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Methods and possibilities for conservation of antique wooden floor in Poland – theory and practice

ANNA ROZANSKA[1], ANNA POLICINSKA-SERWA[2]
[1] Faculty of Wood Technology, Warsaw University of Life Sciences WULS-SGGW
[2] Building Research Institute

Abstract: Antique wooden floors with decorative panel parquets have different preservation condition as well as historic and artistic values. Therefore, renovation and conservation works must be adjusted to a various level of wear and tear of floor or parquet. The conservation may involve only minor repairs with the use of materials and techniques similar to the original ones. In some extreme cases it may also involve restructuring of floor or parquet. The purpose of the research is to analyse the conservation methods of antique wooden floors in Poland on historic and modern examples to recommend the applications of specific materials and repair techniques. The article presents legal grounds for antique floor conservation as well as the analysis of case studies of the best known executions while taking into consideration their effectiveness. It also presents the issue related to the prevention of damage to antique wooden floors on Polish and European markets.

Keywords: antique decorative wooden floor, floor conservation, floor reconstruction

INTRODUCTION

Antique wooden floors with decorative panel parquets have different preservation condition as well as historic and artistic values. Therefore, renovation and conservation works must be adjusted to a various level of wear and tear of floor or parquet. The conservation may involve only minor repairs with the use of materials and techniques similar to the original ones. In some extreme cases it may also involve restructuring of floor or parquet. In the first case it is only dictated by the need to make the top layer ready for use (1) or the top layer together with the necessity to repair the structure through replenishing any structure loss without the need to dismantle/relocate it (2). In the second case the necessity to relocate the flooring even with supplementing the damaged parts as well as replacing them with their copies (3). The highest level of interference results from the need and reconstruction of flooring – that takes into account types of structure, pattern and the wood species that are used (4).

The concept of floor reconstruction should be coordinated with the plan for restoration of individual rooms, interior colouring as well as the requirements of the conservation officer and expectations of the investor.

SCOPE AND METHODOLOGY

The purpose of the research is to analyse the conservation methods of antique timber floors in Poland on historic and modern examples to recommend the applications of specific materials and repair techniques. The article presents legal grounds for antique floor conservation as well as the analysis of case studies of the best known executions while taking into consideration their effectiveness. It also presents the issue related to the prevention of damage to antique timber floors on Polish and European markets.

FLOOR RECONSTRUCTION IN THE LIGHT OF REGULATIONS ON MONUMENTS PROTECTION

Timber floors are protected according to the Act on protection of listed monuments of 2003 and the only acceptable restriction on this protection is preserving utility values by these floor.

Also the theses of the National Programme for the Protection and Care of Historical Monuments which, apart from "conservator officers – office employees, professional conservators – restorers of works of art, conservators – architects, town planners, building restorers, archeologists and researchers" apply also to "the owners and users including clerical regular conservators of historic temples". The principle "primum non nocere", the maximum respect for the original substance of the listed monument and its values (material and non-material)", "the principle of the minimum required interference (refraining from any unnecessary actions)", "the principle stating that only the parts which have a destructive effect on the original work should be removed" promote a different approach to antique floors replacement, mainly on the part of their owner.

The nature of conservation activities must be unblurred and clear and it must be accompanied by descriptive and photographic documentation [Schemat dokumentacji konserwatorskiej 1976, Sękowski, 2003]. The following values listed in the Theses to the National Programme for the Protection and Care of Historical Monuments should be respected: "the principle of legibility and distinctiveness of the interference", "the principles of the reversibility of methods and materials" and "the principle of executing all the works according to the best practice and to the highest standard".

CONSERVATION OF FLOORS IN THE LIGHT OF THE CONSTRUCTION REGULATIONS IN FORCE

According to the Regulation of the Minister of Culture and National Heritage of 11 January 1994 with amendments, the qualifications required to perform conservation works in listed monuments shall be awarded to people with building licenses (civil engineers and architects) who have several years of experience in immobile monuments as well as graduates of universities specializing in monument conservation. As there are no specialist standards for listed monuments regulated in Poland, conservation works are performed on the basis of the constructions standards in force.

As the conservation of wooden floor is connected with the conservation of wooden structures, particular attention should be paid to the phase of diagnostics and the assessment of effectiveness of the suggested repair techniques. It is necessary to follow the adopted guidelines and standards. Conservation activities must be necessary, minimal, reversible and the effectiveness of the techniques used should be proved. Any plans related to conservation activities in the area of wooden structures must be preceded by research activities. Damaged material and structural damage are subject to analysis. Important information about the potential condition of the structure is provided by historical research. Mathematical tests and models are also indispensible [Rozanska et al. 2012b, Rozanska et al. 2012c, Burawska et al. 2012].

The conservation of wooden structures is governed by standards defined by international and national institutions (e.g. ICOMOS International Wood Committee, RILEM TC 215 AST regarding the in-situ assessment of structural timber, EN 1194:1999, Italian UNI-NORMAL WG 20). The basis for conservation of wooden structures involve the "Recommendations for the Analysis, Conservation, and Structural Restoration of Architectural Heritage" of the International Scientific Committee for the Analysis and Restoration of Structures of Architectural Heritage ICOMOS ISCARSAH. According to these recommendations the conservation or restoration (reconstruction) should include several stages of the process: –

preventive assessment of the condition of the structure (conservation status), – project planning (initial conservation schedule), – appropriate interference (execution of the conservation and restoration plan), – monitoring of the effectiveness of the interference.

The purpose of the assessment of the current conservation status is to learn about the effectiveness of static adaptation of the building and the role of the wooden structure to determine possible conservation plans. According to the above-mentioned standard, it involves performance of the historical analysis, determination of geometrical characteristics, damage characteristics, material characteristics and the analysis of the structure.

The historical analysis provides information about the structure and its past (misuse, damage, destruction, alterations). Its tools may involve a dendrochronological analysis, comparative analysis of other nearby historic or contemporary structures in the area of typological differences and similarities.

The geometric analysis defines sections of elements, depicts accidental changes of shape and dimension, determines the causes for deformations (related to load and movement or material features) in individual members and the entire structure. The characteristics of damage caused by biotic factors and mechanical damage define the degree of impact of temperature and moisture fluctuations, i.e. the micro-climate inside the structure on its conservation condition. The damage characteristics are determined through visual observation and through drilling in the members to determine the condition of timber. The following are examined: the material (macroscopically, and in case of any doubts, microscopically by collecting a small sample) and mechanical parameters of every wooden members (visually and with non-destructive methods). The moisture content is measured according to EN 13183-2:2002 by analysing the location of parenchyma cells, growth rate and growth ring inclination [Feio et al. 2005]. The performed examinations result is determination of type, location and scope of damage.

The knowledge of the wood species, geometry and member morphology and the nature of damage as well as their location form the basis for assignment of the strength class to the members. Determining preservation condition, historical and geometrical analysis as well as the damage characteristics provide a basis for any interference planning [Turrini, Piazza 1983; Piazza et al. 2009; Crosatti et al. 2009].

The scope of conservation depends on the preservation condition of floors with a tendency to minimize the interference. Reversible methods are used with economical use of materials and that allow to preserve the original structural layers [Turrini, Piazza 1983; Crosatti et al. 2009]. Although fire protection standards do not apply to architectural monuments, it is worth following their recommendation whenever possible.

RECONSTRUCTION OF WOODEN FLOORS IN POLAND

Factors affecting necessity to replace floors and the scope of conservation works

Antique timber floors have suffered damage for centuries as a result of the natural wood ageing process and as a result of the method of use.

The changes in intended use of manor houses and palaces (e.g. Manor House in Dzikowiec or Manor House in Przewrotne) resulted in new internal divisions. Misused buildings collapsed and new owners restored utility values of the monuments by replacing damaged floors, without even documenting it.

There is a regular necessity to replace, above all, the architectural woodwork and floors. Such a replacement is very often performed comprehensively, where it is connected with installation of horizontal dampproof and thermal insulation in the building. The replacement happens to be justified by poor preservation condition of the floor resulting from the lack of above-mentioned insulation.

However, in Poland the main argument justifying the necessity to replace the wooden elements is fungal attack. Antique panel parquets and their beam support structures are replaced with screeds and mosaic flooring, although strength parameters of antique floors often allow for their further safe use [Rozanska et al. 2011a, Rozanska et al. 2012b, Rozanska et al. 2012c, Andres et al. 2013].

Moreover, new user requirements specified in the construction standards lead to the replacement of antique floor with contemporary solutions, regardless of the pattern and structure. Therefore, following the noble intentions to improve the comfort of use, the only opportunity to save this important part of cultural heritage (the historic values of antique floor that hide in their pattern, structure and product engineering) is squandered.

What is more, reconstruction of antique timber floor in Polish museum objects also refers to merely reconstruction of the parquet and it is not practised to reconstruct beam structures which are preserved only in very few buildings. In practice, the reconstructed floors based on the original patterns recorded in drawings or photographs, are installed on a continuous floor base with mineral underlayment and attached with adhesive to it. Such a method seems rational when reconstructing a building where instead of timber floor system the reinforced concrete floor system is installed. But even on a continuous mineral underlayment, as it is the case of contemporary sport floors, it is possible to install beams, formwork and parquet. In the case of sport and entertainment facilities these are floor lathes and in the case of listed monuments – also the panel parquet.

When original wooden floor systems are preserved in the listed monuments, it is also worth to take into account the possibility to reconstruct all the layers of the floor.

The conservation of wood floor is related to the preservation condition of timber structures [Burawska et al. 2012]. Historic values are thus dominated by overriding aspects of safety which are difficult to assess due to the indicative nature of data, lack of precise assessment of phenomena and discrepancies in the model (e.g. simulated by numbers) and actual conservation status of timber, related to the anisotropic nature of its structure.

Reconstruction of wooden floor in Poland (case study)

Post-war reconstruction of timber floors in almost every palace or manor house was carried out by Monuments Conservation Workshops, performing repairs in the 1950s and the 1960s. Due to the utilitarian status of the floor and due to liquidation of the company, materials regarding these reconstructions are scarce and hardly available. Only towards the end of 1960s the Office for Monuments Preservation managed to take care of all the works performed in listed monuments, including the replacement of the parquet and to document them.

According to the current conservation practices that apply also to the conservation of antique parquet, the parquet is usually reconstructed since it is believed that in the majority of cases they are not suitable for restoration. When reconstructing the parquet in the historic tenement house in Warsaw, on the basis of the design and technical recommendation of the conservation officer, the old wooden parquet was ripped off and the underlayment was cast. As recommended by the conservation officer, a 15 mm thick OSB plate is attached to the underlayment as additional sound insulation, and then palatial mosaic tiles are attached to it with a pattern based on Baroque parquet in the French residence in Soubise. The members imitating the structural elements were made of oak and the members imitating the fillers were made of light ash or the entire structure was made of oak. The parquet was 10 mm thick with the following slab dimensions: 440 x 440 mm. Before the installation was started, the moisture content in the underlayment was measured with the CM method – 1.8% [Zabytkowe parkiety 2005].

A pattern similar to the Versailles pattern by Chapel Parkiet company was used in an old tenement house in Kraków at Plac Mariacki 2, the property of the Parish of the Basilica of St. Mary [Klasyczne piękno drewnianej podłogi 2011]. Also the reconstruction of floor in the historic building dating back to approx. 1870 of Resursa Fabryczna in Żyrardów, involved the attachment of tiles with dimensions of 980 x 980 mm and Versailles pattern to concrete underlayment. The epoxy primer Murexim EP 70 BM was used to attach the mats to the floor. The parquet was attached using a single component flexible adhesive Murexim X-Bond MS-K 511 with long opening time for precise adjustment of tiles [Rewaloryzacja zabytkowej Resursy w Żyrardowie 2011]. The works were performed by "Parkiety Kuczyńskiego" company from Kalisz, holding required conservation licenses. This company started also the reconstruction of parquet in the Fryderyk Chopin European Art Centre in Sanniki [Rewaloryzacja zabytkowej Resursy w Żyrardowie 2011]. Zbigniew Cichocki designed and executed the reconstruction of parquet at the Rehabilitation Centre at the Wiejce Palace [Instytut Rehabilitacji Pałac Wiejce 2003]. There were parquet made of lathes and tiles with a pattern similar to the pattern in the Hallway of the Hunting Palace in Julin. The parquet were attached to the screed (primed with Boba Bonds S520) with Bona Bonds S760 adhesive and painted with: Bona Bonds D-5 primer and Boba Bonds DD-504 finishing paint [Instytut Rehabilitacji Pałac Wiejce 2008]. A similar pattern of tiles, close to that in the original, was used to reconstruct the parquet in the Bronikowski Palace in Żychlin. The oak tiled parquet flooring with dimensions 480 x 480 x 22 mm, connected with loose tongues, attached to the underlayment with the use of polyurethane two-component adhesive ARTELIT PB-89 and protected with two-component paint Silo-pur Finisz firmy Kerakoll [Pałac Bronikowskich w Żychlinie 2010]. In the Ogiński Palace in Siedlce the tiled parquet which were destroyed during the 2nd World War were reconstructed. They were made of solid oak and ash and of the oak mixed with mahogany. Tongue and groove 600 x 600 mm and 575 x 575 mm tiles with the thickness of 22 mm and 400 x 400 mm with the thickness of 32 mm were attached to the underlayment with a two-component adhesive SLC L34 by Keracoll company. They were finished with Euku-ol 1HS oil or Euku-refreshner by Eukula company [Pałac Ogińskich w Siedlcach 2010]. The same finishing agents were used in a private palace in the Mazovia Province. They were used on 471 x 471 mm, 480 x 480 mm, 540 x 540 mm and 600 x 600 mm tiles with the same thickness of 22 mm attached with the polyurethane two-component adhesive Artelit PB-890 as well as rosettes and borders made of oak, maple, nut and merbau [Pałac województwo mazowieckie część I i II 2010].

The reconstruction of parquet in the summer residence of the President of the Republic of Poland, the study of the President in the Sejm, the Hunting palace in Sanssouci in Potsdam, the seat of the Association of Polish Banks, the seat of Eris company in the 18th century palace, several rooms in the Primate's Palace in Warsaw and many private residences has been made since 1896 by Wytwórnia Posadzek Drzewnych Turant Jacek [Woźniak 2005].

The preserved illustrations and photographs were used as the basis for reconstruction of the set of antique wood floor dating back to the period of reconstruction of the Royal Castle in Warsaw by Stanisław August Poniatowski. It was performed in the years 1972–1983 by Zakłady Wytwórcze Mebli Artystycznych Henryków on the basis of many pre-war illustrations of parquets preserved in the collections of the National Museum and unfinished catalogue of the Rudolf Brothers (well known Warsaw manufacturing plant of parquet from the interwar period). If there were no illustrations, the archival photos were analysed which resulted in poor accuracy of the reconstruction both in terms of pattern and the used species of wood [Lewandowski 2001]. The traditional structure of slabs and methods of their installation was used, but the tiles were installed on screeds and OSB plates [Zamkowe podłogi 1989] instead of beam structures.

In Poland, even the floor reconstruction in the buildings renovated under supervision of the Conservation Officer are rarely made on the basis of the preserved original patterns. The best example here are the lost floorings from the Manor House in Hyżne in the southeastern Poland which were described by Taichman in 1994 [Taichman 1994] or the floors removed in 2010 from the floor of the Manor House in Niwiska. During major renovations aimed at adaptation of the listed monuments to a new function, first of all the historic floors are removed, e.g. Tyszkiewicz Palace in Werynia (adapted for the needs of the Rzeszów University), occasionally leaving several slabs as documentation (e.g. Estate Outbuilding in Kolbuszowa which was adapted for the seat of the Folk Culture Museum). New private owners of neglected manor houses, instead of conservation of the preserved timber floorings prefer to replace them with more durable and more fashionable solutions (e.g. the Manor house in Kombornia adapted for leisure complex).

However, there are some exceptions – the parquet from Kombornia were reinstalled in the Manor House in Kopytowe, where the original floors were not preserved.

Very often the investors themselves are the authors of the reconstruction concepts. The floor construction at the Manor House in Witkowice was performed by a parquet company according to its own patterns inspired by partially preserved original patterns of the rosette and tiles. As requested by the owners, the reconstruction was adapted to the nature of the building and it was based on the patterns of simpler parquet of the nearby Łańcut Castle.

Whenever justified, the reconstructions use exotic wood species with better physical properties (shrinkage factor) and strength properties such as for example avodire instead of the original ash used in the Royal Castle in Warsaw. [Kozakiewicz, Szkarłat 2004]. Also for the newly designed, stylized parquets it is recommended to use simple and clear geometric patterns based on up to two wood species – exotic species often unprecedented in historic parquet, such as iroko mixed with oak [Kuczyńska-Cichocka 1999b]. Such a method of reconstruction was adopted for example in the rooms of the Bank Staropolski in Poznań, the Palace in Ciążeń, Neoclassical Gorzno Palace and the Palace in Bytyń [Kuczyńska-Cichocka 1999a].

At present the main conservation problem of antique timber floors are the parquets in listed monuments owned by private investors who prioritize full restoration of utility values within the meaning of the contemporary building standards. For obvious reasons the antique parquet does not meet these requirements (no damp insulation, thermal insulation, etc.), therefore it is replaced with new mosaic tiles or lathes installed on a continuous screed. The parquet magazines (e.g. Parkieciarz) provide many examples of “reconstructions” performed by parquet companies in private palaces and manor houses. The investors try to restore the 19th century patterns; however, also due to limited range of products available on the market, they choose inappropriate patterns. Most of these structures have no reference to the patterns and structures used in the original, without taking into consideration the degree of representativeness of the monument or region of the country, but they repeat a popular type of mosaic parquet with patterns based on Henryków manufacture for the Royal Castle in Warsaw. This kind of approach can be seen in the Palace in Olszanica, located in southeastern Poland.

DAMAGE PREVENTION REGARDING ANTIQUE TIMBER FLOOR

A common practice in protection of antique timber flooring is the use of shoe protectors or separation and covering of circulation paths with carpets. In both cases the sand going between the parquet and the textile causes its abrasion and larger particles cause scratches and dents. The use of carpets also results in differences in colours between the covered and not covered sections of the parquet. Therefore, an effective way to isolate the parquet from the pedestrians is being searched for. A method used for example in the castles in Potsdam is a

transparent bridge on the steel structure above the stone flooring [Vondung 2001]. However; since the gap between the flooring and the pane is too small, water condensation increases the moisture content and discolours the parquet. The problem is also the weight of the metal structure which prevents the use of this type of solutions with beam floor systems. An alternative solution is to cover the entire room with glass plates resting on point supports to reduce the weight of the structure and distribute it evenly over a larger surface of the floor [Vondung 2001].

Unfortunately, all the suggested treatments heavily interfere with the historic substance, and particularly in its aesthetic reception.

SUMMARY

The conservation of antique timber floor is a complex, interdisciplinary issue and it requires special attention and normative regulations [Tajchman 1996; Kurpik, Ważny 2004].

Since the conservation of antique timber floor is connected with the preservation condition of wooden structures and it refers to the safety issue, it is possible to reconstruct the floors if it is justified.

The reconstruction of the floor based on the in-depth knowledge of the structure of antique floor, may be the source of knowledge about these structures provided to the next generations which complies with the valid conservation doctrine and the idea of the protection of the national heritage.

Reconstruction of timber floors implies using materials similar to the original ones which, however, meet high requirements of contemporary building standards.

According to the idea of preservation of the historic substance, in the floor reconstruction in listed monuments it is worth to consider the possibility of relocation of the parquets from other monuments, in particular if the reconstruction is made for the institution with a specific cultural mission.

Moving away from traditional technological solutions, that is currently observed, is related to the fact that the construction of the floor with the beam structure and with panel parquet is very labourious as well as time consuming. I also requires using good quality timber which has direct consequences on the prices.

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***Streszczenie**: Metody i możliwości konserwacji historycznych podłóg drewnianych w Polsce - teoria i praktyka.* Zabytkowe podłogi z dekoracyjnymi posadzkami taflowymi różnią się stanem swojego zachowania oraz wartościami historycznymi i artystycznymi. Dlatego prace renowacyjne lub konserwatorskie dostosowane być muszą do zróżnicowanego stopnia zużycia podłogi lub posadzki. Ingerencja konserwatorska może oznaczać jedynie drobne naprawy, z zastosowaniem materiałów i technik zbliżonych do oryginalnych. Może także w ekstremalnych przypadkach oznaczać rekonstrukcję podłogi lub posadzki. Celem badań jest analiza metodyki konserwacji zabytkowych podłóg drewnianych w Polsce na przykładach historycznych i współczesnych w celu rekomendacji zastosowań określonych materiałów i technik naprawczych. W artykule przedstawiono podstawy prawne konserwacji podłóg zabytkowych oraz analizę przypadków (case study) najbardziej znanych realizacji, z uwzględnieniem ich efektywności. Opisano także problematykę profilaktyki uszkodzeń zabytkowych posadzek drewnianych na przykładach polskich i europejskich.

Słowa kluczowe: zabytkowe drewniane podłogi ozdobne, konserwacja podłóg, rekonstrukcja podłóg

Corresponding author:

Anna Rozanska
Department of Technology and Entrepreneurship in Wood Industry,
Faculty of Wood Technology,
Warsaw University of Life Sciences – SGGW,
ul. Nowoursynowska 159, 02-776 Warsaw, Poland
e-mail: annamaria.rozanska@gmail.com