

AN INVESTIGATION ON THE MAINTENANCE, REPAIR, AND RENOVATION BEHAVIOURS OF FINISHING MATERIALS USED IN HOTEL BEDROOMS

Nil KOKULU

Istanbul Technical University, Faculty of Architecture, Department of Architecture
Lecturer, Antalya Bilim University, Faculty of Fine Arts and Architecture, Department of Architecture
ORCID: 0000-0002-7057-7601

Prof. Dr. Seden ACUN ÖZGÜNLER

Istanbul Technical University, Faculty of Architecture, Department of Architecture
ORCID: 0000-0001-5975-5115

ABSTRACT

Deteriorations such as color and texture loss, decay, wear, and insect infestation in interior materials that occur over time pose a risk in maintaining features such as functionality, aesthetics, safety, and sustainability. In high-user density buildings like hotels, vigilant monitoring of these conditions is crucial for preserving and potentially prolonging the service life of the materials. This study aims to investigate and evaluate the maintenance, repair, and renovation methods and frequencies of finishing materials used in hotel bedrooms. The study's methodology commences with an initial step, conducting a two-part literature review. The first part of the review examines factors contributing to the definition and causes of deterioration of building materials. The second part addresses the maintenance, repair, and renovation methods of building materials. In conclusion, this review pinpoints the existing research gap by analyzing prior research in the field. In the second step, a face-to-face survey was carried out with 101 hotels to investigate the material types, maintenance, repair, and renovation methods and frequencies in 50-year building service life. The study's findings revealed the prevalent use of finishing materials and insights into the frequency and methods employed for their maintenance, repair, and renewal. Furthermore, the research identified the motives and the preferred timeframes for the renovation of the materials. The contribution to the field of this study is notable as it provides essential and valuable insights for material selection, thus aiding in the development of a model that considers both material performance and service life. Possible environmental impacts and wastes can be reduced depending on the frequency of maintenance, repair, and renewal of materials. Examining the factors responsible for material deterioration and conducting studies to mitigate these causes can ultimately extend the material's service life.

Keywords: Finishing material; Maintenance; Repair; Renovation; Hotel.

OTEL YATAK ODALARINDA KULLANILAN BİTİRME MALZEMELERİNİN BAKIM, ONARIM VE YENİLEME DAVRANIŞLARI ÜZERİNE BİR ARAŞTIRMA

ÖZET

İç mekân malzemelerinde zamanla oluşan renk ve doku kaybı, çürüme, yıpranma, böcek istilası gibi bozulmalar, malzemelerin işlevsellik, estetik, güvenlik ve sürdürülebilirlik gibi özelliklerinin korunması açısından risk oluşturmaktadır. Oteller gibi yüksek kullanıcı yoğunluğuna sahip binalarda, bu koşulların dikkatli bir şekilde izlenmesi, malzemelerin servis ömrünün korunması ve potansiyel olarak uzatılması açısından çok önemlidir. Bu çalışmanın amacı otel yatak odalarında kullanılan bitirme malzemelerinin bakım, onarım, yenileme yöntem ve sıklıklarının araştırılması ve değerlendirilmesidir.

Çalışmanın metodolojisi, iki bölümlü bir literatür taramasının gerçekleştirildiği ilk adımla başlamaktadır. Araştırmanın ilk bölümünde yapı malzemelerinde bozulmanın tanımına ve nedenlerine katkıda bulunan faktörler incelenmektedir. İkinci bölümde yapı malzemelerinin bakım, onarım ve yenilenme yöntemleri ele alınmaktadır. Bu şekilde, bu alanda gerçekleştirilmiş olan çalışmalar analiz edilerek literatür boşluğu tespit edilmektedir. İkinci aşamada ise 50 yıllık yapı servis ömründeki malzeme türleri, bakım, onarım ve yenileme yöntemleri ve sıklıklarını araştırmak amacıyla 101 otelle yüz yüze anket çalışması yapılmıştır. Çalışmanın bulguları, yaygın kullanılan bitirme malzemesi türlerinin yanı sıra bakım, onarım ve yenileme için kullanılan sıklık ve yöntemlere ilişkin davranışları da ortaya çıkarmıştır. Ayrıca araştırma, malzemelerin yenilenmesine yönelik motivasyonları ve tercih edilen zaman dilimlerini de belirlemiştir. Bu çalışmanın alanına olan katkısı, malzeme seçimi için gerekli ve değerli bilgiler sağlaması ve böylece hem malzeme performansını hem de servis ömrünü dikkate alan bir modelin geliştirilmesine yardımcı olması açısından dikkate değerdir. Bakım, onarım ve malzemelerin yenilenme sıklığına bağlı olarak olası çevresel etkiler ve atıklar azaltılabilir. Malzemenin bozulmasından sorumlu faktörlerin incelenmesi ve bu nedenleri hafifletmek için çalışmaların yapılması malzemenin servis ömrünü uzatabilir.

Anahtar Kelimeler: Bitirme malzemesi; Bakım; Onarım; Yenileme; Otel.

INTRODUCTION

Today, the construction sector has risen rapidly with the increase in people's knowledge, the development of technology, and the resulting development in building materials and construction techniques. To understand the reason for this rise, the research carried out so far has generally focused on the production and construction processes of the building. However, considering that every building has a life cycle, the method and frequency of maintenance, repair, and renewal, especially during the usage process, has become important with the development of sustainability awareness. The reason for this is to ensure the continued durability of materials and therefore structures (Hauashdh, 2020). Building materials are of great importance in the building as they constitute the physical, functional, and environmental properties of the building. For this reason, the maintenance-repair-renewal behavior of materials throughout their service life is of great importance.

Building materials throughout their service life; show various deteriorations such as wear, aging, and fading due to reasons such as environmental conditions, application errors, and biological, mechanical, and chemical agents (Building Maintenance Guidebook, 2023). Preventing these deteriorations is only possible with planned maintenance and repair work. Schedule maintenance and repair activities are crucial to extend their service life and minimize deterioration. This necessitates fundamental elements: theoretical comprehension, technical expertise, design prowess, and practical application knowledge. Executing these practices demands highly skilled, dedicated professionals with thorough research capabilities (Zakar and Eyüpgiller, 2018). In this context, the maintenance and repair of materials should be regarded as a critical concern, urging the development of various methods to address it (Murta, 1973). At this juncture, a systematic method should be adopted, considering the structure's function. This study aims to explore material deterioration, assess the maintenance, repair, and renewal practices concerning finishing materials utilized in hotel bedrooms, and determine the frequency of material renewal.

METHODOLOGY

Literature Review on Deterioration in Building Materials

According to ICOMOS (2023), deterioration means materials worsening or diminishing in quality, value, or character. Although there are studies on the causes of deterioration observed in building materials, this study focuses especially on interior finishing materials. To learn the causes of material deterioration, it is necessary to identify the agents (Suffian, 2013).

Thermal agents, such as temperature fluctuations in buildings, can trigger a range of material responses. The cyclic expansion and contraction resulting from these changes causes observable changes in the material volume (Kühnel, 2004). These changes, often subtle but impactful, can lead to structural stress, microcracks, and distortions in various building components, potentially compromising their integrity and long-term durability. Managing thermal effects through appropriate insulation, material selection, and structural design becomes crucial to mitigating these negative consequences and maintaining the stability and performance of the building over time.

Chemical agents, especially water, play an important role in the degradation of various coating materials. They trigger a series of harmful effects as described by Mydin, et.al. (2012). The presence of water causes corrosion in metals, damaging their structural integrity. Paint and plaster reduce their aesthetic appeal and protective function due to flaking and mold formation. Additionally, wood exposed to water swells and affects its dimensional stability. Additionally, chemical reactions caused by water can cause changes in the thermal and electrical properties of materials, affecting their performance and usability. These impacts underscore the critical need to protect materials from water intrusion and manage moisture exposure to maintain the functionality and longevity of building components.

Biological agents such as mold, fungus, bacteria, insects, and plants like to breed in areas with high humidity (Viitanen et al., 2010). These agents may cause staining, shedding, or breakage in the materials.

Mechanical agents such as the structure's weight, tremors, and earthquakes can cause various stresses, sprains, slips, and even collapses in the structure (Mydin et al., 2012).

Mistakes made during the application of materials can also cause various deteriorations including cracking, peeling, warping, and discoloration, further compromising the structure and aesthetics of the project. These mistakes can not only reduce the lifespan of the materials but also pose potential safety hazards, making it crucial to adhere to proper application procedures and utilize qualified professionals (Shamsudeen, 2016).

Natural disasters can significantly impact materials, accelerating their deterioration in various ways (Martinez, 2023). Floods or heavy rains can cause water ingress, leading to moisture seepage and dampness. This moisture can warp wooden finishes, promote mold growth on walls and ceilings, and cause paint or wallpaper to peel or discolor. Earthquakes, hurricanes, or severe storms can shake buildings, causing structural movement. This movement can crack walls, ceilings, or floors, leading to visible damage to finishes like plaster or paint. Fires, whether due to lightning strikes, wildfires, or accidents, can char or damage interior finishing materials extensively. Paint, wallpapers, carpets, and other materials can suffer from smoke damage or direct exposure to flames, leading to discoloration, charring, or destruction. Depending on the disaster type, debris or flying objects can impact interior surfaces, causing scratches, dents, or punctures in finishing materials like walls, floors, or ceilings. Some disasters involve chemical spills or releases. These can damage or stain finishes such as flooring or countertops, causing discoloration or corrosion.

Literature Review on Maintenance, Repair, And Renovation Methods of Building Materials

All structures have a service life. During this service life, structures and materials pass through various stages. The usage phase is the stage in which materials are used and maintenance-repair and renewal operations are carried out (Figure 1). Maintenance involves ongoing oversight to ensure structures or areas are consistently monitored, promptly addressing any arising damage or deterioration (Allen, 1993). Repair encompasses the provision of materials, labor, systems, and equipment aimed at restoring or revitalizing an existing structure to regain its solidity after sustaining damage (Straub, 2012). Renovation involves revitalizing a building's segment or texture that has lost its original characteristics by employing new materials or systems. The strategies employed for the maintenance and repair of finishing materials exhibit diversity based on the specific characteristics and composition of each material type, allowing for partial or complete renewal of materials as needed (Zakar and Eyüggiller, 2018).

For wooden materials, cleaning, strengthening, and repairing are viable methods. Light energy or pressure are preferred cleaning techniques. To reinforce wood, applying different protectants onto its surface or utilizing the injection method to eliminate microcracks are effective. In instances where salvaging the wooden material is not feasible, renovation might be the preferred choice (Reinprecht, 2016).

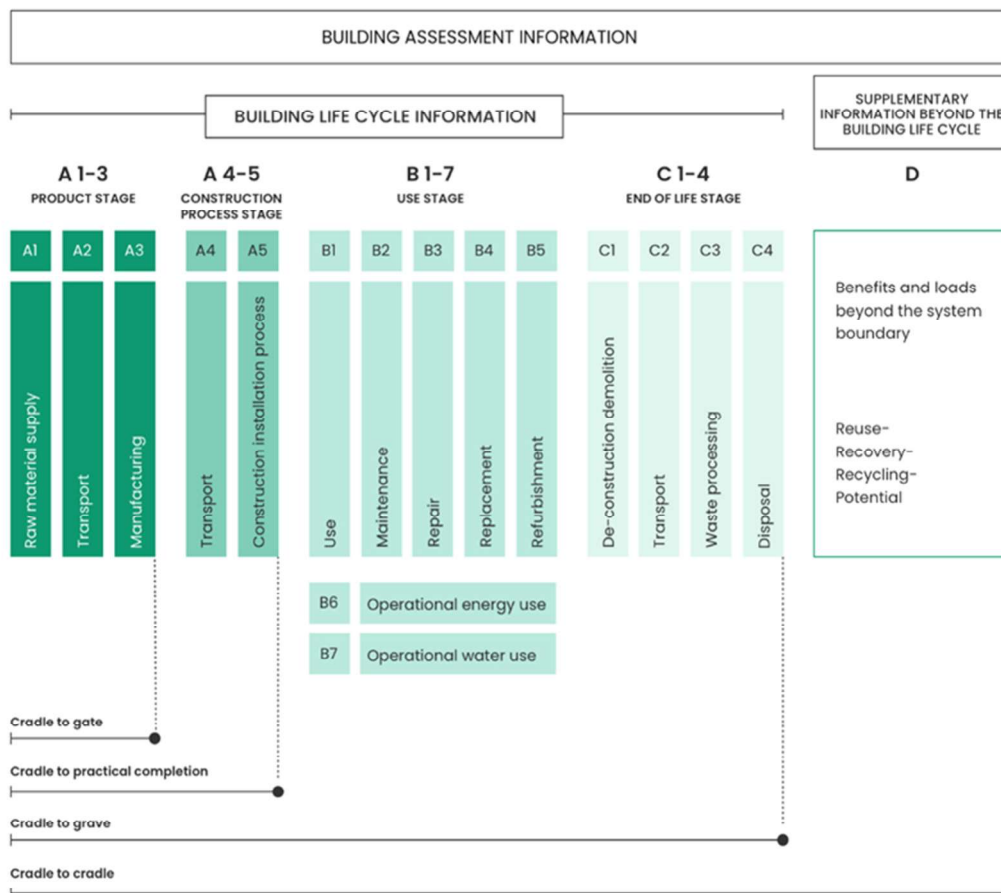


Figure 1: The life cycle stages of the buildings (Masson, 2023)

Maintenance for polymer materials primarily involves regular cleaning using mild detergents to prevent dirt buildup and preserve the material's original appearance. Repairing polymer materials often requires patching or filling to address scratches, cracks, or surface damage. Techniques like heat treatment, solvent application, or specialized fillers help restore the material's integrity and appearance. More extensive renovation might involve complete surface refinishing or replacing severely damaged areas. Skilled professionals employ methods such as sanding, polishing, or recoating to revive the material's aesthetics and functionality, ensuring its durability and visual appeal are maintained. (Ohama, 1996).

For metal materials, various electrochemical methods like cathodic and anodic protection, along with metallic, inorganic, or organic coatings, can be employed. Altering the metal's shape can effectively prevent continuous dampness (Karagüler, 2019).

Restoring mortars, paints, and plasters applied between materials such as marble and ceramics can be achieved through cleaning and patching techniques. Cleaning methods encompass mechanical approaches like brushing or sanding, along with using pure water or compressed pulp. Patching involves filling voids with matching material (Gaspar, et.al., 2002; Arbizzani et.al., 2004).

Restoring artificial stone usually follows a series of steps: beginning with cleaning, then reinforcing with added supports, and concluding with reconstruction. Natural stones can undergo maintenance and repair procedures involving cleaning, reinforcement, cosmetic and plastic repairs, as well as the use of water repellents and surface protectors (Zakar and Eyüpgiller, 2018).

Maintaining glass materials involves regular cleaning using mild solutions and non-abrasive tools to prevent dirt accumulation and preserve transparency. Repairing glass typically focuses on fixing cracks or chips, utilizing methods like resin filling or glass polishing to restore smoothness and clarity. Glass renovation encompasses more comprehensive processes, such as complete replacement for severely damaged sections or employing advanced restoration techniques to eliminate scratches and imperfections (Slaton, 2017).

The Research Gap

The literature review on the maintenance, repair, and renovation of buildings and materials is presented in Table 1.

Table 1: Literature review on maintenance, repair, and renovation of buildings and materials

Reference	Purpose of the study
Allen, (1993)	This paper explores the foundation of building maintenance management, highlighting its significance in light of recent advancements in building design.
Au-Yong, et.al. (2013)	This paper seeks to pinpoint the key features of scheduled and condition-based maintenance in office buildings by analyzing pertinent literature
Awasho & Alemu, (2023)	The objective of this study was to evaluate construction flaws and upkeep methodologies within Mettu building projects
Barratt, (1990)	The study looks at how sealants are used in buildings. Its' main purpose is to research why seals can fail and how checking buildings regularly can stop water from getting in.
Chew et.al. (2017)	This paper aims to introduce a research framework focused on the sustainable maintenance of buildings.
Fan and Xia, (2015)	This paper introduces a multi-objective optimization model focused on minimizing energy usage through retrofitted building envelope components like windows, external wall insulation, and roof insulation, considering economic factors like net present value and life-cycle cost for an optimal maintenance plan, showing potential savings of up to 40% in a case study on a 70-year-old family house.
Iglesias-Campos et.al., (2017)	This study investigates the use of microblasting for cleaning various surfaces, aiming to analyze the technical parameters involved in maintaining building materials.
Ismail, (2021)	The main purpose is to emphasize the necessity of recognizing and addressing the deficiencies in energy efficiency and sustainability of widely used green building materials in Malaysia during maintenance planning, especially as these projects grow in scale and complexity.
Kanniyapan et.al. (2015)	This article aims to investigate the importance of considering maintainability in building material selection in Malaysia, highlighting its benefits, barriers to implementation, and awareness among construction practitioners through a questionnaire survey
Kanniyapan, et.al., (2019)	This paper aims to explore the principles and criteria guiding the choice of building materials to achieve easier maintenance of buildings.
Kayan, (2017)	This paper aims to introduce a decision-making method that uses life cycle assessment (LCA) to evaluate paint repair choices for heritage buildings.
Marteinsson and Jónsson, (1999)	This paper surveys 220 Reykjavik buildings, conducting visual inspections that systematically rate surfaces based on material type, orientation, and three key criteria: material breakdown, breakdown percentage, and repair needs.
Slusarek, (2009)	The purpose is to explore the challenges in maintaining building structures, especially those exposed to harsh environmental conditions, emphasizing sustainable principles and local environmental factors while addressing structural-material solutions, diagnostic tests, and the essence of repairing and strengthening building structures.

III. INTERNATIONAL ARCHITECTURE SYMPOSIUM

December 11-12, 2023 / Diyarbakır, Türkiye

WEB: tr.iksadkongre.com/dumimarliksempozyumu3

E-MAIL: bizimetkinliklerimiz@gmail.com

Suffian, (2013)	This paper discusses common maintenance issues, particularly focusing on civil elements like waterproofing system failures, cracks, and soil settlement in SOCSO buildings across Malaysia, aiming to raise awareness and share experiences to improve systematic building maintenance and prevent costly damages and repairs
Dry, C. (1997)	The study aims to explore employing embedded sensors within concrete for monitoring its condition and identifying possible damage, especially cracks. The primary focus lies in creating and implementing a sensor system capable of detecting and pinpointing cracks in concrete structures, contributing to their maintenance and structural health monitoring.

The research gap found after the literature review can be summarized as follows:

- The research conducted deals with maintenance on a general scale and does not provide detailed data for materials. While there has been research on maintaining structural, insulation, and facade materials, there's a scarcity of publications addressing finishing materials.
- While there are publications covering maintenance and repair concerning specific building functions, such as hotels, existing studies predominantly focus on economic issues and the required workforce, lacking a systematic methodology for maintaining and repairing materials within hotel structures.
- There's a scarcity of specific information on how maintenance, repair, and renovation procedures are conducted in buildings concerning their particular functions.
- Few studies delve into the frequency, timing, and reasons behind material renewals, detailing when and why materials are replaced.

Survey Study

A ten-question survey was carried out among various hotels in June, July, and August. The questionnaire covered diverse aspects such as hotel star ratings, participant employment details, material usage, maintenance practices, renewal tendencies, and frequency. Türkiye boasts a total of 20000 hotels (Turizm Databank, 2023), but this figure couldn't serve as the study's population size due to cost and time constraints. Hence, a sample size calculation was performed to determine the number of hotels to be included in the survey. Sample size signifies selecting a subset of the population under examination, aiming to yield the most representative outcomes for the research (Kaur, 2021). Antalya, known for its high number of hotels in Türkiye, was chosen to narrow the scope. Specifically, the Konyaaltı district was chosen due to consistent hotel renovations driven by a significant influx of visitors. Within Konyaaltı, the survey focused on hotels, amounting to a total of 137 establishments in the population size. Employing a sample size calculation approach led to conducting in-person interviews in 101 hotels. Since the ISO 16204:2012 standard outlines the building's expected service life as 50 years, the renewal numbers of the materials over the 50 years are also included in the table (International Organization for Standardization, 2012).

RESULTS

1. Hotel ratings: Figure 2, displays the star ratings of the hotels surveyed along with their respective percentages of the total numbers. During the study, it was noted that 5 and 4-star hotels declined to share their data. Additionally, it was observed that hotels listed online as having 1, 2, or 3 stars often opted for the 'no stars' classification during the study.

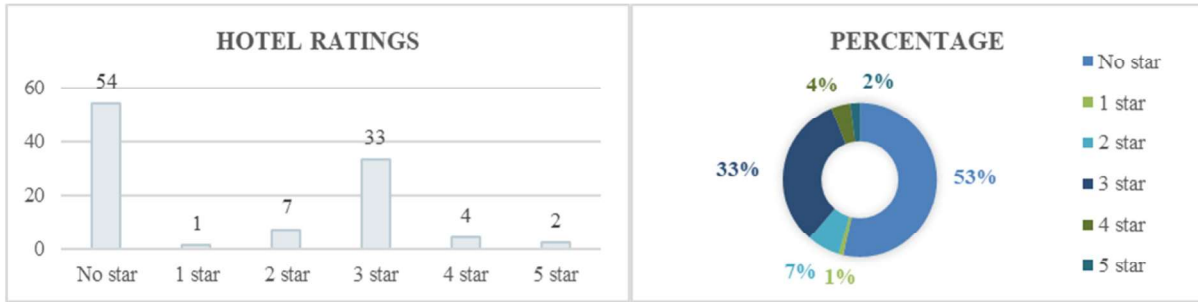


Figure 2: Hotel ratings

2. Duration of employment in the sector: Analysis of the survey participants' tenure in the sector reveals that the largest segment comprises individuals who have worked for 1-5 years, succeeded by those with employment spanning 6-11 years. The number of participants with tenures of 12-17, 18-23, and 24 years or more is relatively similar to each other, as illustrated in Figure 3.

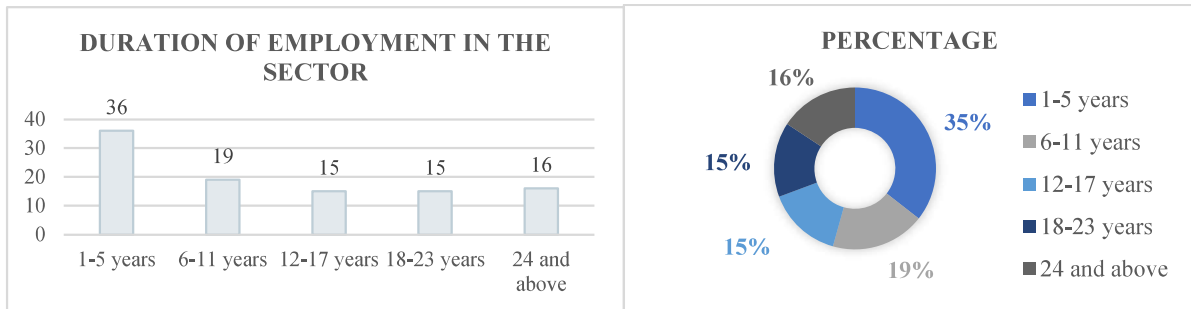


Figure 3: Duration of employment in the sector

3. Department in the hotel: Examining the departments where the survey participants work within the company reveals a concentration in management and front office roles. Following this, there is notable representation in departments such as food and beverage, housekeeping, technical services, and others, including spa and salon chef departments, as illustrated in Figure 4.

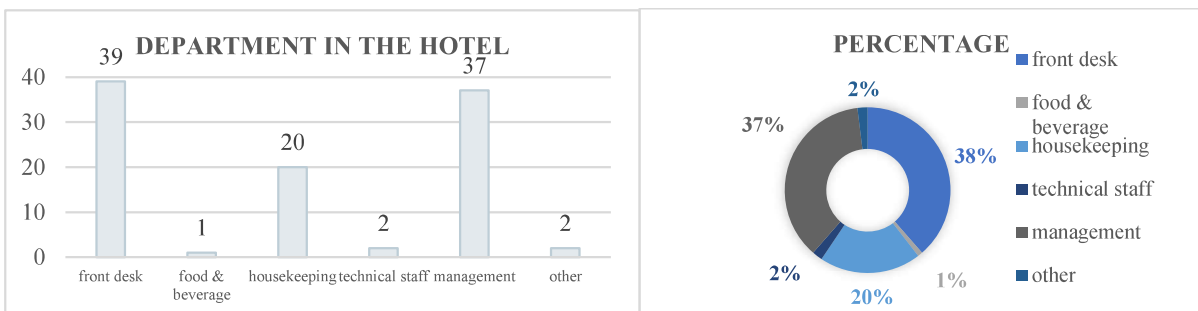


Figure 4: Department in the hotel

4. Finishing materials types: Upon examining the finishing materials applied to the walls of hotel bedrooms, it was observed that out of 133 wall finishing materials used across 101 hotels, painting emerged as the most frequently utilized. Conversely, materials such as metal cladding, glass cladding, composite cladding, cork cladding, and organic cladding were absent in any hotel. Another material, specifically fabric covering, was identified in only one hotel. Additionally, more than one type of finishing material was employed in 27 hotels.

Among the various options, wallpaper and paint stand out as the preferred choices for wall finishing materials in hotels.

Upon examination of the finishing materials employed in the flooring of hotel bedrooms, it's evident that across 101 hotels, a total of 111 flooring finishing materials have been utilized. Wood veneer emerges as the most frequently used material for flooring. Notably, materials like artificial stone cladding, PVC cladding, linoleum cladding, cork cladding, composite cladding, and others have not found usage in these hotel settings. In specific instances, two different materials—wood cladding and ceramic cladding—were used in six hotel rooms, while more than one material was employed in four hotels. Among the array of options, hotels predominantly favor a combination of wood veneer and carpet as their preferred flooring finishing materials.

Upon examination of the finishing materials employed in the ceiling of hotel bedrooms, a variety of 120 ceiling finishing materials were identified across 101 hotels. Notably, suspended ceilings were employed in 62 hotels while absent in 39 others. Among suspended ceilings, plaster coating emerged as the most commonly used ceiling finishing material. Interestingly, materials like metal cladding, mineral cladding, ceramic cladding, and glass cladding were not utilized in any hotel for ceiling finishes. Conversely, in 54 hotels, alternative materials (paint) were employed. Furthermore, more than one material was used in the ceilings of 19 hotels. Predominantly, hotels favor the use of plaster coating and alternative materials like paint as their preferred choices for ceiling finishing materials (Figure 5).

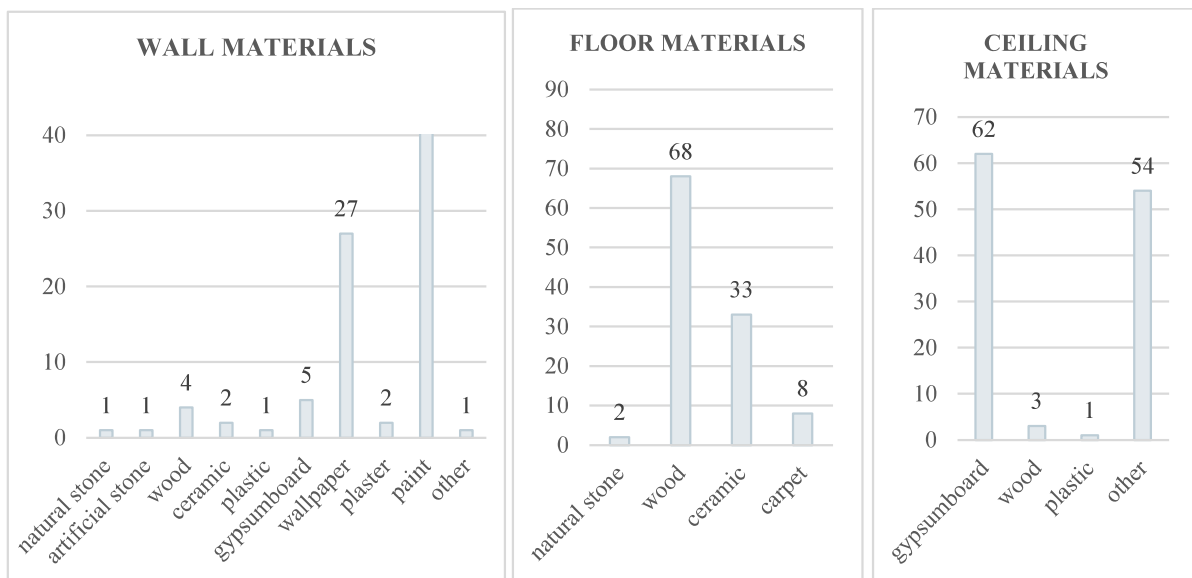


Figure 5: Wall, floor, and ceiling finishing materials used in hotel bedrooms

5. Maintenance, repair, renovation behaviors, and frequencies: The maintenance, repair, and renewal methods and frequencies of the materials are shown in Table 2. Some hotels opt for a 'no maintenance, renovation, and repair' approach, leading to the neglect of their materials. In Antalya, maintenance of ceiling materials became necessary due to heavy rains, as well as issues arising from guests' behavior—such as spilled drinks, smoking in rooms, and insect problems. When examining the typical frequency of renewing wall, floor, and ceiling finishing materials, it's observed that these renewals generally occur every year. It's been noted that only paint, as a wall finishing material, can be renewed more frequently, typically every 1 to 3 or 4 to 6 months. Certain hotels opt not to renew, choosing the 'no renewal' option.

Table 2: Materials maintenance, repair, and renovation behaviors and renovation frequency in 50 years

Renovation Method - Frequency / Materials			MATERIALS																																	
			Wall														Floor							Ceiling												
			natural stone	artificial stone	wood	metal	ceramic	plastic	gypsumboard	glass	wallpaper	plaster	paint	composite	cork	organic	fabrics	natural stone	artificial stone	wood	ceramic	PVC	linoleum	cork	carpet	composite	gypsum	metal	wood	mineral	plastic	ceramic	glass	paint		
RENOVATION METHOD	Application of new cladding on top of the existing one	Same material										X	X	X																						
		Different material												X																						
	Application of new cladding by removing the existing one	Same material	X		X				X	X		X	X	X					X		X	X					X		X							
		Different material		X						X				X								X	X				X		X							
SERVICE LIFE	Service life		50	50	50	50	50	27	50	27	27	27	10	27	50	27	27	100	75	100	75	25	25	15	10	26	75	30	20	30	30	70	30	10		
	Reference		BBSR, (2011)	BBSR, (2011)	BBSR, (2011)	BBSR, (2011)	BBSR, (2011)	SFOE, (2019)	SFOE, (2019)	SFOE, (2019)	SFOE, (2019)	SFOE, (2019)	SFOE, (2019)	Internachi, (1.y.)	SFOE, (2019)	Orr, (2020)	SFOE, (2019)	SFOE, (2019)	SFOE, (2019)	Internachi, (1.y.)	Internachi, (1.y.)	Internachi, (1.y.)	Internachi, (1.y.)	Internachi, (1.y.)	Garskof, (2021)	Internachi, (1.y.)	SFOE, (2019)	Internachi, (1.y.)	SFOE, (2019)	Internachi, (1.y.)	Internachi, (1.y.)	Internachi, (1.y.)	SFOE, (2019)	Internachi, (1.y.)		
RENOVATION FREQUENCY	In 50 years		according to the service life	1	1	1	1	1	2	1	2	2	5	2	1	2	2	0	0	0	0	2	2	3	5	2	0	1	2	1	1	0	1	5		
			according to the survey results	10	15	4	no data	28	17	32	no data	50	24	50	no data	no data	no data	2	3	no data	26	10	no data	no data	no data	16	no data	30	no data	37	no data	18	no data	no data	50	

6. Reason for renewal: When examining the reasons for hotel renovations, among 101 surveyed hotels, 76 were identified as needing renovations, 14 were driven by keeping up with current trends, 10 required renovations for both functional necessities and to stay fashionable, and 1 hotel had reasons categorized as 'other' (based on guest comments or management opinions) (Figure 6).

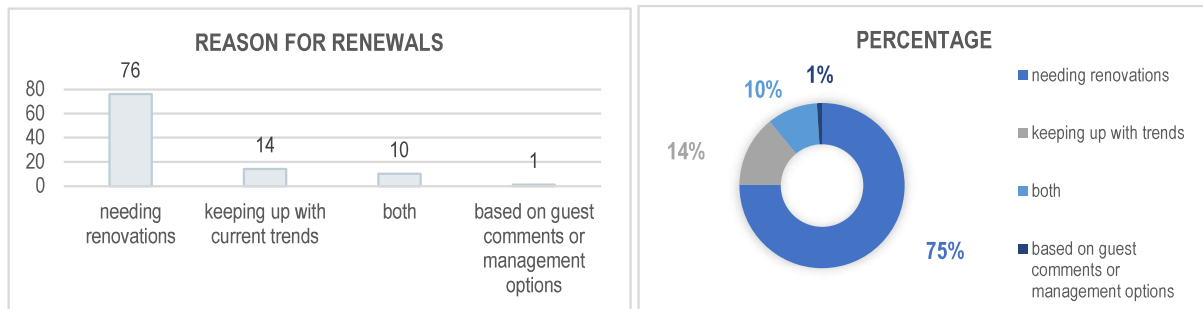


Figure 6: Reason for renewals

7. Waste material usage: Upon re-evaluating unused materials in hotel warehouses that were considered waste from previous use, it was found that 69 hotels opted to utilize these materials, while 32 hotels chose to use new materials instead (Figure 7).

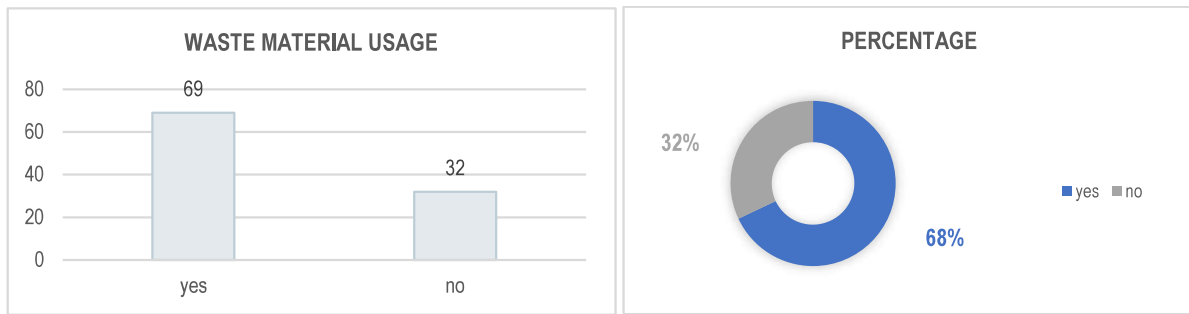


Figure 7: Waste material usage

8. Months of renewal: Upon examining the months when hotels undergo renewal, it was observed that there's a higher intensity of renovations during January, February, March, and April. Conversely, the preference for renewal decreases notably during the seasonal months of May, June, July, August, and September (Figure 8).

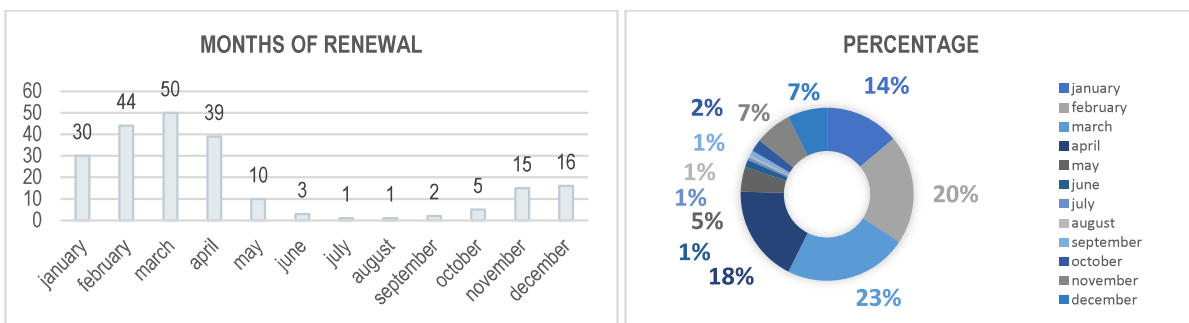


Figure 8: Months of renewal

CONCLUSION

In this study, a literature review was carried out, followed by a survey, to examine the maintenance, repair, and renewal practices concerning wall, flooring, and ceiling finishing materials in hotel bedrooms. Following the literature review, it was noted that there is no established systematic method for the maintenance, repair, and renewal processes of materials in hotel buildings. Moreover, research on this subject is insufficient, and there is a lack of specific laws and regulations governing these practices.

The survey uncovered the prevalent wall, floor, and ceiling finishing materials used in hotel bedrooms. Notably, material choices remained consistent across hotels, regardless of their star ratings. However, gathering data from 4- and 5-star hotels posed challenges, underscoring the need to prioritize these establishments in future studies for deeper insights into material selection trends.

Analysis of the participants' industry tenure indicated a higher number with experience ranging from 1-5 years and 6-11 years. Yet, reaching relevant personnel in some hotels presented difficulties, resulting in data gaps, particularly regarding material maintenance, repair, and renewal behaviors. This situation has caused data deficiencies, especially in the maintenance-repair-renewal behavior of materials. In future studies, more detailed information about the maintenance-repair-renewal behavior of materials can be obtained through a survey conducted with people who have worked in hotels for longer periods and are interested in the subject.

During the survey, the subject of maintenance-repair-renewal was frequently confused by the participants. At this stage, detailed information was provided to the participants. This situation caused a loss of time and delayed the survey analysis.

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E-MAIL: bizimetkinliklerimiz@gmail.com

Since some of the materials mentioned in the survey are not preferred in hotels at all, detailed information about these materials could not be accessed. Therefore, the size of the universe can be expanded in future studies.

During the survey, participants who selected 'keeping up with current trends' as the reason for renewal were informed about the environmental impacts and health problems that occur during the material production process. Likewise, the importance of using waste materials was conveyed to the participants who selected the option 'we do not use waste materials'. To increase the use of waste materials and reduce the environmental/health effects of the material, material selection should not only be made by the Architect but hotel employees should also be informed at various intervals about the effects of materials and waste use.

When the months in which wall-floor-ceiling finishing materials are renewed are examined, it is seen that winter and spring months are generally preferred more than summer months. It is also known that the effects of building materials on human health increase due to toxic substances released especially when the temperature increases. Preferring the renewal of materials, especially in the winter months, can be described as reducing the health effects compared to renewal in the summer months.

The fact that the materials used in hotel bedrooms, depending on the user profile, are wipeable and cleanable and that they cover any damage that may occur from the users can reduce the frequency of repair and renewal of the materials. Therefore, user profiles should also be taken into consideration during material selection.

After repairs and renovations are carried out in the materials used in buildings, the amount of toxic substances released increases- because new materials are used. Therefore, it is important to choose materials with as long service life as possible to reduce these effects.

REFERENCES

Allen, D. (1993), What Is Building Maintenance?, *Facilities*, 11(3), pp. 7-12. <https://doi.org/10.1108/EUM0000000002230>

Arbizzani, R., Casellato, U., Fiorin, E., Nodari, L., Russo, U., Vigato, P.A., (2004). Decay Markers For The Preventative Conservation And Maintenance of Paintings, *Journal of Cultural Heritage*, 5(2), pp. 167-182, <https://doi.org/10.1016/j.culher.2003.12.003>.

BBSR. (November 3, 2011). Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen (BNB) https://www.nachhaltigesbauen.de/fileadmin/pdf/baustoff_gebauededaten/BNB_Nutzungsdauern_von_Bauteilen_2011-11-03.pdf

Building Maintenance Guidebook. (July 14, 2023). Chapter 3 - Understanding Building Maintenance And Management. <https://www.bd.gov.hk/doc/en/resources/codes-and-references/code-and-design-manuals/bmg/ch3-1.pdf>

Dry, C. (1997). Building Materials that Self Repair, *Architectural Science Review*, 40:2, 49-52, DOI: 10.1080/00038628.1997.9697381.

Garskof, (2021). All About Cork Flooring, <https://www.thisoldhouse.com/flooring/22834608/cork-flooring>.

Gaspar, P., Flores Colen, I., Brito, J. de (2002). Maintenance and Durability of External Mortars and Renders Applied to Field Conditions, XXX IAHS World Congress on Housing Construction – An Interdisciplinary Task September 9-13, 2002, Coimbra, Portugal.

Hauashdh, A., Jailani, J., Abdul Rahman, I., AL-fadhali, N. (2020). Building Maintenance Practices In Malaysia: A Systematic Review Of Issues, Effects And The Way Forward, *International Journal of Building Pathology and Adaptation*, 38, 653–672, <https://doi.org/10.1108/IJBPA-10-2019-0093>.

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WEB: tr.iksadkongre.com/dumimarliksempozyumu3

E-MAIL: bizimetkinliklerimiz@gmail.com

ICOMOS (2023). ICOMOS-ISCS: Illustrated Glossary On Stone Deterioration Patterns, Monuments And Sites XV, https://www.icomos.org/public/publications/monuments_and_sites/15/pdf/Monuments_and_Sites_15_ISCS_Glossary_Stone.pdf

Internachi (n.d.) InterNACHI's Standard Estimated Life Expectancy Chart for Homes, <https://www.nachi.org/life-expectancy.htm>

International Organization for Standardization (ISO). (2012), ISO 16204:Durability. Service Life Design Of Concrete Structures, International Organization for Standardization (ISO), Geneva.

Karagüler, E. (2019). YAB 606 Onarım ve Güçlendirme Ders Notları, İstanbul Teknik Üniversitesi, İstanbul, Türkiye

Kaur, Simarjeet. (2021). Sample Size Determination. International Journal of Current Research. 9(3), 48365-48367.

Kühnel, R.A. (2004). Cause And Consequence: Volume Changes Behind Building Material Deterioration, Materials Characterization, 53(2-4), pp. 171-180, <https://doi.org/10.1016/j.matchar.2004.08.012>.

Martinez, D. (2023). A Review Of Main Causes For Building Failures Due To Natural And Manmade Disasters, California State University, Long Beach, Civil Engineering and Construction Engineering Management, <http://hdl.handle.net/20.500.12680/v979v9114>

Masson, S. (2023). Life Cycle Stages, One Click LCA, <https://oneclicklca.zendesk.com/hc/en-us/articles/360015064999-Life-Cycle-Stages>

Murta, K.H. (1973). Staining And Deterioration of Building Materials. Architectural Research And Teaching, 2(3), 173-179. <http://www.jstor.org/stable/24654906>

Mydin, Md.A.O., Ramli, M., Awang, H. (2012). Factors of Deterioration in Building and the Principles of Repair, Analele Universității Eftimie Murgu Reșița. Fascicula de Inginerie, 19(1), pp. 345-352.

Ohama, Y. (1996). Polymer-Based Materials For Repair And Improved Durability: Japanese Experience, Construction and Building Materials, 10(1), pp. 77-82, [https://doi.org/10.1016/0950-0618\(95\)00063-1](https://doi.org/10.1016/0950-0618(95)00063-1).

Orr, J. (2020). How Long Does Cork Last?, <https://corksolk.com/latest-news/how-long-does-cork-last/#:~:text=Whether%20it's%20an%20internal%20wall,in%20excess%20of%2050%20years>

Reinprecht, L. (2016). Wood Deterioration, Protection and Maintenance, Wiley-Blackwell, ISBN: 978-1-119-10653-1

SFOE (October 2019). DUREE Project- Analysis of lifetimes of building elements in the literature and in renovation practices and sensitivity analyses on building LCA & LCC <https://www.aramis.admin.ch/Default?DocumentID=67264&Load=true>

Shamsudeen, M. (2016). Effects Of Design Errors On Construction Projects. International Journal of Scientific and Engineering Research. 7. 1099-1114.

Slaton, D. (2017). Challenges Of Modern Materials: Assessment And Repair. Journal of Architectural Conservation, 23(1-2), 47-61. doi:10.1080/13556207.2017.1312759

Straub, A. (2012). Maintenance and Repair. International Encyclopedia of Housing and Home. 186-194. 10.1016/B978-0-08-047163-1.00523-3.

Suffian, A. (2013). Some Common Maintenance Problems and Building Defects: Our Experiences, Procedia Engineering, 54, pp. 101-108, <https://doi.org/10.1016/j.proeng.2013.03.009>.

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E-MAIL: bizimetkinliklerimiz@gmail.com

Turizm Databank. (August 12, 2023). Türkiye’de Kaç Otel Var?
<https://www.turizmdatabank.com/turizm-istatistikleri/turkiyede-kac-otel-var-2/#:~:text=2023%20y%C4%B1%20Temmuz%20ay%C4%B1nda%20T%C3%BCrkiye,777%20bin%20758%20adede%20%C3%A7%C4%B1kt%C4%B1>.

Viitanen, H., Vinha, J., Salminen, K., et al. (2010). Moisture and Bio-deterioration Risk of Building Materials and Structures, *Journal of Building Physics*. 33(3), 201-224. doi:10.1177/1744259109343511

Zakar, L., Eyüpgiller, K.K. (2018). *Mimari Restorasyon Koruma Teknik ve Yöntemleri*, Ömür Matbaacılık A.Ş., İstanbul.