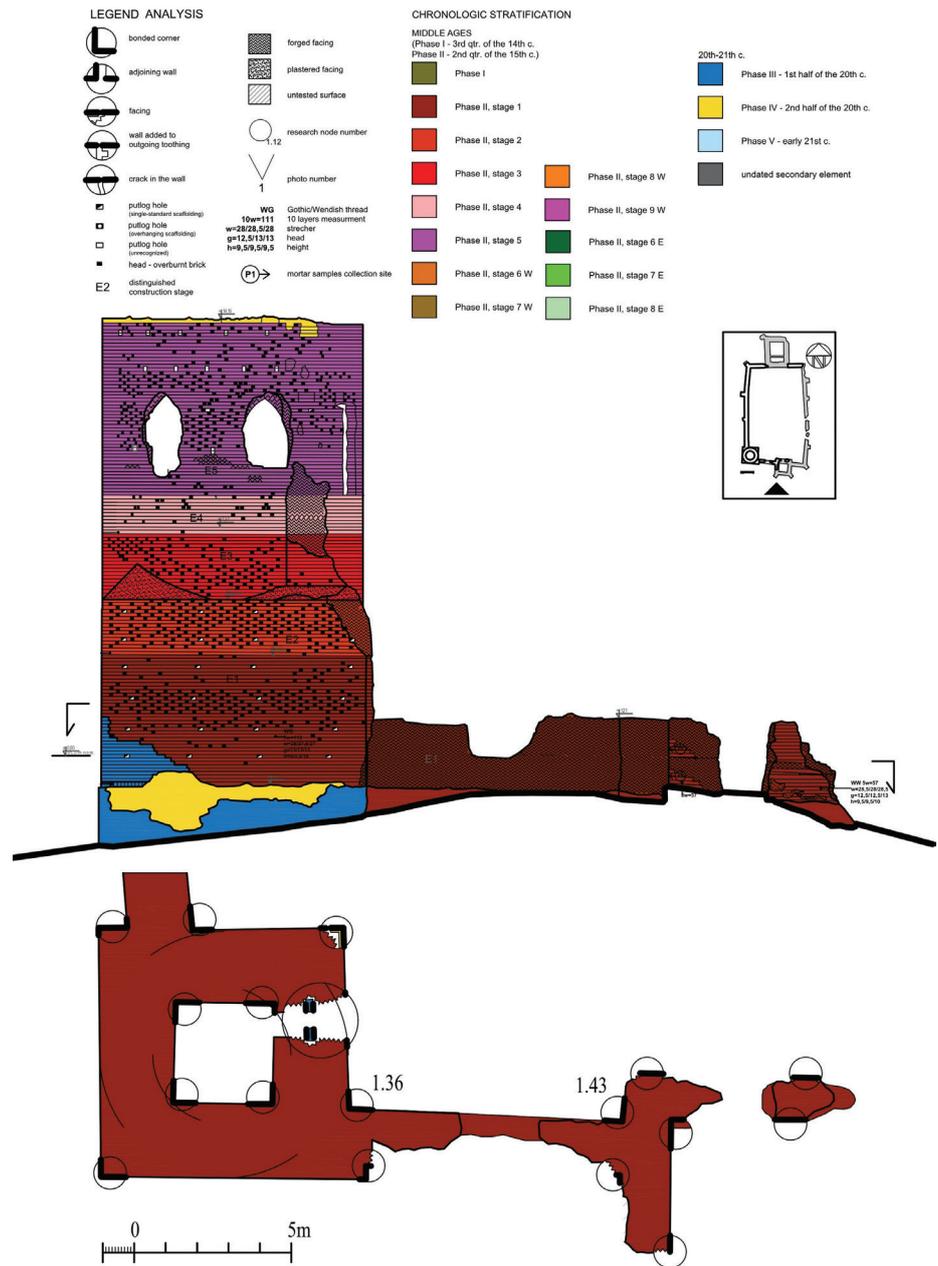


Fig. 7. Kolo, ruins of the castle. Southern elevation. Results of architectural research (elaborated by M. Prarat, U. Schaaf)

Il. 7. Kolo, ruiny zamku. Elewacja południowa, wyniki badań architektonicznych (oprac. M. Prarat, U. Schaaf)

have been dropped. Such a character of the room suggests that it was intended for a prison chamber (called a “terrace” in Old Polish language), designed for the peasants. The second storey was between the board floor and a very poorly preserved offset found in the northern wall. Probably in the 2nd half of the 16th century, after an earlier fire, transformations took place within the described building. At that time, the basement was abandoned and filled with sand. In the north-western corner of the ground floor (previously the 2nd floor), a furnace may have been introduced at that time, as evidenced by a structure made of bricks bonded with mortar. It is difficult to interpret otherwise due to the presence of an offset re-introduced in this place. It was probably then that the interior received a thin lime plaster, traces of which is preserved on the inner face of the northern wall of the building (Fig. 8).

The lack of a fully preserved southern and eastern walls makes it impossible to even attempt to determine the

relation between the individual parts of the northern curtain in its eastern and western parts. Due to the different heights of individual stages and a different construction technique, it should be assumed that these walls were not added to the residential tower at the same time. In the case of the north-western part, the following stages of phase II were distinguished: E6W, E7W, E8W, E9W. They result from the order in which the western curtain was built. Due to the lack of a structure between the southern curtain (E1) and the north-eastern fragments, the subsequent fragments (accessing the residential tower from the eastern side) have been marked as E6E, E7E, E8E similarly to the western part (Fig. 3).

As for the analysis of the western curtain, after the construction of the tower, the middle lower fragment with the northern buttress was constructed by bonding it to the southern toothing and remaining toothing from the north (E6W) (Fig. 5, research nodes no. 1.14, 1.15). The last stage



Fig. 8. Koło, ruins of the castle. Cobbled interior of the basement storey of the gate building, view towards the west (photo by A. Róžański, 2020)

Il. 8. Koło, ruiny zamku. Brukowane wnętrze kondygnacji piwnicznej budynku przybramnego, widok w kierunku zachodnim (fot. A. Róžański, 2020)

of closing the lower part of the curtain was to research node the fragment with the corner (E7W) to the southern tothing and to the western wall of the residential tower (Fig. 5, research node no. 1.14, 1.15; Fig. 3, research node no. 1.7). A diagonal buttress was built together with the corner (Fig. 5, research nodes no. 1.11, 1.13). Only after closing the lower perimeter was a wall built along the entire length from the stepped part of E2 to the residential tower (Fig. 5, research node no. 1.33). Whether there was a wooden battlement between the building of a slightly narrower strip of breastwork (E9W) along the entire length of the western and north-western curtains is not known. There are no traces of such construction. There is no doubt, however, that when the tower was constructed in the earlier stages, this elevation was already taken into account.

At one of the stages, the north-eastern wall (E6E) was also connected to the residential tower (Fig. 3, research nodes no. 1.3, 1.5). In the lower part, the stone foundation was lowered at the tower due to the relieving arch installed there (below the first arch there is another one, which was shown during earlier archaeological research). In order to support it on the existing structure of the stone residential tower, it had to be slightly chiseled. Perhaps the space between the arches was used to drain water from the courtyard (Fig. 9). Further on, the wall was built up (E7E) and provided with a breastwork (E8E), yet higher than the western wall, i.e. 1.5 m. At that time, the perimeter of the castle was closed.

When it comes to the medieval construction technique of the castle, it should be stated that each of the mentioned stages was slightly different, mainly in terms of the joint. Evident traces of work performed in sections or after construction stoppage (tothing) remained. The perimeter walls and the tower (on a square plan) up to the height of the breastwork were made using single-standard scaffolding. The breastwork itself was made of overhanging scaffolding, installed at least on two levels. Therefore, it is difficult to identify these through-holes with a bridge extending the wooden porch, as Baciński saw it [6]. The tower construction process was different. The structure

of the cylinder from the base with the squinches to the base of the window openings was made of single-standard scaffolding, however, placed in the center of the tower. The construction of the upper structure remains open, although it seems that overhanging scaffolding were used there, similarly to the breastworks.

When approaching the attempt to reconstruct certain tangible elements, we should start again with the corner tower itself. The only communication with this part of the castle was from the porch on the western curtain. Originally, there was one usable level, at the base of the communication openings. Above the window openings, the beams of the upper storey of the tower were mounted on consoles, on which the roof truss probably rested. The entrance to the top led through the original stairs in the thickness of the wall, accessible from the lower level. Originally, the upper zone of the tower, in which there may have been a battlement, must have looked much more impressive. Its relics are shown in the iconography of the castle ruins from the 19th century. It is also possible to approximate the size of the window openings with pointed arches. In the case of the eastern communication opening, the researchers saw an entrance to a wooden bay window protruding from the face. The originally bricked sockets, at a slight angle above the opening and under the console below (Fig. 10e) suggest at least the form of its roofing and the exit of the platform based on the console (Fig. 10b–d). A fragment of the construction beam has been preserved in this place up till now. It seems, however, that the beam itself was placed in a slightly forged opening secondarily. It is necessary to perform dendrochronological tests to confirm this fact. Their results do not have to be identical with the time of the construction of the tower, but certainly with its use. It cannot be ruled out that the entrance simply led to the southern porch. Baciński argues with this solution due to the lower level of the curtain with the breastwork. Yet in the light of the research carried out, it must be said that his conclusion is incorrect. A careful observation of the face of the tower at the junction with the curtains enables us to draw two more conclusions. Firstly, if a battlement



Fig. 9. Koło, ruins of the castle. Northern façade from the outside. View on the east side. Markings: a) the foundation of the residential tower, b) the rebuilding associated with the addition of an arch with the eastern curtain, c) the course of the preserved tothing (photo by M. Prarat, 2020)

Il. 9. Koło, ruiny zamku. Elewacja północna od zewnątrz. Widok po stronie wschodniej. Oznaczenia: a) podmurówka wieży mieszkalnej, b) przemurowanie związane z dostawieniem łuku z kurtyną wschodnią, c) przebieg zachowanych strzępi (fot. M. Prarat, 2020)



Fig. 10. Koło, ruins of the castle. The upper part of the tower in the south-west corner. Markings: a) forging of the southern curtain, b-d) traces of ceiling beams, e) roofing traces (photo by M. Prarat, 2020)

Il. 10. Koło, ruiny zamku. Górny fragment wieży w narożniku południowo-zachodnim. Oznaczenia: a) skucie po kurtynie południowej, b-d) ślady po osadzeniu belek stropowych, e) ślady po zadaszeniu (fot. M. Prarat, 2020)

was placed there, it must have been at the level of min. 2 m above the porch (at this height the fragments of the breastwork are maximally preserved). Secondly, the entire breastwork could have been 5.2 m high. Exactly the same height was observed at the northern and eastern openings of the tower. The width of the upper breastwork is an open question. The preserved fragments suggest narrowing to the level of the width of a brick. Few fragments of pigment in the joints of the northern buttress of the western curtain (E6W) and at the base of the northern wall of the tower (E1) may suggest that the entire façade was covered with red.

Perhaps in the early modern period, the layout was transformed, which involved the introduction of a secondary chimney in the upper zone of the tower and the opening of the entrance in the ground floor with the installation of a secondary ceiling there. However, these research findings cannot be specified in detail due to the problematic accessibility to the object.

Phase III – conservation works in the 1st half of the 20th century

The existing literature on the subject lacks information on conservation works undertaken before the end of World War II. Baciński was the only one to notice that al-

ready in the interwar period minor security measures were carried out in the castle [6] on the initiative of Czesław Freudenreich or Ignacy Ziembowicz. However, the author did not identify any of the surviving parts of the wall with this period. A more thorough analysis of certain historical photos and postcards makes it possible to conclude that no action was taken until the 2nd quarter of the 20th century. On the other hand, many photographs generally dated to the interwar period enable us to establish that the most damaged south-western corner of the tower was rebuilt at that time. For this purpose, a good quality hand brick of slightly larger sizes was used. Its fragments were also noticed in the face of the outer part of the western curtain and incidentally on the inner side.

Phase IV – conservation works in the 2nd half of the 20th century

From 1953 till the end of the century, numerous conservation works were carried out with a very different degree of execution. A mechanical brick was used, and the joint was retracted relative to the face. Larger fragments of facings can be found in the northern (both parts) and western curtains. The protection of the wall crown should also be associated with this time.

Phase V – conservation works in the 21st century

Few fragments of the walls have been repainted relatively recently. The materials used as well as the level of execution should be described as disastrous, hence all fragments assigned to this period were qualified for replacement. This will mainly concern redevelopment of the western curtain from the side of the courtyard.

An undated secondary element – these will mainly include stone foundations, which were probably re-layered or heavily jointed.

Conservation issues

Conservation issues related to the ruins of Kolo castle boil down to the three basic issues: securing the walls which may be destroyed, conservation and preservation of the existing historical substance, and making the facility accessible. The guiding principle adopted in the conservation applications was to preserve, protect and expose not only the original historic substance which built the walls, but also the later historical layers. They indicate different approach to repairing and supplementing defects in the facing layer, aimed at saving the castle walls, which had been deteriorating for several centuries. Despite the assumption of preservative conservation, it was allowed to restore some fragments of the wall in places where it was necessary for structural reasons or to protect the structure from further destruction.

The ruins of Kolo castle are located on the left bank of the Warta river, about 20 m from the riverbed. Geotechnical studies [10] have shown that in the immediate vicinity of the structure, the near-surface aquifer consists of waters whose extreme amplitude of water table fluctuations can be up to about 2.0 m. The change in the water level causes undermining of the facility located on a hill (level of the inner courtyard approx. 6 m above the water table), which results in impoverishment and loosening of the ground, particularly on the eastern side, where the level of the free water table was found at a depth of approximately 0.65 m below the natural surface of the land. One of the basic recommendations is to stilt the ground in order to protect the entire ruin from undermining the foundations and destroying the structure. The brick exterior walls have extensive damage and cracks. First of all, the continuity of the northern curtain wall was interrupted (the wall only below the ground level), which was divided into two parts in the overground zone. It resulted in the lack of rigidity of the eastern part, despite its considerable thickness. The wall was in poor technical condition, which did not make it possible to transfer loads from wind forces. The remaining part of the preserved walls showed various degrees of damage [5]. The construction design also included conservation works in accordance with the program of con-

servation works [11] considering cleaning, repairing and preserving the historic substance.

In order to protect the eastern fragment of the northern wall, it was decided to design a reinforced concrete core hidden inside the partially reconstructed, central section of the northern wall (Fig. 11). The location of the new element resulted directly from archaeological and architectural research. The new L-shaped barrier was placed on top of the existing foundations of the northern curtain wall and eastern wall of the residential tower. The face wall was made of hand-made brick. As the form of possible window and door openings was not known, it was not decided to completely connect both parts of the northern wall. Since it is not known what historical height the wall was, a lower addition was designed in the form of steps. The tooth-ing was retained. The adopted solutions enable us to make it clear that the wall existed in this place (which is consistent with the research). Yet, they do not create an imaginary, unsupported by evidence form of the building.

The problem that is still waiting to be solved is the method of making the ruins of the castle available to visitors. The monument is one of the tourist attractions of the region and it is often visited. Due to its picturesque location on the banks of the Warta River, it is also a place of rest and relax for the local community. After the conservation and restoration works have been carried out, the building should be safely open to the public. At the design stage, a concept was developed to make the elements of the building accessible by introducing, among other things, stairs leading to the top floor of the tower (approx. 11 m above the level of the inner courtyard), from which one can see both the preserved the layout of the perimeter walls of the building as well as the surrounding area with the panorama of the town. However, a much greater challenge is the possible access to the crown of the western wall and the introduction of a passage along the wall within it.

Conclusions

The archaeological research carried out in recent years, and then the architectural research on the ruins of the castle, enabled us to trace its construction history in quite a detailed way. After the residential tower appeared on the north side, the corner tower was erected and the curtains were added in several stages. It is also possible to reconstruct the original height of these walls. On the basis of the research conclusions, the fragment on the western side was secured. In the future, archaeological and architectural research should be continued, especially when the level of the courtyard is lowered. The final concept of making the castle ruins accessible and legible also remains a challenge.

*Translated by
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Abstract

The ruins of the castle in Kolo in the light of the latest architectural and archaeological research, and their conservation issues

The ruins of the castle in Koło are one of the better-preserved examples of a stronghold from the times of Kazimierz Wielki in the lowlands. The building has been in a state of ruin since the 17th century. A prominent corner tower with a fragment of three curtains has survived to this day. The purpose of this text is to discuss the results of architectural and archaeological research carried out in the years 2019–2020 and the project of the castle's partial protection.

The analysis of the aforementioned research made it possible to state that the construction of the stronghold began with the residential tower in the northern part. Subsequently, a tower was built in the south-west corner. In the next few stages, curtain walls were erected, closing the courtyard. In the southern part there was a gatehouse. A different construction technique enables us to conclude that there were several workshops working on it, which used single-rack and overhang scaffolding. The condition of the ruins was so bad that it was necessary to arrange a project to protect parts of one of the walls, which was completed in 2020.

Key words: Middle Ages, castle, architectural research, archeological research, Koło

Streszczenie

Ruiny zamku w Kole w świetle najnowszych badań architektonicznych i archeologicznych oraz związana z nimi problematyka konserwatorska

Przedmiotem artykułu są ruiny zamku w Kole. To jeden z najlepiej zachowanych przykładów warowni z czasów Kazimierza Wielkiego na terenach nizinnych w Polsce. Budowla ta już od XVII w. znajdowała się w stanie ruiny. Do dziś zachowała się wydatna wieża narożna z fragmentem trzech kurtyn. Celem autorów niniejszego artykułu było omówienie wyników przeprowadzonych w latach 2019–2020 badań architektonicznych i archeologicznych ruin zamkowych oraz projektu częściowego zabezpieczenia tych pozostałości.

Wykonane analizy pozwoliły na konstatację, że budowę warowni rozpoczęto od wieży mieszkalnej w części północnej. W dalszej kolejności powstała wieża w narożniku południowo-zachodnim. W kolejnych kilku etapach wzniesiono mury kurtynowe, zamykając dziedziniec. W części południowej funkcjonował budynek przybramia. Zastosowane różne techniki budowlane prawdopodobnie świadczą o tym, że pracowało przy niej kilka warsztatów, które wykorzystywały rusztowania jednosztandarowe i przewieszane. Stan zachowania ruin był na tyle zły, że konieczne było wykonanie projektu zabezpieczenia fragmentu jednej ze ścian, co też wykonano w 2020 r.

Słowa kluczowe: średniowiecze, zamek, badania architektoniczne, badania archeologiczne, Koło