

JUSTYNA JASKOWSKA-LEMAŃSKA\*, DANIEL WAŁACH\*, ALICJA SIATKA\*\*

## SELECTED ISSUES CONCERNING RECONSTRUCTION OF THE PALACE COMPLEX IN GORZANOW

### WYBRANE ZAGADNIENIA REKONSTRUKCJI ZESPOŁU PAŁACOWEGO W GORZANOWIE

#### Abstract

The paper discusses an assessment of the technical condition of the historic Palace Complex in Gorzanow, and the reasons behind the damage incurred to its structure. The research has been carried out by the authors. The article presents the scope of implemented repair work intended to secure the building against further degradation, as well as a work plan that would make it possible to fully reconstruct the most valuable qualities of the palace in Gorzanow. The primary focus of the article has been applied to technical and organisational issues, regarding an ambitious endeavour to restore the building in question to full functionality and serviceability.

*Keywords: Repairing of a historic building, assessment of technical condition, assessment of building structures*

#### Streszczenie

W artykule przedstawiono wykonaną przez autorów ocenę stanu technicznego omawianego obiektu o charakterze zabytkowym oraz przyczyny powstałych w nim uszkodzeń. Przedstawiono także zakres przeprowadzonych prac naprawczych zabezpieczających obiekt przed jego dalszą degradacją i program prac umożliwiających pełną rekonstrukcję najcenniejszych walorów pałacu w Gorzanowie. W pracy skupiono się na problemach technicznych i organizacyjnych związanych z realizacją ambitnego przedsięwzięcia, jakim jest doprowadzenie omawianego obiektu do pełnej funkcjonalności i użyteczności.

*Słowa kluczowe: Remont obiektu zabytkowego, problemy remontowe, ocena stanu technicznego, diagnostyka konstrukcji budowlanych*

\* Ph.D. Eng. Daniel Wałach, M.Sc. Eng. Justyna Jaskowska-Lemańska, Department of Geomechanics, Civil Engineering and Geotechnics, Faculty of Mining and Geoengineering, AGH University of Science and Technology.

\*\* M.A. Alicja Siatka, president of the Fundacja Pałac Gorzanów (The Gorzanow Palace Foundation).

## 1. Introduction

Historic palace complexes are an inherent part of the landscape of Lower Silesia. However, in recent decades many of them have succumbed to slow degradation and lost their artistic qualities. This is often due to a lack of regulated proprietary rights and the need to frequently implement large scale modernisation works, in order to restore such a building to serviceability [1]. The palace complex in Gorzanow has experienced a similar situation, as the lack of proper protection and failure to carry out necessary modernisation work has resulted in a construction disaster. The building in question has undergone frequent changes in ownership and the lack of ongoing repairs led to many permanent defects in structural elements, but above all, degradation of the magnificent decorations, ornaments, and architectural details.

## 2. Assessment of the technical condition

Assessment of the current technical condition constitutes the basis for designing all necessary reinforcements, repairs, reconstructions, and protection of this historic building. Due to its bad technical condition, the Palace Complex in Gorzanow discussed herein required a comprehensive assessment, which will help to enable future preservation and reinforcement work.

The highest level of damage recorded during the survey resulted from mistakes made while using and repairing the building. Above all, the mistakes discovered resulted from lack of maintenance and faulty repairs, as the structure of the building had not been previously analysed. The result was a series of defects, caused by the impact of weather and climate conditions on structural elements of the building.

The highest level of damage was recorded in the central part of the palace – the east wing (Fig. 1), where incorrect repair work resulted in destroying parts of the roof. The original roof was covered with red shingles, and then roof tiles. The roof was later covered with ceramic tiles during repair work. The scope of repair work did not include reinforcing the wooden structure of the rafter framing, which demonstrated symptoms of biological corrosion that resulted from numerous areas of damp, which was almost certainly due to the effect of the bad technical condition of the roofing. The excessive loading on the rafter framing, due to much heavier ceramic tiles being placed upon it, led to the collapse of that part of the roof. Load-bearing walls of the building were all that remained in the area of that construction disaster. The east wing that did not collapse was however leaky and each successive storey downstairs demonstrated numerous defects, which was a result of the impact of the precipitation of water. The following can be listed as the most frequently recorded types of defects: partial and complete failure of floors; significant development of biological corrosion on dampened materials; damage to stucco decorations on ceilings; damp in load-bearing walls, including loosening of plaster, and degraded structure and painting decoration on the crowning cornice. A large number of defects have also been discovered in the west section of the building – which contained residential rooms, as recently as 2011. The defects resulted from lack of roofing, both wooden elements and the masonry structure.

The roof in the west wing had suffered from long term degradation, resulting from the impact of weather conditions, i.e. snow load and rainfall.

The majority of the roof had collapsed under its own weight, resulting from a lack of maintenance and poor technical condition of the rafter framing. Severe damage was also observed in the staircase in the west wing, which could possibly lead to a dangerous failure. Thanks to the good condition of the roofing (modern roofing systems), the north and south wings have been preserved in significantly better condition. The south wing features a number of modern structural solutions, while many elements of the wooden floors have been cut out (removed), due to poor technical condition. As for the brick vaults on the ground floor, they required securing. The polychrome Renaissance ceilings in the north wing have been well preserved. The defects recorded in the north wing primarily consist of large cracks on the external walls, looking from the north side. This structure contains buttresses, which were added some time after the palace itself had been built. This led to the conclusion that the cracks in that part of the building have been present for a long time. The reason for that could be an unstable foundation, which demonstrates significant damp and a high level of underground waters, on that side of the palace. The administration wing has also demonstrated numerous cracks.

Assessment of the technical condition was made on the basis of [3–5] survey which were conducted.



Fig. 1. View of the facade and roofing in the east wing, on the day of August, 2011 [2]

### 3. The scope of implemented repair work

In the fourth quarter of 2012, custody over the historic building was granted to Fundacja Pałac Gorzanów (The Gorzanow Palace Foundation), which started repair work, according to the construction disaster procedure, considering the collapsed roofs in the east and west wings.

The initial phase was basic securing work, which would prevent further destruction and devastation of the palace. The first step was a complete removal of the remaining rafter framing in the east and west wings – the entire area of the removed rafter framing was 1,300m<sup>2</sup>. The roofing work carried out in the west wing was completed before the beginning of winter. The rafter framing was restored, and covered with full roof boarding and bitumen roofing paper. The structure of the rafter framing in the east wing has been modified from a structure based

on collar beams and queen posts to a roof truss, which brought about a beneficial change in the static diagram and lightening of the wooden ceiling on the second storey, which had previously demonstrated significant deflections. The roofing on the cupola of a 55 m-high palace tower was also replaced. The scope of renovation included the dial-plate and workings of the clock, as well as all architectural details, up to the height of the roof ridge in the east wing.

Securing of the structure included carrying out of 500 m<sup>3</sup> of rebuilding (bricklaying), which was primarily related to the elements that demonstrated significant fracturing, cracking and defects. The work seldom involved reconstructing entire wall elements, but in some cases, load-bearing walls and ceilings were rebuilt. All repairs were carried out using ceramic brick, regardless of the different types of materials used to erect the original wall structures in the palace (Fig. 2). The dormer windows on the roof in the east wing have also been restored and filled in, during masonry work.

In addition, the securing of the building consisted of repairing and restoring the wooden beam-framed floors present in the palace (Fig. 3). All wooden elements were surveyed, based on which it was possible to select which elements could be left in place or reinforced, and the ones which had to be replaced. Some wooden floors have been replaced with floors based on pre-tensioned pre-stressed concrete, placed in the existing pockets, which enabled work to be completed more quickly.



Fig. 2. View of the administration wing and repairs which have been made using ceramic brick. Left side is a view on the day of February 2nd, 2013 to the right as at September 28th, 2013



Fig. 3. Wooden beam-framed floors restored in the north wing of the palace

#### 4. Technical and organisational issues, regarding the carrying out of repair work

When carrying out the ambitious task of restoring the Palace Complex in Gorzanow to its full functionality and serviceability, a number of technical and organisational problems were encountered.

The condition of wooden beams and all other structural elements of the palace's tower cupola turned out to be far worse than initially thought (Fig. 4). Similarly, the rafter framing in the main building turned out to be in far worse condition than was expected after the initial assessment. Additionally, the weather at the end of 2012 and the beginning of 2013, as well as in the first months of 2013, did not permit the covering of the decked roof over the main wing with roofing paper, which extended the period in which the interior was soaking with water, and rendered it impossible to undertake work which was necessary in order to secure Baroque ceilings covered with stuccowork. This brought about many concerns, regarding the soaking walls which still contained precious decorations, including among others the ones in the *Sala Terrena*.

The scaffolding required to repair the palace's tower made it impossible to provide the proper protection of the joints between the roof and walls of the tower, during repair work (Fig. 4). Therefore, the mentioned joints were only temporarily protected against the weather, until the scaffolding was removed.



Fig. 4. View of the clock tower. On the left before renovation, to the right during the renovation

The north wall on the north wing at the main courtyard remains in very poor condition (it has probably been so for many years, considering the buttresses added on that side), which results from the instability of the slope in the park – which needs to be analysed with specialised equipment.

A large amount of soil which was deposited in the grange courtyard, during the post-war years clogged and obstructed the drainage and sewage system that has existed in the palace

at least from its last repair in the years 1900–1906, and it also led to a significant damp in the walls and floors in the west wing. The east wing near the south courtyard (the so-called Classical wing) was damaged during roof repairs carried out in the 1990s, and it turned out to be extremely unstable. The funds collected for its repairing were only sufficient for the rebuilding and reinforcing of the west wall to preserve a badly damaged and collapsing vault inside the east wing, and the floor above it that constitutes the foundation for the floor of all rooms on that storey (formerly residential rooms), turned out to be a very demanding task, in the context of design and brick work. It was discovered that the walls adjoining the park (on the south side) were fractured, in that part of the wing. As a result, a drainage system was unearthed to remove water from that area – among others from under the building itself.

One of the significant organisational and logistical problems was the installation of floors based on pre-tensioned pre-stressed concrete, as it was impossible to move heavy construction equipment near the building. Consequently, the costs of installing girders were higher, than expected. However, it is worth mentioning that the overall costs of the repair work completed to this date has been consistent with the approved cost estimate of repair work. Naturally, there were some unexpected costs that emerged during repair work, for example regarding the repairing of the clock on the palace's tower. Nonetheless, the clock has been restored, as high costs would be incurred again in the future, resulting from the necessity to erect scaffolding.

The decisions concerning the sequence of carrying out each successive phase of repair work were predominantly the result of the amount of funds derived from the Ministry of Culture and National Heritage (500,000 PLN), the Marshal Office of Lower Silesia (60,000 PLN), and the National Fund of Environmental Protection and Water Management (384,000 PLN for the initial maintenance work in the park surrounding the palace). The guidelines specified through expert opinions and suggestions made by designers who cooperate with the Foundation have also been taken into account.

The philosophy behind the repair work was to ensure a significant level of “recovering” building materials, to re-use them in the future. However, only around 15.0% of stones and wooden structural beams have been recovered. Re-cut wooden elements will or have been re-used in the rooms of lesser spans (Fig. 5).

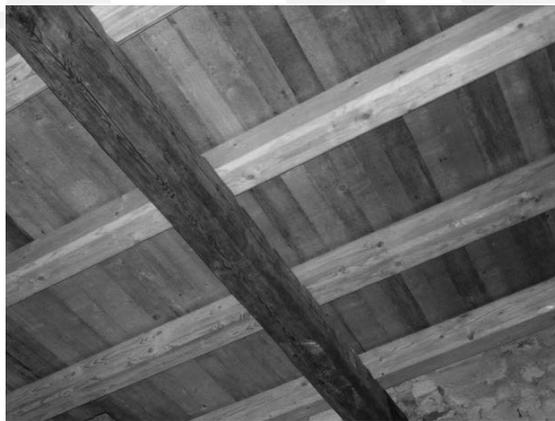


Fig. 5. New and old (recovered) structural elements used as part of the ceilings

The work schedule for 2014 is directly related to raising funds for carrying out this work. It will not be possible to determine, whether the plan can be completed and to what extent, without having any information about awarded grants. Still, the following scope of further repair work has been agreed:

- Carrying out of repair and protection work in the theatre wing, from January 2014 to July 2016;
- Continuation of repairs and protection work in all other wings, predominantly in the main building;
- Carrying out a detailed survey and securing the slope from the side of the park;
- Attempting to de-clog and restore the existing drainage system (drainages), or – should the first option be impossible – installing a new drainage system;
- Carrying out necessary conservation work in each successive wing of the palace.

## 5. Conclusions

Damage inventory and tests conducted make it possible to determine the current technical state of the Palace Complex in Gorzanow. Experiences from previously conducted renovations show that macroscopic assessment alone is not an appropriate for establishing the technical state of the construction, especially regarding wooden elements of the construction. The incorrect assessment of the technical state of the wooden elements of rafter framing ultimately lead to prolonged renovation, increased planned costs, and also create the possibility of further damage occurring.

The current problem for all ongoing construction is the impact of atmospheric conditions, which are especially dangerous in the case of historic buildings. In the Palace Complex in Gorzanow, this problem stems from the limited ability to isolate individual floors from precipitation and also from the high sensitivity of historic stucco and paintings to moisture.

It is not unusual that the order of implementing renovation projects in historical buildings is determined by acquired grants, which most frequently come from various sources. The order in which funding for specific tasks are obtained causes buildings to be renovated in an order which is not aligned with the recommended technological order. In the above mentioned conservation project, decision models were not implemented and the order of executing particular tasks was based on the system of funding. Most decisions regarding specific renovation issues stemmed from the need to allocate obtained funding.

Years of negligence, in terms of maintaining a building in an appropriate technical state, are very difficult to undo. However, protective renovation work conducted by the new owners of the Palace Complex in Gorzanow are encouraging and suggest that the palace and its entire surrounding will eventually be restored to its previous glory.

## References

- [1] Łuczyński R.M., *Losy rezydencji dolnośląskich w latach 1945–1991*, Atut, 2010.
- [2] Materiały udostępnione przez „Towarzystwo Miłośników Gorzanowa”.

- [3] Prawo budowlane z dnia 7 lipca 1994 r. – z późniejszymi zmianami.
- [4] Rozporządzenie Ministra Infrastruktury w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie z dnia 12 kwietnia 2002 r. – z późniejszymi zmianami.
- [5] Rozporządzenie Ministra Spraw Wewnętrznych i Administracji w sprawie warunków technicznych użytkowania budynków mieszkalnych z dnia 16 sierpnia 1999 r.

