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Research paper

Floods – a permanent threat to building structures on the example of the Odra River basin

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Abstract: The article is a summary of the authors' experiences, who participated in examination and assessment of damage caused by floods to building structures, particularly in the recent period, i.e., in September 2024. The primary goal the authors set was to present the scale of the problem of damage that has been caused by floods, as well as their subsequent consequences. The article also references experiences gained during earlier disasters of similar or even greater magnitude that occurred at the end of the 20th century and in the first decades of the 21st century. Floodwaters pose both structural and microbiological threats to buildings and structures, but they are also a threat to the mental well-being of their occupants and of those providing assistance to the flood victims. The mental state of the specialists assessing the extent of the damage had a significant impact on the quality of those evaluations; therefore, could not be omitted in the assessment of the technical condition of the damaged structures. The impact of floodwaters on the nature of degradation and the durability of building materials is also not yet fully understood.

The article, using selected examples from the authors' own work [1–3] and literature sources [4–6], presents the issue of flood-related damage mainly over the past thirty years. It discusses methods of handling structures that have been in contact with floodwaters and also summarizes the effectiveness of the emergency and repair measures implemented for them. As part of the technical condition assessment, the moisture content of building partitions in residential structures was also examined selectively, along with an evaluation of their salt content. The results obtained were compared with permissible values, as well as with corresponding partitions in buildings of a similar structural state that had not been exposed to floodwaters.

Keywords: flood events, flood damage, structural integrity assessment, remedial measures

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1. Introduction

Floods have accompanied humanity for centuries, and there is no indication that they will cease to occur in the future. Climate change undoubtedly contributes to the intensification of this phenomenon, but it is not its sole cause, as evidenced by the documented history of flooding in the catchment area of a river in Central Europe which is referenced later in this article. The authors do not aim to propose methods for preventing these catastrophic events; rather, the purpose of this paper is to present the extent of damage floods can inflict on built structures and to propose a course of action for addressing such damage once floodwaters have receded.

2. History of flooding in the Odra River basin (Southern Poland)

2.1. Types and characteristics of floods

Floods are natural phenomena of an extreme and often sudden nature, occurring irregularly. According to Article 16, Item 43 of the Water Law Act of July 20, 2017, a flood is defined as the temporary inundation of land that is not normally covered by water (Fig. 1, 2), particularly resulting from rising water levels in natural water courses, reservoirs, canals, or from the sea. This definition excludes flooding caused by surges in sewage systems.

Floods are not new phenomena nor are they solely a consequence of climate change. In some regions, they have occurred regularly for many centuries, and even modern flood protection technologies do not always prove fully effective in mitigating their impact.

Fig. 1. Lewin Brzeski in September 2024 – photo by S. Szpineta, J. Kieronski, M. Karas, A. Czepichal

Currently, the causes and extent of flooding are often attributed to global climate warming. But is this truly the case? Fig. 3 presents a graph showing the frequency of such catastrophes over the past 12 centuries, with the highest number of floods occurring in the 15th, 16th, 19th, and 20th centuries.

(a) (b) (c)

Fig. 2. Residential buildings in the village of Jarnoltowek (near Glucholazy): a) flood wave, b) damaged residential buildings (August 1997), c) newly constructed buildings on the site of the damaged ones (October 1998) – photo by D. Bajno

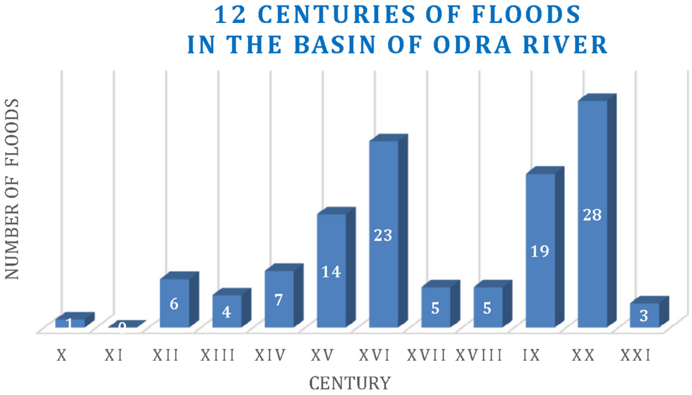

Fig. 3. History of catastrophic floods in the upper Odra River basin

The extent of post-flood damage can vary significantly, and as mentioned earlier, is not always directly related to structural failures of buildings. In many cases, the overall technical condition of affected structures may have already been compromised prior to the flood due to prolonged neglect, such as the absence of routine maintenance, repairs, or failure to adhere to legally mandated inspection intervals [6, 7].

A major issue associated with flood impacts is the infiltration of microbiologically contaminated water into building components such as floors, ceilings, and walls, including their surface finishes. Depending on the location of the structure, this water frequently contained pollutants originating from industrial facilities, workshops, official and unofficial waste disposal sites, sewage treatment plants, and even cemeteries [1–4].

While the 19th and 20th centuries were periods of industrial revolution - when industrial development had a significant impact on environmental degradation – the 15th and 16th centuries “did not generate such pollution." Therefore, it is not entirely accurate to attribute the causes of flooding solely to global climate warming (Table 1).

Table 1. Selected examples of documented catastrophic flood events and the damages they caused [4] – this topic is discussed in more detail in [3]

No.	Time of occurrence [year(s)]	Time span (in years)	Phenomenon description
1	988	0	Frequent precipitation and prolonged river overflows, followed by a hot summer
2	1125, 1151—1152, 1158	5/26/6	A period marked by severe estimated losses in human life, livestock, and agricultural yields
3	1219–1221	61	Catastrophic flood season
4	1253	32	The flood, which lasted from April 20 to July 25, had exceptionally catastrophic consequences, as continuous heavy rainfall occurred throughout this period, both day and night
5	1310	40	A catastrophic and widespread flood affected the territories of Poland, the Czech Republic, Germany, and Italy (on July 26 alone, over 2,000 people drowned in Klodzko).
6	1350	40	The most severe flood in Raciborz in the past 100 years which destroyed all nearby fish ponds
7	1405	5	A catastrophic and unprecedented water overflow
8	1454	2	The overflow of the Oder River and its tributaries on August 10 resulted in damage that was assessed as ’immense’.
9	1495	20	The most severe flood in 30 years, lasting from July 7 for three consecutive days and nights
10	1501	5	A flood caused by the overflow of the Oder River, lasting from April 1 until autumn. It was the largest in 40 years and affected Wroclaw, Nysa, Legnica, Raciborz, and Opava
11	1515	7	Severe floods across Europe caused extensive damage to infrastructure; storms lasted from July 13 to 22, while rainfall continued until August 24. The water breached all levees and persisted until September 8.
12	1572	1	In March and April, floods of unprecedented magnitude and intensity occurred as a result of the overflow of the Elbe, Oder, Havel, Spree, and Warta rivers
13	1732—1744	19	With the catastrophic flood of 1736, resulting from intense rainfall between May 10 and July 22 (73 days of precipitation). The greatest damage was recorded in Wroclaw
14	1854	9	The most catastrophic flood of the 19th century. On August 21, Wroclaw and Opole were virtually entirely submerged
15	1897	0	A catastrophic flood event from July to September affecting the upper courses of the mountainous rivers Bobr, Kwisa, Nysa Klodzka, Luzycka, Opawica, and Olza

Continued on next page

Table 1 – *Continued from previous page*

No.	**Time of occurrence [year(s)]**	**Time span (in years)**	**Phenomenon description**
The lower part of the table lists the dates of floods that occurred in the 20th and 21st centuries			
16	1902, 1903, 1906, 1909, 1911, 1915, 1917, 1925, 1926, 1931, 1937, 1938, 1939, 1940, 1948, 1952, 1953, 1958, 1960, 1965, 1966, 1968, 1970, 1972, 1977, 1980, 1985, **1997, 2010, 2012, 2024**		Floods between years 1902 and 2024

2.2. Genesis of floods

Floods can be classified into four categories: pluvial, thaw-induced, winter, and storm floods. Pluvial floods, as the name suggests, result from intense and continuous atmospheric precipitation lasting at least several days, after which weather conditions typically improve and stabilize; however, the swollen rivers generate a flood wave. These floods are caused by torrential or frontal (widespread) rainfall events. The earliest records of land inundation due to rivers overflowing their banks date back to the 10th century. Between the 10th and 20th centuries, more than 120 catastrophic floods were documented, notably affecting cities such as Wroclaw, Opole, and Raciborz. This historical frequency of flooding prompted the initiation of early flood defense works as early as the medieval period. In 1813, a pluvial flood considered catastrophic occurred, during which the maximum flood wave height in Opole reached 604 cm, exceeding the then alarm threshold by over 200 cm. During the 1997 flood, the flood wave height rose even further, reaching 777 cm which was 173 cm above the alarm level recorded in 1813 [1, 3, 4]. Protective waterproofing measures against both hydrostatic and hydrodynamic water pressure began to be widely implemented in newly constructed buildings only after 1920. At that time, their durability was estimated to be between 15 and 30 years; thus, during the “millennium flood” of 1997, such systems in older buildings, both in terms of age and technology, were no longer capable of fulfilling their protective functions. In the 1930s, flood mitigation structures known as “relief channels” were constructed to alleviate the impact of future river and stream overflows. In many threat scenarios, these channels proved effective; however, in extreme cases, water still overtopped the embankments protecting the channels’ beds or caused damage to them. Consequently, widespread destruction occurred across residential buildings, public utility structures, and infrastructure facilities.

Currently, to mitigate the effects of accumulated stormwater runoff, retention reservoirs are constructed, and flood embankments, relief channels, flood polders, regulatory structures, as well as artificial and dry flood reservoirs, are maintained in proper technical condition. Unfortunately, examples from both past and recent floods confirm a persistent lack of adequate preparedness for rescue and post-flood recovery operations.

2.3. Investigation and assessment of post-flood damage in buildings affected between 1997 and 2024

This period was primarily characterized by the removal of flood consequences, notably the clearance of contamination, see Fig. 4. (depicting heavily deposited and bacteriologically polluted sludge) as well as the evaluation of the technical condition of damaged structures and the immediate mitigation of visible ongoing damages. These activities marked the initial phase of preparatory work for subsequent targeted repairs and renovations.


(a) (b) (c)

Fig. 4. Nowy Swietow, 22 September 2024: a), b) wet and contaminated floors and walls of basements and ground floors; c) damaged structure of a building dating from the mid-19th century – photo by D. Bajno

During this time, forced and uncontrolled water removal from basements through pumping frequently occurred which caused renewed inflow of water from the exterior through building partitions insufficiently protected against moisture (a phenomenon known as suffosion, resulting from pressure differentials). Such situations were often inadvertently caused by the building owners themselves, albeit in good faith, without consulting specialists beforehand. This practice damaged the structural integrity of the building materials forming the partitions by allowing additional water flow through them.

Following detailed inspections and technical condition assessments, as well as appropriate calculations and analysis of the results, some of these buildings were classified as demolition candidates due to the risk of structural collapse [1, 6–8], while others were designated for reinforcement and repair.

Based on their own experience and research, the authors identify two forms of destructive impact that floodwaters can have on buildings and their components. The first involves the direct and dynamic effect of the flood wave, while the second, less intense, relates to the period of gradual inflow and rising water levels. In both cases, it is necessary to assess the type and extent of damage and contamination left behind after the water recedes in order to plan effective repair and remediation work.

The diversity of construction technologies, the varying technical conditions of buildings (Fig. 1, 2–6), the lack of clearly defined guidelines for handling buildings during and after floods, as well as the absence of executive regulations, have all contributed to the fact that in many cases, both the timing of repair work and the selection of methods and materials have been arbitrary and not always well-founded. Another challenge has been the improper identification of the construction technology used in the assessed constructions especially in regard to the structure of the materials from which they were built.

It should be emphasized that, in accordance with Article 73 [8], not all damage to buildings qualifies as a construction disaster, since two conditions must be simultaneously met: the destruction must be both unintended and sudden. For many structures affected by floodwaters, this process may occur over an extended period of time (Fig. 4). A more detailed discussion of this issue can be found in [1, 6, 7].

Fig. 5. Buildings already in very poor technical condition prior to the flood (Lewin Brzeski) – photo by S. Szpineta, J. Kieronski, M. Karas, A. Czepichal

(a) (b)

Fig. 6. Causes of bacteriological contamination: a) flooded workshop surfaces (September 2024) – photo by M. Karas; b) a water-filled municipal waste storage basin (July 1997) – archive of the Municipal Services Department in Opole

The article describes the extent of damage to buildings and structures caused by flooding, as well as the subsequent sequence of essential repair and remediation works.

The most severe structural damage was observed in buildings that had direct contact with the flood wave and with objects carried by it. A less critical phenomenon for structural integrity was the presence of water flowing in a steady and prolonged manner; however, the process of mitigating its effects proved to be significantly more time-consuming [1, 9, 10].

Floods serve as an "undesirable" testing ground that "verifies" the technical condition of structures built in different periods and using various construction technologies. They also test the adequacy of the material and technological solutions employed – particularly the resistance of building materials to impacts that had not previously been anticipated. Despite the fact that floods are not uncommon, especially in southern Poland [3, 4], there are still no clear and effective protection procedures in place. This is especially true for buildings located in areas that are not protected by effective passive or active systems, such as relief channels or retention basins, as well as by direct protective measures like appropriate elevation above ground level or watertight insulation against hydrostatic pressure.

Accurate forecasting of the timing and magnitude of such disasters remains imprecise and, consequently, ineffective, even though emergency response teams are equipped with modern tools and weather prediction technologies. During such emergencies, a noticeable gap exists in the availability of professional literature that could stem from the consequences of these disasters and the lessons learned from them. This lack of knowledge should not pertain exclusively to flood-related threats [10].

A completely different form of threat to buildings, compared to structural damage, was the laminar inflow and flow of water through structures that were not affected by the impact wave (Fig. 4–6). In many cases, contaminated and biologically polluted water remained in basements and ground floors for several days (Fig. 4a,b). *In situ* measurements of the gravimetric moisture content in building partitions (walls and floors), taken after the water had been removed from these levels, indicated a high level of saturation. For instance, brick masonry locally reached up to 20%, which subsequently necessitated the removal of finishing layers.

The in situ measurement results obtained using an ultrasonic moisture meter were verified in the laboratory by means of the gravimetric drying method. The measured values are presented below (Fig. 7), whereas the ranges defining dampness levels of the building partitions are provided in Table 2.

(a) (b) (c)

Fig. 7. Laboratory test results of brick moisture levels: a) sample no. 1, b) sample no. 2, c) sample no. 3

Table 2. Criteria for the assessment of masonry based on water content [12]

No.	The Condition of walls	*Wm* (%)
1	at an acceptable level of moisture	0–3
2	at an elevated level of moisture	3–5
3	at a moderate level of moisture	5–8
4	at a high level of moisture	8–12
5	wet	> 12

The gravimetric (drying oven) method was used to determine the following mass moisture content of the bricks (Fig. 7):

- sample no. 1 – 6.15% (*at a moderate level of moisture*),
- sample no. 2 – 7.48% (*at a moderate level of moisture*),
- sample no. 3 – 12.92% (*wet*).

In reality, some of the examined walls exhibited a very high-water content (classified as wet according to Table 2) which was primarily due to the lack of proper protection of these partitions against external moisture, as well as disorganized water management around the buildings. Nevertheless, these conditions were not the result of the recent flood events.

It turned out that plaster layers served as an effective barrier, filtering floodwater and trapping contaminants carried by it. Their removal up to approximately 0.5 meters above the stabilized floodwater level significantly reduced microbiological hazards inside buildings and structures.

The same, however, cannot be said about floors and their underlying layers which in most cases were not removed unless visibly damaged. Elevated indoor humidity often exacerbated by the premature application of new plasters and flooring, following the replacement of windows with overly airtight units (lacking air vents) favored the growth of mold and mildew. This led to the formation of an indoor microclimate harmful to both human and animal health.

This problem was frequently compounded by insufficient or entirely nonfunctional ventilation which had often already been ineffective even before the flooding. Partition walls in the basements of newer multi-family buildings typically constructed from hollow bricks were prone to damage due to the disturbance of the floor's base layers which lacked proper foundations and depth. Numerous previously unnoticeable, web like cracks in the plaster appeared as the result of leaching of lime binders and shrinkage during the drying process. Floor finishing layers such as parquet and wooden boards became warped and detached from the subfloor, rendering them unusable even after disinfection (Fig. 4b).

For several historical buildings whose external walls had been repeatedly exposed to floodwater (Chapter 5 – Fig. 9, 10), an assessment of the moisture content in their basement walls was carried out *in situ* using non-invasive methods. This was done with a Protimeter MMS2 device which applies the electrical resistance method to measure moisture in building materials (to a depth of approximately 20 mm), as well as by the gravimetric (drying oven) method on plaster and brick samples taken directly from the walls. The MMS2 display readings classified the material as having a medium level of moisture content (locally wet). The criteria for evaluating the moisture levels in the masonry were based on the values presented in Table 2 [12].

To determine the salt content in basement plaster coatings, fragments of plaster were taken from the same samples that had been tested for moisture content.

The results of the analysis showed that the salt content was low for nitrates, chlorides, and sulfates (Table 3 and Fig. 8).

Table 3. Classification of salt contamination according to WTA 2-9-04

Types of salts	**Salt contamination level (%)**		
	Low	**Moderate**	**High**
Nitrates (NO_3^-)	< 0.1	0.1–0.3	> 0.3
Sulfates (SO_4^{2-})	< 0.5	0.5–1.5	> 1.5
Chlorides (Cl^-)	< 0.2	0.2–0.5	> 0.5

Sample test results for three specimens are presented in Table 4 (Fig. 8).

Fig. 8. Results of salt content analysis in plasters and bricks

Table 4. Results of salt content determination

Assessment of Salt Contamination Level Based on Salt Concentration					
Types of salts	**Measured values (mass %)**			**Classification range**	**Assessment**
	sample no. 1	sample no. 2	sample no. 3	(mass) %	
	%				
Nitrates (NO_3^-)	0,005	0,005	—	<0,100	low
Sulfates (SO_4^{2-})	0,2	0,2	—	< 0,500	low
Chlorides (Cl^-)	0	0	—	< 0,200	low

The moisture condition of the examined walls indicates a stabilization of their moisture levels.

3. Other causes and negative effects of flooding

Additional causes of damage indirectly related to floodwaters included:

- objects carried by the water, such as rescue equipment, vehicles, small architectural elements,
- carcasses of animals (Fig. 9b),
- flooded cemeteries (Fig. 9a), workshops (Fig. 6a), manufacturing facilities, wastewater treatment plants, and waste disposal sites (Fig. 6b).

(a) (b)

Fig. 9. Sources of microbiological contamination in floodwater: a) cemetery adjacent to residential buildings (Nowy Swietow, September 2024) – photo by D. Bajno; b) dead animals (July 1997) – photo by M. Przygoda, after [4]

A relatively long period of elevated moisture content in structural and finishing building materials (Fig. 4) which negatively affected their durability, technical performance, and overall living comfort. This prolonged moisture exposure resulted in:

- adverse changes in indoor microclimate, persisting long after water had receded, and even after cleaning and drying of affected interiors,
- reduced thermal performance of external partitions and several months of increased moisture content (Fig. 4),
- damage to the structure of foundations (Fig. 2, 4c), walls, and floors (Fig. 4a,b), due to partial or complete loss of subbases and protective layers [1, 9–11],
- local, surface-level deterioration of porous materials in which accumulated water would expand during freezing conditions,
- the promotion of biological degradation, primarily the growth of mold and wood-decay fungi. These organisms thrive in environments with high humidity (above 20%), presence of organic residues (including dust), constant air access, and ambient temperatures between 18°C and 30°C,
- damage to both internal and external utility systems, whose defects could further compromise building performance after emergency operations were completed.

4. Previously applied protection measures and repairs of buildings

4.1. Emergency protection measures

Immediately after the recession of floodwaters, the scope of emergency work most often included:

- backfilling of washed-out soil beneath foundations, often using "random" materials such as sandbags, stones, debris from concrete elements, bricks, rocks, etc.,
- propping up cracked walls and ceilings using wooden supports, sometimes in unjustified locations and without consideration of the structural behavior of the affected elements, removal of debris and sludge brought in by the water from inside buildings,
- clearing of installations (particularly sewage systems) to allow for the discharge of wastewater (often without verifying the functionality or tightness of these systems),
- performing preliminary damage assessments at the request of local authorities, frequently under extreme and hazardous conditions, directly following the flood recession. In many cases, thorough technical assessments of buildings were not feasible due to limited access to structural components and foundations. Moreover, such assessments were not always purposeful, as actual damage often became apparent only in the following weeks, as historical cases have shown.

4.2. Restoration of buildings to operational use

The subsequent stage of actions included:

- removal of water still present in basements and depressions, often through forced pumping immediately after the flood receded, without prior consultation with experts on the appropriateness of such actions. This led to repeated water inflow from the outside and the emergence of new cracks and fissures in walls and floors. The cause of this phenomenon (suffosion) was the pressure difference on both sides of the partitions,
- removal of contaminated and cracked plasters,
- restoration of damaged building elements, primarily foundations and walls (less frequently ceilings and roofs), to their original state, including strengthening where necessary,
- partial or complete replacement of joinery; mainly wooden and wood-based components,
- drying of rooms, most commonly by means of one of two basic methods:
  - natural drying which consisted of regular ventilation of rooms after removal of internal plasters (sometimes also external plasters), provided that weather conditions permitted it, e.g., a long hot summer and mild winter. Many buildings had external thermal insulation layers. In general, the natural drying period of walls without plasters could last up to several months. In the buildings examined by the authors, wall thickness ranged from 25 cm to 110 cm which extended the natural drying process from six months to several years. The duration was also dependent on the hydrogeological conditions around the building parts located below ground level, and on whether drying was possible from one or both sides of the partition. A simulation of this process is described in [3],

- forced drying which could shorten this period, but it had to be carried out in a controlled manner with monitoring of changes occurring in the wall materials.

Simple methods used to secure flood-damaged buildings, particularly their structural and finishing elements, proved effective in most cases, provided they were implemented in a timely manner and under specialist supervision. Based on the experience gained during the 1997, 2010, and 2012 floods, it should be noted that natural drying of walls and floors for at least a year may not have restored them to their pre-flood moisture content. However, from the perspective of later use, this approach proved effective – even with the application of new plasters and other sublayers installed using "wet" technologies.

5. Comparison of flood damage in the 19th, 20th, and 21st centuries

Figures 10 and 11 present the same locations and buildings affected by flooding over the past 120 years (specifically in 1903, 1997, and 2025). Current surveys of these structures, conducted in 2025, did not reveal any structural damage, either in the underground or above-ground parts. No traces of flood-related moisture effects from past events are currently visible. Moreover, the interior surfaces of the basement walls and ceilings show no signs of cracking, fissuring, or fungal growth.

(a) (b) (c)

Fig. 10. Spychalskiego Street in Opole: a) in July 1903 (according to [4]), b) in July 1997 (photo by M. Przygoda, from [4]), c) current view (January 2025) – photo by D. Bajno

(a) (b)

Fig. 11. Wroclawska Street in Opole: a) in July 1997 (photo by M. Przygoda, from [4]), b) current view (January 2025) – photo by D. Bajno

6. Conclusions

Throughout history, floods have consistently caused similar types of damage to buildings, regardless of their function. This includes structures that were equipped with protective measures against both surface and hydrostatic water. The most often affected components are the materials forming the building envelopes, with structural systems being damaged less frequently. Despite progress in construction technologies and the implementation of modern flood protection methods, the scale of such disasters continues to result in significant losses to both buildings and infrastructure, alongside psychological distress and human casualties.

In many cases, the cost of restoring or repairing flood-damaged buildings exceeds the cost of rebuilding them entirely [13]. Recovery efforts are often accompanied by disruptions to transportation systems, economic activity, and most notably, residents' reluctance or fear to return to their homes. The "quiet" periods between floods tend to reduce the vigilance of institutions responsible for flood safety which negatively impacts the organization and effectiveness of emergency responses.

Accurate damage assessments should be carried out by experienced professionals with appropriate technical qualifications. While uniformed services generally demonstrate a high level of preparedness, civil services have only recently begun to recognize the full scope and complexity of the issue, as was confirmed by the September 2024 flood.

Future floods and associated damage to infrastructure, the economy, and human life are inevitable. Therefore, it is essential to develop clear procedures and legal frameworks for responding to such disasters. Consideration should also be given to the establishment of a dedicated body responsible for organizing and dispatching expert teams to assess structural damage and potential threats to public safety. These teams should be adequately funded and equipped with the necessary tools and transport [13].

The content presented in this publication should be treated as preliminary research material supporting future flood damage assessments and guiding the planning of post-flood recovery efforts. It may also prove useful for studies focused on the harmful effects of pollutants left behind by floodwaters in structural elements, and how these substances impact the condition and durability of construction materials – an area still lacking in research. The authors plan to continue monitoring the investigated structures and their finishes after complete drying, i.e., approximately 18 months after the floodwaters have receded.

An analysis of historical flood data (Table 1) suggests that floods will continue to recur regardless of ongoing climate change. Thus, efforts must begin now to develop forecasting systems capable of predicting both the likelihood and extent of such events. These systems should also estimate the potential scale of damages and propose methods and timelines for their remediation. Additionally, they should account for the availability of qualified professionals especially those with practical experience and legally certified construction credentials who will be essential to mitigating the consequences of future disasters.

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Powodzie – stałe zagrożenie dla konstrukcji budowlanych

Słowa kluczowe: powodzie, szkody powodziowe, ocena stanu technicznego obiektów, propozycje napraw

Streszczenie:

Artykuł jest podsumowaniem doświadczeń jego autorów, uczestniczących w badaniach i ocenach szkód spowodowanych przez powodzie w obiektach budowlanych, szczególnie w ostatnim okresie, tj. we wrześniu 2024 roku. Podstawowym celem jaki obrali autorzy artykułu było przybliżenie skali problemu szkód spowodowanych i powodowanych przez powodzie a także ich późniejszych następstw. W artykule przywołano również doświadczenia nabyte podczas wcześniejszych kataklizmów o zbliżonym a nawet większym wymiarze, które wystąpiły pod koniec XX oraz w pierwszych dekadach XXI wieku. Woda powodziowa stanowi konstrukcyjne i mikrobiologiczne zagrożenie dla budynków i budowli, lecz jest również zagrożeniem dla stanu psychicznego ich użytkowników a także osób niosących pomoc powodzianom. Nie jest również poznany jej wpływ na charakter degradacji oraz trwałość materiałów budowlanych. W artykule, na wybranych przykładach własnych [1–3] i na podstawie literatury [4–6] przybliżono problem uszkodzeń spowodowanych przez powodzie głównie w okresie ostatnich trzydziestu lat, omówiono sposób postępowania z obiektami, które miały styczność z wodami powodziowymi jak również podsumowano skuteczność wdrożonych dla nich działań ratunkowo-naprawczych.

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