

Article

Consequences of Abandoning Renovation: Case Study—Neglected Industrial Heritage Building

Beata Nowogońska 

Faculty of Civil Engineering, Architecture and Environmental Engineering, University of Zielona Góra, ul. Szafrana 1, 65-516 Zielona Góra, Poland; b.nowogonska@ib.uz.zgora.pl; Tel.: +48-68-3282-290

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Abstract: The abandonment of renovation works is an extremely important factor causing degradation of the building. Omission of repairs may lead to a threat to the stability of the building's structure, threaten the lives of users, further damage to the building by damaging further elements. The aim of this article is to analyze the consequences of abandoning renovation works in order to minimize the occurrence of construction failures in the future. The article presents problems related to the abandonment of repair works of damaged elements. A classification of the effects of abandonment of repairs for historic buildings has been worked out. Industrial heritage buildings were often not used for a long time, and the lack of maintenance very often caused their partial or even complete destruction. The progressive degradation of buildings is mainly the result of human negligence, lack of effective, and continuous maintenance. The problem of abandonment of repairs is presented on the example of the granary in Krosno Odrzańskie.

Keywords: buildings; buildings elements; degree of technical condition; degradation of buildings; abandonment of renovation works; maintenance management of building; use management of building; assessment of the technical condition of the building

1. Introduction

Damage to buildings made in traditional technology is caused by various reasons. Apart from the natural wear of materials, the destructive influence of atmospheric processes, topographical factors, design errors, errors during the construction of an object, various types of natural disasters, there is another important factor causing damage to a building. During the exploitation of the object, repairs should be performed in it on an ongoing basis [1–4]. The abandonment of renovation works is an extremely important factor causing degradation of the building.

Proper operation of residential buildings requires experience, interdisciplinary knowledge, and skills [5–7]. Incorrectly made decisions of building owners or managers regarding the redeployment during the implementation of renovation projects have a negative impact on the ageing processes of buildings. Decision making is always difficult due to limited financial resources. Research on rational planning of renovation and modernization projects is constantly being conducted [8–11], but the impact of the level of public awareness on the efficiency of building resource management is neglected. The efficient management of buildings maintenance embraces many skills that include identifying maintenance needs and the accurate and spot on remedies [12]. During the operation of buildings, there are many problems related to maintenance management, use management and assessment, and forecasting of the technical condition of the building [13]. The consequences of wrong decisions concerning the renovation or neglected maintenance of buildings lead to irreversible destruction processes [14–17]. The ageing process of a building is closely related to technical wear [18–20]. Absence of renovation work results in its acceleration. In many historic buildings, renovation activities

are often abandoned. Then, the technical condition is constantly decreasing, and the functional properties reach lower and lower values [21,22].

The preservation of historical buildings as cultural heritage is one of the priority tasks of local authorities, in practically every country. Unfortunately, both the current assessment of the technical condition and the necessary renovation works are not performed over a long period of time [23–25]. Renovation dates are often postponed [26–29]. A lot of research is being carried out on the subject of renovation needs assessment. The methods of renovation needs assessment are being worked out, for example Assessment Method for Building's Rehabilitation Needs MANR [30], Architectural and Psycho-environmental Retrofitting Assessment Method APRAM [31], BuildingsLife: a building management system BdMS [32], Determining the Rehabilitation Needs of Buildings DRNB [33], a model integrating the genetic algorithm, and simulation [34].

Research on the possibility of adaptation included a comprehensive review of the factors affecting adaptive reuse decision-making and to develop a holistic model for adaptive reuse strategies for heritage buildings. Regeneration problems relating to derelict and mismanaged buildings in Lithuanian rural areas are analyzed by means of multi-criterion decision-making techniques [35]. They were developed methodologies that permits finding and comparing optimal retrofits for historic buildings in a multi-perspective way [36,37].

The problem of abandoned buildings belongs to the subject of sustainable development. Rehabilitation of buildings is part of the scope of sustainable solutions because of its own vocation to reuse the existing building, which is expanded and improved rather than demolished and abandoned [38]. Vacant and abandoned buildings pose significant challenges to the health and safety of communities also [39,40]. The problem of abandoning renovation works and growing renovation needs also in modern construction is often pointed out [41–43].

Repair needs are a popular research topic. Methods of planning renovation works, renovation methods, methods of building modernization, or methods of making decisions in renovation strategy are the subject of many studies. However, the problem of the effects of abandoning repairs remains unrecognized. The aim of the research is to identify and classify the consequences of a lack of renovation works. The analysis of the consequences of abandonment of renovation works is one of the issues concerning building management. Presentation of the consequences of abandonment of renovation works may help in making a decision to start renovation projects of various buildings. All buildings where repairs are not carried out on an ongoing basis are poorly managed. The indirect aim of the research is to make building owners aware of the consequences of abandoning repair work.

The literature provides a topic of planning of renovation works, which results in the order of renovation of each building component. This article presents a slightly different approach. The method of consequences of lack of renovation works of each building element is presented. This method can be used to plan renovation works on the principle that the greater the consequences the more necessary the renovation.

Abandoning renovation works always brings with it many consequences. The most dangerous effect is building degradation. The example of a granary in Krosno Odrzańskie presented in the article is the worst possible case of the consequences of failure to carry out repairs. In this building, technical condition tests were carried out, the scope of renovation works was proposed, but the renovation works were not performed. There was a construction disaster and the main reason for it was the abandonment of renovation works.

2. Method of Analyzing the Consequences of Abandoning Renovation

The aim of the article is to identify and classify the consequences of a lack of renovation works. The indirect aim of the research is to make building owners aware of the consequences of abandoning repair work. Knowledge of consequences of abandoning renovation works can help to minimize the occurrence of construction failures in the future.

The analysis of the effects of abandoning renovation works was carried out in three stages:

- Stage 1. Determination of the most important effects of the lack of overhaul;
 Stage 2. Determination of weights for each effect using the analytic hierarchy process AHP method;
 Stage 3. Determination of the level of consequences of abandonment of renovation works for each component of the building.

The proposed method aims to show the magnitude of the effects of lack of renovation works in the form of numerical values. The numerical values do not constitute any physical quantity. The numerical values obtained are without units. The values only show the scale of the problem to make building owners aware of the need for renovation. The higher the numerical value, the greater the consequences of a lack of renovation.

To assess the consequences of abandonment of renovation works, a multi-criteria analysis was used, performed with the use of the AHP problem hierarchical analysis method (analytic hierarchy process). The AHP method allowed to apply many non-measurable criteria.

Decision making is always difficult. Proper selection of damaged building elements for renovation is problematic with limited financial resources. The most often presented are the positive consequences of the renovation works of an element in the building. The article presents the consequences of lack of renovation of an element in a building. The proposed method shows the consequences of lack of renovation work on individual building elements. The proposed method assumes that all building elements are destroyed, and the financial means are limited.

The results obtained show the scale of the problem of lack of renovation works. The obtained figures, ordered from the largest to the smallest, will allow to rank the building elements in terms of the necessity of carrying out renovation works.

The presented analyses of hazards, breakdowns, and construction disasters in Poland [44] show that over the last 50 years, the largest number of them concerned brick, mixed, and steel structures, followed by wooden and reinforced concrete (prefabricated or monolithic). The results are shown in Figure 1, and the number of construction disasters in Poland is shown in Figure 2.

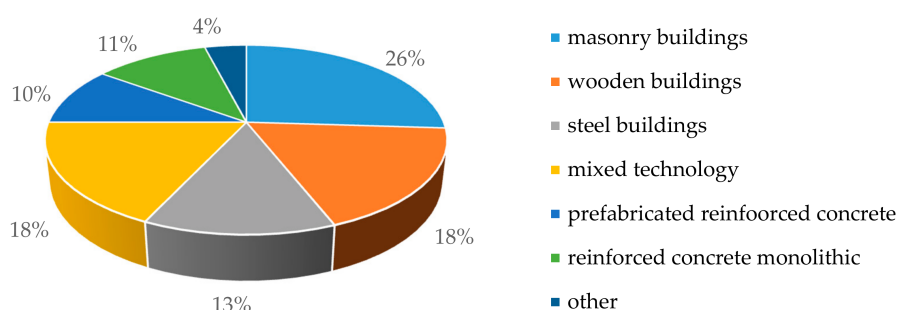


Figure 1. Percentage share of threats, failures, and disasters according to the division into technologies of the constructed object according to [44].

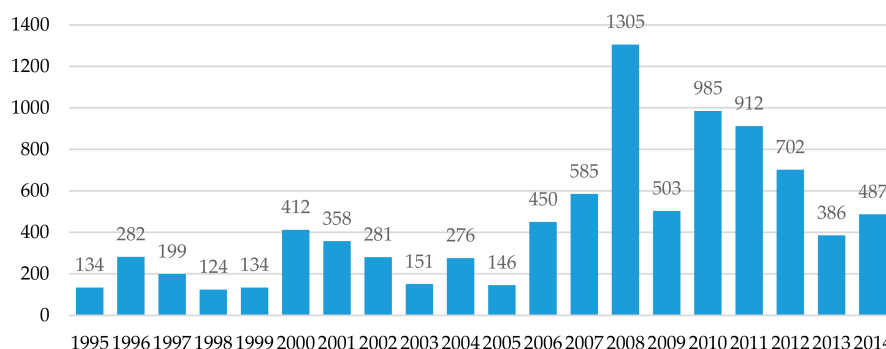


Figure 2. Number of building disasters according to Building Research Institute ITB data [44].

The results of statistical research indicate the need for research to help prevent construction breakdowns. Breakdowns and damage are the result, the causes must be found. Knowing the causes will help to prevent breakdowns.

2.1. Determination of the Most Important Effects of the Lack of Overhaul

The abandonment of renovation works is an extremely important factor causing further damage to the building. A damaged element may cause a threat to the stability of the building structure, endanger the life of users, and further damage to the building by damaging further elements (Figure 3).

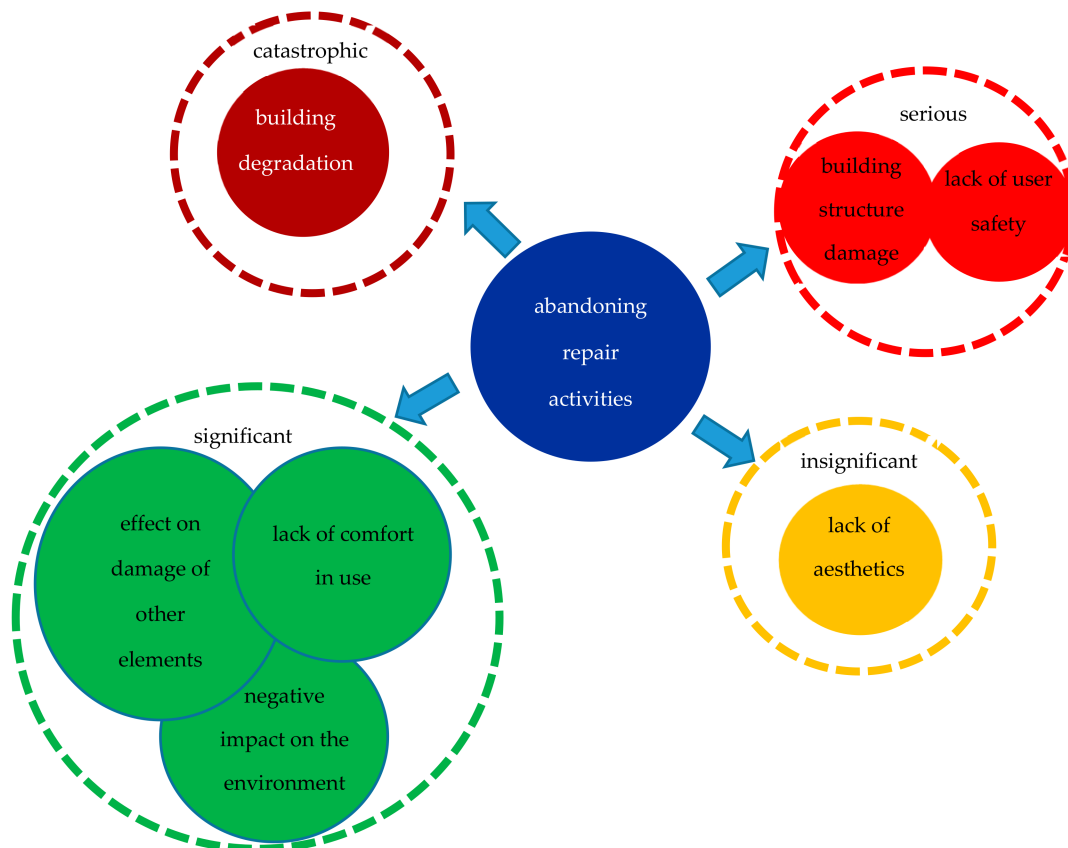


Figure 3. Consequences of abandoning repair work.

The effects of failure to repair individual building elements presented in Figure 3 are divided into catastrophic, serious, significant, and insignificant. The catastrophic effect was defined as degradation of the building, which may be caused by the lack of repair of damaged structural elements and gas pipes, tiled stoves, pipes, and electrical installation accessories. The consequences of serious omission of repairs included damage to the building's structure and lack of safety of users. For example, a damaged roof covering may cause damage to the rafter framing and ceilings of the highest stores.

Failure to carry out repairs involving roofing has both catastrophic, serious, significant, and irrelevant consequences. Destroyed and not repaired roofing is the cause of the lack of aesthetics of the object (insignificant effect). Lack of renovation of the roofing causes damage to other elements of the building, such as roof truss structure, floors, and plaster (significant effect). As a result of abandoning the renovation of the roofing, there is a lack of comfort in using the object (significant effect) and even a lack of safety of users (serious effect). Destroyed and not repaired roofing may be the cause of damage to other structural elements (serious effect) or even degradation of the building (catastrophic effect).

2.2. Determination of Weights for Each Effect Using the AHP Method

To assess the effects of abandonment of renovation works, a multi-criteria analysis was used, made using the hierarchical AHP problem analysis method. The AHP method allowed to apply many non-measurable criteria.

The proposed method can be used to assist in planning renovation works. It is always difficult to make a decision to select a damaged building element for renovation with limited financial resources. In the proposed method, decision-making processes in the form of a hierarchical structure have been applied. Many techniques supporting the choice are known. The simplest of these is the AHP technique, which has been used in the method of consequences of lack of renovation works.

There are many techniques supporting choices. The decision-making process with the use of AHP technique is one of many, and it is flexible and universal. In the method proposed in the article, AHP technique was used.

The assessment of the consequences of abandonment of renovation works was carried out by means of a multi-criteria analysis. The weights of each consequence of abandonment of renovation works were determined using the AHP hierarchical analysis process. The data were obtained on the basis of consultations with persons involved in the renovation of buildings: Building managers, university research workers, appraisers, conservators, employees of design offices, and contractors. Over 50 experts were consulted. The task of all experts was to determine the weighting of the consequences of lack of repair works: C1—building degradation, C2—building structure damage, C3—lack of user safety, C4—negative impact on the environment, C5—lack of comfort in use, C6—effect on damage of other elements, and C7—lack of aesthetics.

The consequences of C1, C2, C3, C4, C5, C6, and C7 were then compared in pairs in terms of relevance for each criterion. After summing up for each variant the scores obtained in each of the criteria, the final assessment of the variant is obtained. In this way, a ranking of options for the consequences of lack of renovation work is created, determining the relative advantage of one over another.

The obtained results of consultations are presented in Table 1. The obtained results of the AHP method are presented in the diagram in Figure 4.

The numerical values obtained are the weights of the individual consequences. The numerical values are not physical quantities, they are without units, and they are unchanged numbers.

Table 1. The assessment of the consequences of abandonment of renovation works.

Aim	C1	C2	C3	C4	C5	C6	C7
C1	1.000	0.333	0.200	0.143	0.200	0.200	0.111
C2	3.000	1.000	0.333	0.143	0.200	0.333	0.143
C3	5.000	3.000	1.000	0.200	0.333	1.000	0.143
C4	7.000	7.000	5.000	1.000	3.000	0.200	0.333
C5	5.000	5.000	3.000	1.000	1.000	5.000	0.143
C6	5.000	3.000	5.000	5.000	0.200	1.000	0.200
C7	9.000	7.000	7.000	3.000	7.000	5.000	1.000
Cj	35.000	26.333	21.533	10.486	11.933	12.733	2.073

The designations: C1—building degradation, C2—building structure damage, C3—lack of user safety, C4—negative impact on the environment, C5—lack of comfort in use, C6—effect on damage of other elements, C7—lack of aesthetics, Cj—total.

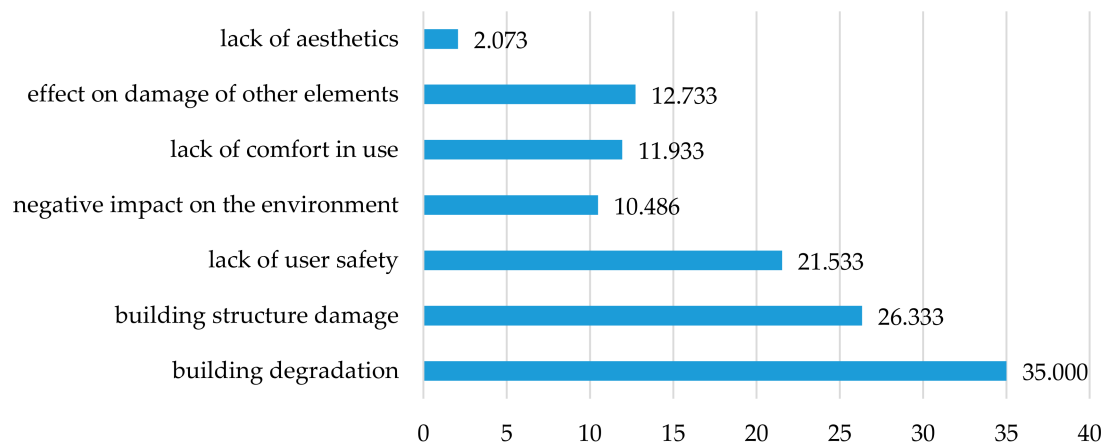


Figure 4. Obtained results of the analytic hierarchy process AHP method— C_j .

2.3. Determination of the Level of Consequences of Abandonment of Renovation Works for Each Component of the Building

Lack of repair work on each element leads to different consequences. Weightings of the consequences of abandoning renovation works have been assigned to the building's components. The sum of the weights for each element is defined as a coefficient of the consequences of abandonment of renovation works:

$$E_{i,j} = \sum_{i=1}^n C_j \quad (1)$$

where:

- $E_{i,j}$ —coefficient of the consequences of abandonment of renovation works;
- C_j —weight of consequences j ;
- i —denotes an ordinal number of an element in a building, $i = 1, 2, 3, \dots, n$;
- j —denotes consequences, $j = 1, 2, \dots, 7$.

The value of the coefficient of consequences of abandoning renovation works does not represent any physical quantity. It only serves to compare the coefficients for different building components. The coefficients can be ranked from the highest to the lowest value. This ranking can help in planning renovation work.

The results obtained for each building component are shown in Table 2.

The results in Table 2 are color coded. The colors indicate the division of the building elements due to the consequences of abandonment of renovation works:

- Blue— $E_{i,j}$ is over 100;
- Green— $E_{i,j}$ from 50 to 100;
- Orange— $E_{i,j}$ from 20 to 50;
- Yellow— $E_{i,j}$ is from 0 to 20.

Table 2. Breakdown of the consequences of abandoning renovation works.

Damaged Component	Consequences							E _{i,j}
	Catastrophic	Serious		Significant		Insignificant		
	Building Degradation	Building Structure Damage	Lack of User Safety	Negative Impact on the Environment	Lack of Comfort in Use	Effect on Damage of Other Elements	Lack of Aesthetics	
Brick foundations	35.000	26.333	21.533	10.486	11.933	12.733	0.000	118.019
Masonry brick walls	35.000	26.333	21.533	10.486	11.933	12.733	2.073	120.092
Masonry partition walls	35.000	26.333	21.533	10.486	11.933	12.733	2.073	120.092
Wooden beam ceilings	0.000	26.333	21.533	10.486	11.933	12.733	2.073	85.092
Wooden stairs	0.000	0.000	21.533	0.000	11.933	12.733	2.073	48.273
Roof rafter	0.000	26.333	21.533	0.000	11.933	12.733	2.073	74.606
Tail caver	0.000	26.333	21.533	0.000	11.933	12.733	2.073	74.606
Gutters and drainpipes	0.000	26.333	0.000	0.000	0.000	12.733	2.073	41.140
Internal plasters	0.000	0.000	0.000	0.000	0.000	12.733	2.073	14.806
External plasters	0.000	0.000	0.000	0.000	0.000	12.733	2.073	14.806
Windows	0.000	0.000	0.000	0.000	11.933	12.733	2.073	26.740
Doors	0.000	0.000	0.000	0.000	11.933	12.733	2.073	26.740
Glazing	0.000	0.000	0.000	0.000	11.933	12.733	2.073	26.740
Wooden floor	0.000	0.000	0.000	0.000	11.933	0.000	2.073	14.006
Wall coatings	0.000	0.000	0.000	0.000	0.000	0.000	2.073	2.073
Woodwork oil coatings	0.000	0.000	0.000	0.000	0.000	12.733	2.073	14.806
Cores of ceramic cookers	0.000	0.000	0.000	10.486	11.933	12.733	2.073	37.225
Tiled stove	0.000	0.000	0.000	10.486	11.933	12.733	2.073	37.225
Central heating pipes	0.000	0.000	21.533	0.000	11.933	12.733	2.073	48.273
Boilers and heaters for c.h.	0.000	0.000	21.533	0.000	11.933	12.733	2.073	48.273
Water supply and sewage pipes	0.000	0.000	0.000	10.486	11.933	12.733	2.073	37.225
Water supply and sanitation fittings	0.000	0.000	0.000	10.486	11.933	12.733	2.073	37.225
Gas pipes	0.000	0.000	21.533	10.486	11.933	12.733	2.073	58.759
Electrical installations	0.000	0.000	21.533	10.486	11.933	12.733	2.073	58.759

The $E_{i,j}$ values obtained can help to plan the renovation of damaged buildings. The values assigned to the individual building elements, in order from the largest to the smallest, are the order of renovation works. The obtained hierarchy follows from the risks of consequences of absence of renovation works. Due to the most unfavorable consequences of the absence of renovation works, it is necessary to renovate the elements with the highest values marked in blue (masonry brick walls, brick foundations, masonry partition walls) first. Next, elements in the building should be renovated in green (roof rafter, tail cover, wooden beam ceilings, gas pipes, electrical installations), then in orange (gutters and drainpipes, wooden stairs, windows, doors, glazing, cores of ceramic cookers, tiled stove, central heating pipes, boilers and heaters, water supply and sewage pipes, water supply, and sanitation fittings). The last group of the building elements marked in yellow (internal plasters, external plasters, wooden floor, wall coatings, woodwork oil coatings) is the less dangerous as a result of absence of renovation works and therefore these elements can be renovated later than the other elements in the building.

3. Case Study—Granary in Krosno Odrzańskie—An Example of Neglect of Industrial Heritage

An example of building degradation due to abandonment of renovation works is the granary in Krosno Odrzańskie. The granary is located in the north-eastern part of the Old Town, between the Oder River and the Piast Castle. The Granary is the only surviving farm building of the castle complex. The building is two-story with a high hipped roof, in which there are two more stories. It is set on a rectangular plan of 28.30×14.10 m. The building is built of erratic stone and brick. The basement floor is recessed about 1m below the surrounding area. The basement rooms are covered with barrel vaults with telescopes based on internal pillars and perimeter walls. In the first aboveground story, there is a wooden naked beam ceiling based on the southern external wall, a stool wall in the middle of the span, and a stool wall located near the northern wall. The structure of the ceiling of the highest story is made up of collar beams.

The rafter framing structure is flint with one two-story stool wall. In full trusses, at the level of the lower story of the rafter framing structure, there are stools lying parallel under the rafters, connected with double grooves and rafters. Throttles are nailed to the lower part of the rafters, which cause a slight refraction and extension of the roof slope beyond the edge of the wall. The roof is covered with a double-cutter clay tile.

Facades are without divisions (Figure 5). The decoration of elevations are the remains of rustication and traces of window bands. The majority of window openings are rectangular with different dimensions. Rectangular door openings are located in the eastern, western, and northern elevation. The opening in the eastern elevation is closed with a sectional arch.



Figure 5. Granary building—outbuilding of the Piast Castle. (a) outbuilding of the Piast Castle and the south-west part of the castle walls, (b) the view from the north-western side, in the background there is a reconstructed part of the Piast Castle.

The wooden external staircase at the western elevation and the decorative, openwork cast-iron, winding internal staircase have unfortunately not survived to today.

The granary in Krosno Odrzańskie is one of the farm buildings connected with the castle. The original castle was erected in the first half of the 13th century and rebuilt in the 16th century in the Renaissance style [45–47]. The granary was built in the first half of the 17th century on the initiative of the then owner of the castle, Elżbieta Charlotta, wife of the Brandenburg elector Jerzy Wilhelm. The building was erected in a Baroque architectural form, squatted and massive, characteristic of the economic buildings of the time [45–47]. During the reign of Henryk Bearded, the castle in Krosno was an important border stronghold in the defensive system of Lower Silesia.

3.1. Causes of Building Degradation

The natural wear and tear of building elements, the destructive influence of atmospheric, biological, and mechanical factors, and the failure to carry out ongoing maintenance and repair the resulting damage are the main causes of poor technical condition of the building before the disaster. The granary has not been used for many years, there were no current repairs, maintenance, protection against the influence of weather conditions, and also against access by third parties. (Figure 6.)



Figure 6. Granary building—cellar (a), first floor (b), second floor (c). (a) Moisture of vaults and basement pillars due to the lack of horizontal and vertical insulation. (b) First floor aboveground. (c) Damaged ends of floor beams in places where they rest on perimeter walls on the south side.

There were numerous cracks and scratches in the walls. Due to the damage to the roofing, the upper parts of the walls were covered with moisture, numerous cracks in bricks, and washed out mortar. The central part of the northern wall was deflected from the vertical about 70 cm at the whole height.

Due to the leaks in the roofing, the precipitation has, for many years, caused the destruction of wooden elements of the building. Elements of the rafter framing structure were damp and molded, and the strength of wood was reduced. There was fungus and moisture in the ceiling joists, pillars, and pillars of the stool wall.

3.2. Analysis of the Causes of the Disaster

As a result of the technical condition assessment [48], the following conclusions and recommendations were formulated:

- The significant deviation from the vertical of the central part of the northern wall is caused by the abandonment of the renovation of previously damaged wooden elements of the ceiling and rafter framing structure. Due to the considerable amount of displacement and numerous cracks and scratches, it is recommended to brick up the entire north wall, if possible, using demolition material. Until the renovation is carried out, it is necessary to provide temporary protection to strengthen the wall structure.

- For the rest of the walls, the walls should be demolded. It is also necessary to strengthen and repair the scratched fragments of walls using, depending on the size of the scratches, the method of stitching the scratches with steel rods in the joint or brick the wall fragment.
- On the walls, horizontally above the first aboveground story (ground floor), it is proposed to make a wreath or internal reinforced concrete tie based on pilasters, adjacent to the inner face of the existing walls, or steel girders.
- Numerous scratches and cracks in the walls also indicate uneven subsidence of the ground. In order to strengthen the foundation of the building, one (or several simultaneously) of the methods of ground stabilization should be used, e.g., using micro-injection piles or using traditional methods of foundation reinforcement, e.g., by increasing the area of the bench base by concreting on both sides.
- Due to the dampness of basement walls and vaults, vertical and horizontal insulation of foundations and foundation walls should be made.
- Due to the poor technical condition of the ceiling above the ground floor threatening catastrophe, renovation should be carried out immediately, taking into account the preservation of as much of the historical substance as possible in an unchanged form.
- For each floor beam at all floor levels, the choice of the appropriate method of structural reinforcement should be determined individually, e.g., reinforcements achieved by enlarging material sections, reinforcing the material structure, incorporating elements made of other materials into the cooperation and ultimately replacing the elements with new ones.
- The ends of ceiling joists in places where they are supported on perimeter walls are the most vulnerable to damage, as they are subject to the most intense effects of moisture due to precipitation, wind, or lack of sunlight (especially north and west walls) and lack of natural ventilation. Less damaged parts of ceiling joists on supports directly in contact with the wall should be reinforced with wooden or steel overlays or the damaged end of the joist should be replaced with a supplementary element made of wood or steel, restoring the original length and bearing capacity of the ceiling joist. Heavily corroded beams should be replaced completely.
- When repairing the ceiling structure of the uppermost story, it is necessary to supplement and strengthen the sections with additional elements, impregnate and inject, strengthen joints by introducing new connectors, and replace the most damaged ones.
- Due to poor technical condition threatening a catastrophe, the roof truss structure should be immediately repaired. When replacing damaged elements or their fragments, wood of appropriate humidity and characteristics consistent with the original material should be used. New elements or their fragments should be made of the same species of wood, with similar grain as in the original elements. When replacing parts of the roof truss structure, it is recommended to use traditional methods of connection.
- The roofing should be replaced with new ones. As before, it is made of clay tile, a double-crowned clay tile. In addition, make new fixings, gutters, and downpipes. Connect the water drainage from the roof to the municipal collector.
- Lack of repair activity is a serious destructive factor of the building; the repair works proposed above should be carried out immediately so as to preserve the authenticity of the building.

However, the owner of the granary did not apply any of the proposed and urgently recommended repairs. No protective measures have been taken to stop the destructive processes. The temporary protection of the northern wall structure was also omitted.

The presented results of the condition assessment are to show the scale of the problem. All elements of the granary building in Krosno Odrzańskie are subject to renovation works. However, despite such a thorough study, the owner did not apply any measures.

The effects of failure to repair individual elements of the building, presented in point 2 in Table 2, were divided into catastrophic, serious, significant, and insignificant. In the case of the granary in Krosno Odrzańskie, the effects are catastrophic, as can be seen in Figure 7.



Figure 7. Building after the disaster.

Less than a month after the technical and conservation recommendations were made, a construction disaster occurred. The northern wall and the construction of the rafter framing with a wooden ceiling above the ground floor were destroyed (Figure 7). The immediate cause of the catastrophe was a failure to carry out repair work.

After the catastrophe, it also turned out that there was a wreath in the form of two parallel wooden beams running along the northern wall. The biological corrosion of these elements caused a leaning from the vertical of the wall.

In the case of the granary in Krosno Odrzańskie, renovation works on all building components were abandoned. The effect factor of abandonment of renovation works of the whole building E_b is equal to the sum of effect factors of abandonment of renovation works of the building components:

$$E_b = \sum_{i=1}^n E_{i,j} \quad (2)$$

where:

- E_b —coefficient of the consequences of abandonment of renovation works of the whole building;
- $E_{i,j}$ —coefficient of the consequences of abandonment of renovation works;
- i —denotes an ordinal number of an element in a building, $i = 1, 2, 3, \dots, n$;
- j —denotes an consequences, $j = 1, 2, \dots, 7$.

For the granary in Krosno Odrzańskie the coefficient E_b reaches its maximum value: $E_j = 1185.601$.

4. Conclusions

The longevity of buildings is influenced by many factors related to the successive stages of their existence, starting from the design, to the execution of construction works during the erection of the buildings, up to the stage of use. In order to keep existing buildings in good technical condition, it is necessary to carry out inspections, maintenance, and repairs on time. The progressive degradation of buildings is the result of human negligence and lack of effective and continuous maintenance. The performance of renovation works will extend the life of existing facilities.

The method presented in the article determines the scale of lack of renovation works. The consequences may be:

- Catastrophic C1—degradation of the building (weight 35.00);
- Serious C2—building structure damage (26.333),
C3—lack of user safety (21.533);
- Significant C4—negative impact on the environment (10.486);
C5—lack of comfort in use (11.933);
C6 effect on damage of other elements (12.7330);
- Insignificant C7—lack of aesthetics (2.073).

The scales in brackets show the scale of the problem. The individual consequences assigned to each building element should influence the awareness of building owners of the consequences of abandoning renovation works.

Marking the obtained results with colors serves to emphasize the problem of damaged building components. The colors blue, green, orange, and yellow are the scale of problems related to the lack of renovation works assigned to each element of the building. However, each damaged building element must be renovated. Lack of renovation work on even one building element causes different effects.

Current renovation works in existing buildings will stop the progressing degradation of buildings. Due to the failure to repair the roof covering and rafter framing in the granary in Krosno Odrzańskie, wooden floors, then ceilings, stairs, plasters, and walls were destroyed. The exemplary granary is one of many destroyed post-industrial buildings. Due to the abandonment of repairs most often caused by the lack of the owner, improper manager, or irresponsible users, the degradation of these buildings occurs.

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