

Bogdan Filip Zerek

Guidelines for preparing an emergency protocol for libraries and archives



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Coordinator of the Project: Adrien P. Holl, Budapest City Archives

Main author and editor: Bogdan Filip Zerek¹

Co-authors:

Chapter 4: Creating an emergency protocol; General remarks
Martina Bajžíková² and Ján Koniar²

Annex 1: Case studies

Part 1: Petra Vávrová³, Jitka Neoralová³, and Ludmila Holotíková³

Parts 2-3: Bogdan Filip Zerek¹

Part 4: Bogdan Filip Zerek¹ and Magdalena Dyda⁴

Part 5: Adrien P. Holl⁵

Layout and typesetting:

Magdalena Dyda⁴



¹ Faculty of Conservation and Restoration of Works of Art of the Academy of Fine Arts in Warsaw <https://wkirds.asp.waw.pl/>



² Slovak National Library, Martin <https://www.snk.sk/en/>



³ The National Library of the Czech Republic, Prague <https://www.en.nkp.cz/>



⁴ University of Warsaw <https://im.biol.uw.edu.pl/> and RDLS Ltd. <http://muzea.rdls.pl/>



⁵ Budapest City Archives, Budapest <https://bparchiv.hu/>

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1. Introduction

Crisis planning is a set of urgent activities that describes the tasks and the manner of their implementation aimed at ensuring the protection of persons and the rarest cultural heritage or minimizing their damage.

Crisis management includes risk analysis of the movable cultural heritage, decisions and measures taken to resolve the crisis, and eliminate or mitigate its consequences, as well as the cooperation of the organization's crisis staff with the district staff and the municipality's crisis staff and request assistance from the municipality or district administration office. [Methodical instruction no. 2/2016 "Metodický pokyn č. 2/2016 na ochranu kultúrneho dedičstva v krízových situáciách" (in Slovak) https://www.culture.gov.sk/wp-content/uploads/2019/12/metodicky_pokyn.pdf]

Institutions (e.g. libraries, archives) must make every effort to be prepared for possible emergencies by analysing their specific situation and resources and be able to draw up a prevention and crisis management plan. [IFLA Disaster Preparedness and Planning: A Brief Manual <https://repository.ifla.org/handle/123456789/1315>]

2. Scope

The basic assumptions are:

- 1 Timeline: pre-disaster, disaster, post-disaster
- 2 In the time of disaster staff is evacuated, and objects stay in the building
- 3 Post-disaster activities are focused on salvage, usually preceded by re-location (relocation of parts of collections or whole collections)
- 4 Relocation procedures are usually ready (access, exhibitions, loans, moving collections)

Based on experience and case studies (**Annex 1 Case studies**) the most time-consuming activity is packing the objects and unpacking them in the new location. Therefore, it must be considered critical to pack the objects before and not

The basic purpose of the prevention and crisis management plan is to:

- minimize risks where possible,
- maximize the effectiveness of the response in the event of a natural disaster or accident.

No specific emergency plan is universally applicable!

The purpose of this material is not to provide a specific model that can be universally applied, but to point out the problems and facts that each institution should consider when designing a specific plan in accordance with their needs and conditions, taking into account existing legislative requirements.

The structure (general part) of the Emergency Protocol (EP) document is comprehensively and in detail described in several sources, e.g. IFLA (some sources are listed in **Annex 8**). Therefore, the aim of this document is mainly to point out some problems and facts, based on practical experiences and case studies, that each institution should consider when designing a particular EP.

after the disaster. Logistics and responsibility of relocation of objects are parallel to daily routine and organization chart.

The most likely disasters are floods and fires extinguished with water.

3. Definitions

As explained in the Emergency Management Terminology of Conservation Center for Art & Historic Artifacts (CCAHA):

<https://ccaaha.org/resources/emergency-management-terminology>

Accident

A deviation from normal operations or activities associated with a hazard, which has the potential to result in an emergency.

Action plans

Written or verbal plans that reflect the overall incident goal (control objectives) and incident strategy, objectives for the designated operational period, specific tactical actions and assignments, and supporting information for the designated operational period. They provide designated personnel with knowledge of the objectives to be achieved and the strategy and steps to be used for achievement, hence improving coordination across different levels of government and intrastate jurisdictional borders. Action plans not only provide direction but also provide a metric for measuring the achievement of objectives and overall system performance.

Chain of command

The orderly line of authority within the ranks of the incident management organization.

Crisis

A short period of extreme danger.

Disaster

A large-scale calamity that requires immediate action. May result in significant loss, damage, or destruction. An emergency that has gotten out of control.

Drying

Decreasing the humidity of a porous material that can absorb and desorb water or another solvent. For methods of drying see Annex 3 Drying methods description. Not a CCAHA definition.

Emergency

A serious, unexpected, and often dangerous situation requiring immediate action.

Emergency plan or protocol

It contains a brief, clear, and concise description of the overall emergency organization, designation of responsibilities, and procedures, including notifications, involved in coping with any or all aspects of a potentially credible operational emergency.

FEB, FEBs

Folder, Enclosure, Box – any dedicated protective enclosure for an object or set of objects. Not a CCAHA definition.

Hazard

A natural, technological, or social phenomenon that poses a threat.

Incident

An event, accidentally or deliberately caused, that requires a response.

Mobilization

The process and procedures used by all organizations (...) for activating, assembling, and transporting all resources that have been requested to respond to or support an incident.

Mutual aid or assistance agreement

Written or oral agreement between and among agencies/organizations and/or jurisdictions that provides a mechanism to quickly obtain emergency assistance in the form of

personnel, equipment, materials, and other associated services. The primary objective is to facilitate rapid, short-term deployment of emergency support prior to, during, and/or after an incident.

Operational period

The time scheduled for executing a given set of operation actions, as specified in the Incident Action Plan. Operational periods can be of various lengths, although usually, they last 12 to 24 hours.

Preparation

Those activities, programs, and systems that exist prior to an emergency that are used to support and enhance response to an emergency or disaster.

Recovery

Those long-term activities and programs beyond the initial crisis period of an emergency or disaster and designed to return all systems to normal status or to reconstitute these systems to a new condition that is less vulnerable.

Relocation

The activity of moving objects from one location to another one.

Resources

Personnel and major items of equipment, supplies, and facilities available or potentially available for assignment to incident operations and for which status is maintained. Resources are described by kind and type and may be used in operational support or supervisory

capacities at an incident or emergency operations centre.

Risk

The possibility of suffering harm from a hazard.

Risk assessment

The process of identifying the likelihood and consequences of an event to provide the basis for informed decisions on a course of action

Salvage

The act of saving artifacts at risk of being completely destroyed.

Stabilization

Treatment procedures intended to maintain the integrity of the cultural property and to minimize deterioration

Tabletop exercise

An activity in which key personnel assigned emergency management roles and responsibilities are gathered in a non-threatening environment to discuss various simulated emergencies.

Threat

Natural or manmade occurrence, individual, entity, or action that has or indicates the potential to harm life, information, operations, the environment, and/or property.

Vulnerability

The susceptibility to damage or injury from hazards.

4. Creating an Emergency Protocol

General remarks

The Emergency Protocol is created for every unit and based on their regular responsibilities. The crisis plan is processed on the basis of the tasks of individual institutions (libraries, archives, museums, etc.) in the crisis management system, or as a response to the analysis and assessment of their internal and external risks and threats. It contains data, measures, and annexes, but also specific components according to the nature, tasks, and specific risks and threats affecting the entity ["Krizový plán ochrany zbierok v prípade ohrozenia a katastrof", Slovak National Library (SNL), Martin. (Internal document of SNL - in Slovak)].

The plan must be drawn up in accordance with the applicable legislation, including the relevant methodological guidelines, which are issued in order to establish the procedure of the entities in relation to the protection of cultural heritage, in relation to crisis management and crisis preparedness [Methodical instruction no. 2/2016 "Metodický pokyn č. 2/2016 na ochranu kultúrneho dedičstva v krízových situáciách" (in Slovak), available on: https://www.culture.gov.sk/wp-content/uploads/2019/12/metodicky_pokyn.pdf]

There are many specifics in the conditions of individual institutions (libraries, archives, museums, etc.) that will affect the elaboration of a given crisis plan. Therefore, each institution should carry out a thorough review of its own conditions and requirements and then propose a contingency plan that meets all the specific needs of the institution [IFLA Disaster Preparedness and Planning: A Brief Manual <https://repository.ifla.org/handle/123456789/1315>]

The emergency procedures should include variants of relocation of whole collections (e.g. large fire extinguished with water, flooding of whole collections) as well as only part of them (minor water accident e.g. broken water pipe or drain pipe).

The emergency procedures should be based on the risk assessment of the building and the storage rooms.

For such an institution's plan to be effective, it must include a risk analysis - an estimate of the main hazards and their relative probability, and must also include information on the existing resources and procedures needed to overcome the emergency situation [IFLA, *ibid.*]

Logistics and responsibility - parallel to daily routine and organization chart

	Units considering their daily tasks	pre-emergency tasks	post-emergency tasks
1.	storing and working with objects	<ul style="list-style-type: none"> packing of objects defining the relocation procedure (including finding the new location) procedure should define the conditions for starting the relocation declaring requirements of relocation (staff, cars, security, outsourcing) 	<ul style="list-style-type: none"> supervising the relocation unpacking objects for control and salvage activities as needed re-packing the objects after salvage
2.	administration	<ul style="list-style-type: none"> declaration of the staff and materials as required preparing the emergency outsourcing of staff and materials 	<ul style="list-style-type: none"> providing the staff and materials for relocation introducing outsourcing as planned
3.	conservation / preservation	<ul style="list-style-type: none"> cooperation with units defining the relocation procedure (including planning the "field conservation atelier" in the new location if needed) 	<ul style="list-style-type: none"> cooperation by unpacking objects for salvage activities salvage activities
4.	maintenance of the building (technical services, fire protection, building re-view)	<ul style="list-style-type: none"> preparing the quickest possible path for starting the relocation procedure (securing the building or storage rooms) 	<ul style="list-style-type: none"> executing the planned path to relocation
5.	accountancy	<ul style="list-style-type: none"> preparing the quick path for administration needs 	<ul style="list-style-type: none"> executing the path for administration needs
6.	health and safety	<ul style="list-style-type: none"> defining the working conditions in rooms after a disaster preparing requirements for staff delegated to relocation procedure provide protective materials for relocation procedure 	<ul style="list-style-type: none"> control working conditions in rooms after a disaster
7.	security	<ul style="list-style-type: none"> preparing the security procedure for disaster 	<ul style="list-style-type: none"> executing the security procedure for disaster
8.	head of the institution	<ul style="list-style-type: none"> appointing the coordinator of pre-and post-emergency tasks controlling the execution of pre-emergency tasks 	<ul style="list-style-type: none"> providing the priority of post-emergency tasks
9.	coordinators of pre-and post-emergency tasks	<ul style="list-style-type: none"> controlling the execution of pre-emergency tasks organizing of training and simulation of post-emergency tasks 	<ul style="list-style-type: none"> supervising the execution of post-emergency tasks

Guidelines for Emergency Protocols for units considering their daily tasks

1. Units for storing and working with objects

Creating risk assessment for storage rooms and collections - **Annex 4 Storage rooms evaluation**

Reorganizing collection structure by classes of salvage priorities and drying methods:

- immediately dry, do not freeze; usually air dry
- immediately freeze or dry; air or vacuum freeze-dry
- freeze or dry within 48 hours; air or vacuum freeze dry

Defining the procedure of relocation - see **Annex 5 Training and simulation in situ**.

Defining a situation requiring a relocation staff.

Defining objects for relocation (technology, numbers).

Defining the operational period.

Defining the teams (structure, size, number of teams). As can be seen in **Annex 5 Training and simulation in situ** the staff of these units and that of the conservation unit will be the leaders of the teams (during vast relocations).

Defining the resources.

Tabletop exercise and training.

2. Units for administration

Selecting own staff that can join the relocation teams.

Preparing **Mutual aid or assistance agreement** for outsourcing.

Preparing spaces and rooms for relocation inside the institution if possible.

3. Units for conservation/preservation

Assisting **Units for storing and working with objects** with help and knowledge in the creation of the relocation procedure.

Prepare resources to handle materials of class: **immediately dry, do not freeze**.

Preparing the “field conservation atelier”.

Tabletop exercise and training.

4. Units for maintenance of the building (technical services, fire protection, building review)

As observed in **Annex 5 Training and simulation in situ** the time gap between the end of a disaster and the start of any operation in the rooms after the disaster must be as short as possible.

The officers giving clearance for accessing the rooms (usually construction, fire protection, electricity installation, and water installations) must do their job as soon as possible.

Any obstacles caused by the disaster must be cleared as soon as possible.

Preparing the outsourcing of these tasks.

5. Units for accountancy

Preparing the emergency funds and procedure for quick purchase and delivery.

Expect cash payments within the first 12 hours after the disaster.

The list of suppliers of resources should be ready to use.

6. Units for health and safety

Preparing lists of protective gear for people working on the disaster site.

Checking the structures of the teams and their staff for people that are not capable of such actions.

Creating labour risk assessments for work on disaster sites.

7. Units for security

Preparing the staff for additional work during and after a disaster.

Since, in general, security guards are mostly strong men, consider using them as the main “working force” of the relocation team.

8. Head of the institution

Prepares **Mutual aid or assistance agreement** for outsourcing to other similar institutions. Considers outsourcing to the military, fire guards, and police units. Controls the preparation of emergency procedures. Creates extra funds for disaster response. Delegates at least three people as coordinators (so the emergency response could be conducted 24h per day). Provides the official cellular phone dedicated to coordinator teams. This number should be available permanently.

Final comments:

The emergency response (and it was confirmed as we can see it in the case studies) always works with the “all hands on deck” approach.

The role of coordinators (of pre-and post-emergency tasks) is to have an overview of possible emergencies, possible responses, and resources available at hand as well as those that need to be outsourced.

The plans, procedures, and protocols are the methods of the management of the staff and resources in a crisis. Organizing lacking resources before the lack appears.

Of course (as we can see in **Annex 5 Training and simulation *in situ***) no institution would keep as an “emergency kit” 39 rolls with almost 3,500 m² of polyester fibre.

Nota bene:

This would cover the need for interleaving 60,000 early prints of the National Library of Poland. The real number of early prints in Krasinski Palace was 160,000 (only the ground floor was chosen for tabletop exercise, there were also storage rooms on the first and second floors).

9. Coordinators of pre-and post-emergency tasks

Working as a team of at least three people (as explained above).

Supervising and coordinating the emergency plan of all units.

Having contact phones to all head and deputy heads of the units.

Daily 24-hour official cellular phone duty of one of the coordinators.

Choosing the assistants (one for every coordinator) for emergency response.

Suggested separation of duties: during emergency response coordinator(s) take(s) decisions, the assistant(s) perform(s) the paperwork and communication with staff not engaged in the *in situ* actions.

Furthermore: in 2010 (see **Annex 1 Case studies**) there were altogether three departments of special collections in the Krasinski Palace:

- Manuscripts – 40,000 units in three storage rooms (not marked as storage rooms in the picture (**Annex 5 Training and simulation *in situ***) but symmetrical to rooms: 20, 22, 23)
- Iconography – 5 rooms on the second floor+ cellar storage – 500,000 units
- Early prints – with 60,000 on the ground floor and a further 100,000 on the first and second floors not considered in the tabletop simulation.

Do not lose the point: in every case, the crucial part of an emergency response is relocation. To the conservation atelier, to the freezer, to the industrial freeze storage facility, or to the industrial vacuum dryer. Relocation.

Relocation is the key.

The relocation procedure is the operation of the units that store and daily work with collections.

All other units support them.

Annex 1 Case studies

1. Floods in August 2002 in Prague

Direct quotation of: KOVÁŘOVÁ, Martina. Průzkum a zhodnocení metod ošetření zmrazených sbírkových fondů po povodních v roce 2002 [online]. Brno, 2007 [cit. 2022-06-17]. Dostupné z: <https://is.muni.cz/th/ed3yu/> . Bakalářská práce. Masarykova univerzita, Filozofická fakulta. Vedoucí práce Pavel HOLMAN.

Two extraordinary waves of precipitation affected southern, central, and northern Bohemia and Moravia on August 6–7, 2002, and August 11–13, 2002; the Vltava, Elbe, Ohře, Berounka, Sázava, and many other rivers overflowed their banks.

Archives and registries

Of the state archives, only the State District Archive of Litoměřice, based in Lovosice, was affected by the floods. Approximately 300 running meters (hereinafter referred to as 'RM') of less rare archival records and 150 RM of books and periodicals were flooded. Another 650 RM of archives only got wet.

The city archives reported the flooding of two workplaces – the Archive of the Capital City of Prague and the Archive of the City of Ústí nad Labem. In the former, 350 RM of archival records were flooded and subsequently frozen, 660 RM of documents were completely soaked and had to be shredded, and 300 RM remained undamaged. The Archive of the City of Ústí nad Labem managed to move most of the archives in time, so only collections of lesser importance were affected.

Of the archives of special importance, the following were most affected: The Military Central Archive, Archive of the National Technical Museum, and the Archive of the Czech Academy of Sciences. At the Military Central Archive in the Invalidovna in Karlín, Prague, water flooded 25,000 cartons of archival material, of which 15,500 cartons were frozen, 650 cartons were allowed to dry on site, and about 8,000 cartons with less important material had to be shredded.

The Archive of the National Technical Museum also in the Invalidovna was underwater to a height of 3.2 meters for two days. The level of the one-hundred-year flood was marked in the past at the height of only 40 cm above ground level. The Archive of Architecture and Civil Engineering was flooded, i.e. various types of plans, drawings, sketches, photographs,

negatives, personal and company documents of important Czech architects, brochures, and professional books and magazines from the second half of the 19th century to the present, including valuable plans of the National Museum by Zitek and Šulc, plans from the period of Art Nouveau (Jan Kotěra), Cubism (Pavel Janák, Josef Gočár) or Functionalism. Another that was flooded was the Archive for the History of Technology and Industry, a large part of which concerned the development of Czech aircraft production and contained aircraft plans, etc. The water also hit a collection of photographs and negatives. One hundred and five running metres of archival records from the total number of 340 RM and 17,200 negatives and positives from the total number of 22 500 pieces were completely destroyed.

Photographs and documents were the most affected in the Archives of the Czech Academy of Sciences, and everything was subsequently frozen.

State agencies did not escape the floods either. A number of registries of ministries, city councils, and also 20,000 volumes of valuable books in the Czech Statistical Office found themselves underwater.

In some buildings, such as several ministries, the floods did not cause any damage '... mainly because the registries and administrative archives were not located in the basements. The situation was exacerbated, among other things, by the wrong location of some buildings, which we can read about in the documents of the Ministry of the Interior. 'All affected institutions were located in flood zones in violation of the law.

Libraries

The August floods affected or completely destroyed 42 libraries. 776,000 volumes of books, magazines, and other documents were destroyed or severely damaged. Of course, the damage to building equipment is also huge. The estimated damage is CZK 400 mil.

In total, the libraries managed to freeze about 140,000 volumes, of which about 6,000 volumes were old prints and the rest were books from the 19th and 20th centuries. Among the most damaged were newspapers and magazines printed on acidic paper, whose mechanical properties were poor even before the floods. Another smaller part of the volumes managed to be dried immediately after the floods, the others had to be destroyed.

The degree of damage in different libraries varied considerably. The National Library of the Czech Republic (hereinafter referred to as 'NK ČR') was affected by the floods to a lesser extent than many other buildings. Evacuation work promptly started in the Klementinum complex, preventive measures were taken before the area was potentially flooded, and water was continuously pumped out. Only reserve collections were flooded, which were used to replenish lost and damaged books and were not used by readers. In the depository in Neratovice, water flooded the lowest shelves with volumes of Bohemical periodicals. The library calculated the damage at approx. CZK 20 mil.

In the Municipal Library in Prague, the floods destroyed 46,000 volumes, which is about 2 per cent of the library collection; damaged were about 20,000 rare historical prints and also the library's oldest print, the Prague Bible, which is the first Slavic Bible from 1488. Total damage was estimated to be CZK 40 mil. Two of its branches in the Karlín and Holešovice districts were completely destroyed; in Holešovice, they saved 20 per cent of its collection. The central building in the Old Town was also damaged. In the Central Library on Mariánské náměstí, the water level on the underground floors reached five metres, and the collections

were not flooded only due to the promptness of the staff.

In the library of the National Museum, water hit the depository with about 16 thousand books from the collections of the Department of Castle Libraries, a handling depository of magazines and newspapers from 1996 onwards, and about 50 old prints. Except for the prints, it was a substitutable production of the 19th and 20th centuries. The materials, which could not be dried immediately on the spot after the flood, were frozen by the library. Furthermore, the damaged paper material of the National Museum included part of the sheet music archive and library in the Velkopřevorský (Grand Priory) Palace, where the Czech Museum of Music is located. Most of the collections were saved thanks to timely evacuation.

Many other libraries were affected, such as some libraries of the Czech Academy of Sciences or the library of the Faculty of Mathematics and Physics of Charles University. The saved collections were mostly frozen by libraries, but not all of them decided to do so.

The South Bohemian Scientific Library in České Budějovice had 240,000 flooded volumes of books, magazines, and annual reports, but did not let the materials freeze because they concluded that this should only apply to rare and irreplaceable books for financial reasons. However, the library had flooded books and magazines of the 20th century, which are also available in other libraries in the Czech Republic and abroad.

Additional remarks:

The top water level in Prague - ~8 m

Top water level in Drezno - ~9.4 m (usual 2 m)

In total, the flood wave took around 12 days to travel from the upper reaches of the Vltava to the mouth of the Elbe in northern Germany, a distance of over 1,000 km (620 miles). Approx. 84 km/day, 3.5 km/h

Conclusions: Avoid cellars and ground floors for storage rooms.

2. Floods in July 1997 in Poland

Five archives were flooded in July 1997. 3 running kilometres of archival material were flooded including the most precious and important objects. An additional 7 running kilometres of archival material of non-archival institutions were flooded with 2-4 days of water presence. The communication and information on the flooding wave failed.

All archives had flooded cellars (no cellars in Nysa). Some archives had also flooded ground floors.

Water levels in flooded ground floor rooms:

Racibórz – 3.7 m

Kamieniec Żąbkowicki – 3.6 m

Wrocław – 3 m

Opole – 2.2 m

Nysa – 1.3 m

Kłodzko – water level of river Nysa Kłodzka

8.71 m above usual

The salvage team was formed by conservators of many Polish institutions and freelancers as well.

Objects were frozen or air-dried immediately.

Drying methods:

- air drying of 200 running metres from Wrocław Archive – 5 days, not effective,
- vacuum drying in wood dryers, 40 °C, 2 days – very effective,
- vacuum drying in a dedicated vacuum-drying-sterilisation (ethylene oxide) chamber, 36 hours
- freeze drying,

Based on:

Floods in July 1997 in Poland – Daria Nałęcz, *The flood experience, ARCHEION, XCIX*, General Direction of the Polish State Archives, Warsaw 1998

Conclusions:

Avoid cellars and ground floors for storage rooms. Avoid air drying for a large number of objects whenever possible. Use vacuum drying.

3. Relocation of the Iconographic Collections of the National Library of Poland

Approx. 500,000 items – Sep 2010 – Feb 2012 + reference library and *varia* up to June 2012

22 February 2010

Monday (of course!) – the first information on water activity on the two walls in the corner of room 218 in Krasiński Palace (see also **Annex 5 Training and simulation *in situ***); immediate local visual inspection and swab sampling of the walls, about 2 m² of already drying wet spots and plaster coming off the wall; photographic documentation of the damaged spots; microbiological sampling of the air.

February – March 2010

Microbiological sampling and evaluation of conditions.

22 March 2010

The final report on the situation The decision on moving the Iconographic Collections Department to the main building is made.

9 July 2010

The first schedule of relocation of the Iconographic Collection to the main building according to their microbiological condition. July and August 2010 Preparation of the new rooms in the main building. On 2 September 2010, the first transport of 16 regular library steel cases with Iconographic objects reaches the Department-Laboratory for preventative disinfection. The last batch of the regular collections left the Department-Laboratory in February 2012, and the reference library and *varia* left the Department-Laboratory in June 2012.

The Department became, in 2012, a “fully mobile department”

Except for large formats (drawers) and photographic albums (codices), everything is listed (e-documents) and stored in numbered boxes. Using the seals (e.g. with the bar codes), the physical inventory could be limited to checking the seals only.

<http://library.ifla.org/id/eprint/1353/1/083-zerek-en.pdf>

Conclusion: Any relocation is a very complicated issue and the most time- and resource-consuming activity is packing.

4. Fire in the Krakow City Archives in February 2021

Fire in a modern dedicated storage building.

- The building was put into use in spring 2018.
- The halls had all the consents and technical approvals that allowed them to be used.
- A specialized fire-fighting system notified the fire brigade of the fire, and according to a spokesman for the Krakow magistrate, the aerosol firefighting system also worked but failed to extinguish the fire.
- Unfortunately, the fire could not be controlled and spread to the entire volume of the two halls where the archival materials were stored.
- The firefighting operation was conducted in difficult conditions, mainly due to the architecture of the building (no windows, only one small entrance door).
- As a result of the fire, 20 running kilometres of files were destroyed.
- It is estimated that 150-200 million documents were irretrievably lost.
- According to the media, it was the biggest loss of Polish archives since the Warsaw Uprising.
- The causes of the fire are unknown. Under the supervision of the District Prosecutor's Office Krakow - Nowa Huta, an investigation was launched on 9 February 2021. According to the investigators, the cause of the fire could have been equipment failure, human error, or deliberate arson.

The fire started on 6 February 2021. The alarm system responded, and the automatic aerosol extinguishing system was activated. The action of the fire guard started immediately and, ended on 16 February 2021. 60,000 m³ of water, 2,000 dm³ of foaming agent, and 4 tons of extinguishing powder were used.

The prosecutor's investigation took place until 10 April 2021. ("deliberately bringing on a situation that threatens a property of a great size") On 12 April 2021, the salvage operation started.

Out of the 20 running kilometres, only 900 running metres were salvaged: frozen, dried, disinfected.

[Based on a summary by Magdalena Dyda: Department of Geomicrobiology, Institute of Microbiology, Faculty of Biology, University of Warsaw <https://im.biol.uw.edu.pl/> and RDLs Ltd. (University of Warsaw spin-off company) <http://rdls.pl/>; <http://muzea.rdls.pl/>]

Conclusions: Even the most modern storage building can burn and access to survived objects will be delayed till prosecutors do their job. It did not matter anyway then, but the salvage action started 2 days after the investigative work and evidence collection in the Archives building had been completed.

5. Fire in the Ráday Collection in Budapest in 2019.

Timeline:

- 23 January 2019 – fire and flooding
- 24 January 2019 – assessment of damages in the collection
- 25 January 2019 – Agreement on immediate in situ salvaging and removing material to Budapest City Archives (BCA)
- 28 January 2019 – in situ salvaging work starts
- March 2019 – removing materials from Ráday Street to BCA finished
- 28 May 2019 – Conference of the Association of Hungarian Archivists on *Ráday Archives, After the Disaster*
- September 2019 – relocation of Ráday Library and the Manuscripts of the Ráday Collection to BCA

5 running-metre water-damaged records (mainly economic and church administration documents, plans, church renovation documents, bound journals from the 1980s, 1990s, and 2000, and foreign publications from 1601 to 1850) were immediately transported to BCA in plastic crates

In the drying room and temporary storage area of BCA designed especially for this purpose, our colleagues spread the material over 24 metres, on 35 drying racks. Professional assistance on the spot (library, damaged displays, position of vault), professional cooperation.

Result: no mould developed, books and records damaged physically but not irreversibly

Relocation of Ráday Archives

The RH of documents arriving at BCA was 20-25 %. Restorers dried them in the temporary storage area to achieve the ideal level of 10–15 %. To stop the formulation of moulds ultrasound humidors were used to distribute essential oils in the rooms. Documents from wet boxes were unloaded and dried separately, then the dried documents were packed into new boxes.

[P. HOLL, Adrien A restaurátor szemével Levéltári Szemle 70. évf. 3.sz 2020 pp73-79 <https://www.epa.hu/03000/03048/00019/pdf>

Conclusions: A model action. Great work.

Annex 2 Salvage

Tables below are direct quotations of the [Emergency Plan for resolving situations, rescuing people and collections, Moravian Library Brno; Kounicova 65, 601 87 Brno](#)

Assumption: objects are not packed in FEBs and will be handled directly by staff.

Material	Priority	Measures taken	Packaging method	Drying method
Paper documents and manuscripts				
stable media	freeze or dry within 48 hours	do not separate the layers	interlay folders and store in suction boxes or cartons	air, vacuum, or freeze dry
brittle media (pastels, chalk)	dry or freeze immediately	do not dry mechanically – do not wipe, do not wipe off water, etc.	interlay folders and store in suction boxes or cartons	air or freeze dry
soluble media (markers, colored pencils, ballpoint pens)	dry or freeze immediately	do not dry mechanically – do not wipe, etc.	interlay folders and store in suction boxes or cartons	air or freeze dry
	moist	fan out the book and dry it with fresh air and at the usual or lower temperature; measure humidity; interlay with absorbent paper; rotate regularly; turn pages; thin bundles can be hung on cords		
	partially wet	interlay with absorbent paper; thin bundles can be hung on cords		
	wet	store in clean water until freezing, freeze within 48 hours; the book block must not dry out, otherwise it will harden		
	muddy	rinse the mud from closed books with clean water, do not rinse material containing water-soluble substances (inks, stamps, watercolors)		
	Acta material	inspect and transfer the dry items to new cartons		
Maps and plans				
stable media	freeze or dry within 48 hours	take extra care if they are folded or rolled	place into cardboard, plywood, or map boxes	air or freeze dry
soluble media (maps and plans created by photo reproductions, hand-colored maps)	dry or freeze immediately	do not dry mechanically – do not wipe, etc.	interlace the folders and pack as above	air or freeze dry
technical plans on tracing paper	dry or freeze immediately	avoid pressure	pack as soluble media in plastic boxes	air or freeze dry single or interlined pages
Coated paper maps	dry or freeze immediately		pack as soluble media in plastic boxes	freeze dry is preferred
Books				
Books and leaflets	freeze or dry within 48 hours	do not open or close, do not part layers	separate with the so-called freezer paper (Special paper that can be ironed on the fabric on one side – it can also handle repeated ironing), wrap in boxes or cartons with the backdown, in one layer	air drying, vacuum drying, freeze drying, turn the pages

leather and parchment binds	dry or freeze immediately, if there are many of them	do not open or close, do not part layers	separate with the so-called freezer paper (Special paper that can be ironed on the fabric on one side – it can also handle repeated ironing), wrap in boxes or cartons with the backdown, in one layer	air dry
books and periodicals on coated paper	dry or freeze immediately	do not open or close, do not part layers	wrap spine down in boxes lined with plastic bags	preferably freeze drying, air drying only with a hair dryer while turning the pages

Parchment manuscripts

	dry or freeze immediately		interlace folders, pack large materials flat	air or freeze dry, do not freeze gilded or illuminated manuscripts
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Artwork on paper

print and drawing with stable media	freeze or dry within 48 hours	do not separate the layers	interlay and store in suction boxes or cartons	air drying, vacuum drying, freeze drying
large prints and drawings	freeze or dry within 48 hours	take extra care if they are folded or rolled	place into cardboard, plywood, or map boxes	dry with wet air or freeze, wet drying is preferred
framed prints or drawings	freeze or dry within 48 hours	extra care when handling glass	remove from the frame and pack as above	air or freeze dry once removed from the frame
soluble media (watercolors, soluble ink, hand prints)	dry or freeze immediately	do not dry mechanically – do not wipe, do not wipe off water, etc.	interlay and store in suction boxes or cartons	air or freeze dry
coated papers (e.g. posters)	dry or freeze immediately		when freezing, store in boxes lined with plastic bags	freeze drying is preferred, air drying only by pages

Black and white photos

photos on albumin paper	freeze or dry within 48 hours	do not touch with bare hands, do not expose to light and moisture (creation of silver mirrors in the photo), and prevent mechanical damage (breaking the cardboard on which the photo is glued)	interlace groups of photos	air dry or thaw and air dry
matte and glossy collodion photo	freeze or dry within 48 hours	prevent mechanical damage (e.g. scratching the photo and negative), do not touch with bare hands		air dry or thaw and air dry, freeze dry

Silver bromide photography and gelatin bromide silver papers, collodion direct copying papers – celloidin, gelatin direct copying papers - artist, pigment printing, flexographic printing	freeze or dry within 48 hours	do not touch the emulsion with bare hands (the emulsion layer is very fragile, it is often cracked), and do not expose it to light radiation (yellowing and fading of the photo)	if it is frozen, it needs to be kept wet, to be packed in boxes lined with plastic	air drying, freeze drying, do not dry under pressure
carbon photography and Woodburytype	dry or freeze immediately		pack horizontally	air dry
photomechanical prints (calotype, heliogravure) cyanotype	freeze or dry within 48 hours	do not separate the layers	interleave and pack in boxes or cartons	air or freeze dry
Color photos				
Dye transfer process	freeze immediately	do not touch the emulsion	carry in a horizontal position	air dry with the photo layer facing upwards
chromatic photography (chromophotography, autochromes)	freeze or dry within 48 hours	do not touch with bare hands	if frozen, keep moist, pack into plastic containers	air drying is preferred before freezing, do not vacuum
Cased Photographs (direct positive process/adjusted in frames)				
ambrotype, pannotype	The chances of rescue are very low, dry immediately	handle very carefully, extremely prone to breakage, in ambrotypes the back of the black lacquer often peels off – do not peel, in pannotypia, the canvas may crinkle/crease	pack horizontally in lined boxes	air dry with the photo plate facing upwards, never freeze
daguerreotype	dry immediately	handle very carefully, extremely prone to breakage, do not expose to sunlight	pack horizontally in lined boxes	air dry with the photo plate facing upwards, never freeze
ferrotype	dry immediately	handle very carefully, extremely prone to breakage, the sensitive layer of the plate peels off, and mechanical and chemical (corrosion) damage to the sheet can occur	pack horizontally	air dry, never freeze
Negatives				
wet collodion glass plates	The chances of rescue are very low, dry immediately	handle very carefully, prevent mechanical damage (e.g. scratching the negative)	pack horizontally in lined boxes	air dry with the emulsion facing upwards, never freeze

Dry gelatin plates (silver bromide Maddox plates)	freeze or dry within 48 hours	work in gloves, the boards are sensitive to moisture	if frozen, keep wet, pack in plastic bags, vertically in lined containers	air drying is preferred before freezing
nitrate film material (photographic film made of nitrocellulose) (deteriorated nitrates with soluble binders)	freeze or dry immediately, the chances of rescue are low	do not dry mechanically – do not wipe, do not wipe off water, etc. The material must be given more attention, it is not only sensitive but also dangerous to its surroundings (nitrocellulose is an unstable and highly flammable material – danger of ignition)	pack horizontally	air drying and freeze drying are being tested
deteriorated acetates	freeze or dry immediately, the chances of rescue are low	handle with care, especially the emulsion	pack horizontally	air drying and freeze drying are being tested
polyester-based films, nitrates, and acetates in good condition	freeze or dry within 48 hours	do not touch the emulsion with bare hands	if frozen, keep wet, pack in small plastic bags and boxes	air drying is preferred, freeze drying is possible, but do not dry in vacuum
Foils				
slides (glass), silver gelatin	freeze or dry within 48 hours	handle with care	pack vertically into lined containers	freeze dry is preferred
Colored foils				
additive colored foils (mostly glass)	keep packed to prevent damage, the rescue rate is very low, dry immediately	handle with care	pack horizontally in lined containers	air dry, never freeze
chronometric color foils, film strips	freeze or dry within 48 hours	handle by the holder and hold it by the edges	if frozen, keep wet, pack in plastic bags and boxes	air drying is preferred, freeze drying is possible, but do not dry in vacuum
Film				
	rinse and dry within 48 hours		if frozen, keep wet, wrap in plastic	
Microforms				
microfilm rolls	rinse and dry within 48 hours	do not remove from the containers	if frozen, keep wet, pack (in blocks of 5) in polypropylene crates	
punched cards	freeze or dry within 48 hours		if frozen, keep wet, pack in plastic bags and boxes	air or freeze dry
microfilms	freeze or dry within 48 hours, store in cold before freezing	remove from the reels, clean the rolls with alcohol and dry immediately while rewinding slowly	if frozen, keep wet, pack in plastic bags and boxes	air or freeze dry
microfiche	freeze or dry within 48 hours		interlay the envelopes, pack in polypropylene boxes	air or freeze dry

Optical discs

dry discs immediately, paper packaging within 48 hours	do not scratch the surface	pack vertically in crates or polypropylene boxes	air dry
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PC media

tapes	rinse in clean/distilled water immediately, dry paper packaging within 48 hours, tapes may remain wet for several days, do not freeze	do not manipulate magnetic media with bare hands, open the tapes at the spool	keep tapes wet in plastic bags, pack vertically in crates	air dry
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floppy disks	rinse in distilled water, pack immediately, and transport to a place where they can be dried, do not freeze	do not touch the surface of the disc with bare hands	pack wet and keep them wet during transport, pack vertically in plastic bags or containers with cold water	air dry
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Audio and video recordings

audio and video tapes	rinse with clean/distilled water immediately, dry paper packaging within 48 hours, tapes can remain wet for 48 hours, do not freeze	do not touch the surface of the disc with bare hands	keep tapes wet in plastic bags, pack vertically in crates and polypropylene boxes	air dry
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shellac and acetate records	dry immediately, and dry the packaging within 48 hours	the records are very fragile, only touch the edges when handling	pack vertically in boxes foamed with polyethylene	air dry, the use of a record cleaner is preferred
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vinyl records	dry within 48 hours, freezing has not been tested, if freezing is necessary, the temperature should not fall below -18 °C, dry or freeze packaging within 48 hours	only touch the edges when handling	pack vertically in boxes foamed with polyethylene	air dry, the use of a record cleaner is preferred
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Annex 3 Drying methods description

Direct quotation of:

KOVÁŘOVÁ, Martina. Průzkum a zhodnocení metod ošetření zmrazených sbírkových fondů po povodních v roce 2002 [online]. Brno, 2007 [cit. 2022-06-17]. Dostupné z: <https://is.muni.cz/th/ed3yu/>. Bakalářská práce. Masarykova univerzita, Filozofická fakulta. Vedoucí práce Pavel HOLMAN.

There are quite a lot of drying methods, they differ from each other mainly in the pressure and temperature used:

Air drying

It is done in a ventilated room; absorbent paper is inserted into the books for faster water drainage, and then the books are dried fan open. Drying time is 5–10 days depending on the thickness of the volumes. I would also include the method of sandwiching in this group, where larger documents are interleaved with absorbent materials, dried at first under load, and then loosely on sieves.

Vacuum packing

Shortly before the floods, two Englishmen, Stuart Welch and Nicolas Hadgraft, came up with the idea to use vacuum food packaging machines for paper drying. The book is covered with a layer of non-woven fabric and absorbent paper and sealed in a polyethylene bag from which air is sucked out. The book is re-packaged until dry. The total drying time is usually 10 to 20 days.

Thermal vacuum drying

Drying takes place in a vacuum chamber at a pressure of 5–10 mbar and a temperature of 25–30 °C. The books are spread out on shelves in the oven, the evaporated water leaves through an oil pump with an oil temperature of 150 °C. Drying takes about a week.

Hot air drying

The books are dried in the chamber by a stream of dry hot air with a usual temperature of about 115 °C and almost zero relative humidity. The paper materials are placed on shelves and separated by aluminium plates for faster heat

distribution. The drying time is about one day, the method can only be used for materials such as official files.

Drying with moist warm air

It is drying with circulating air in modified wood dryers at the usual temperature of 60 °C and relative humidity of 35 per cent. The drying time is about two weeks.

Lyophilization – vacuum freeze drying

Lyophilization is drying in a vacuum (or at a pressure lower than 6.1 mbar) and below freezing point, when the water changes from a solid-state directly to a gaseous one (ice sublimates), omitting the liquid phase. Drying takes several days.

Microwave drying

Drying is based on the fact that liquid water absorbs microwaves. Heat is generated at the point of absorption, which accelerates the evaporation of water.

Cryogenic drying

It is a patented method of vacuum freezing, with the difference that for a short time the dried water finds itself in a liquid state and the dried material thus contains slightly more moisture than during lyophilization. This is to completely prevent the paper from warping. Drying occurs by water evaporation in a vacuum chamber with controlled temperature; the resulting vapours are removed from the chamber by a specially designed vacuum pump, then they are isolated, heated, and converted into steam, which is released into the atmosphere. The method was developed in the United States and is also used for other frozen materials – microfilms, microfiches, photographs, audio, and video tapes, and magnetic media. Drying takes several weeks and can allegedly be used successfully for rare old prints and manuscripts.

Multi-purpose vacuum chamber

This chamber allows vacuum drying at temperatures above freezing point, lyophilization, drying with moisture and heat (controlled atmosphere), air conditioning of books, and also disinfection of books. The books are inserted into the chamber wrapped in so-called sandwiches. The environment in the chamber is controlled by sensors to prevent over-drying. A prototype of this chamber was put into operation in August 2006.

Arctic freezer drying

This type of drying is mentioned by the Archaeological Institute of the Czech Academy of Sciences, which had its collections dried by specialists in Denmark. It is a method of freeze drying with cold air, the temperature of which must not exceed $-23\text{ }^{\circ}\text{C}$. The books can be placed separately in the chamber to speed up the drying process, or they can be fixed between two bound plates with holes to prevent deformation. The method is safe for leathers and parchments that do not over-dry, but it is very time-consuming – it can take weeks or months, depending on the air temperature and the wetness of the book.

Annex 4 Evaluation of storage rooms

Location and description

Including distance to ground level, door marks, and type of building.

Characteristics of collections

The technology of the objects – base and information layer, number of objects.

Number and location of objects that:

- Cannot have contact with water (see **Annex 2 Salvage**)
- Cannot be frozen – require immediate air dry when wet.

Stocklist information

Inventory lists and their localization.

Incoming objects, signatures/tagging

Procedures for introducing new objects into storage rooms (including microbiological control).

Security access entrance/exit procedures

Anti-theft systems, locks, access to the keys.

Access for readers

Regular migration of objects. The number of objects leaving a storage room per day.

Microbiological control and disinfection

Microbiological evaluation of objects. Objects sampling. Microbiological air sampling. The general characteristics of the room's condition.

Climate control

RH and T loggers and metres. Short- and long-term analyses. Physical and chemical pollution analyses.

Storage room evaluation (provide numbers):

- floor size, space (square and cubic metres)
- level (basement, ground floor, second floor, etc.)
- water installations (heating, fire extinguishing, sprinklers, rain-, clean and wastewater pipes)
- doors – types and classes including the descriptions of locks
- windows – types and classes
- alarm system – type and class
- electric installation, date of the last review
- fire protection system

Protective enclosures

The number of objects with FEBs. Percentage of objects with FEBs. Suggested time-span of providing all objects with FEBs.

Rooms and infrastructure cleaning procedures

Staff responsible for regular cleaning. Specification of cleaning materials. Frequency of cleaning.

Digitizing and selection for digitizing

The number of digitized objects vs. the total number. Digitizing plans.

Available free storage space

Long- and short-term analyses of acquiring new objects.

Special care objects

The number and location of objects that:

- Cannot have contact with water (see **Annex 2 Salvage**).
- Cannot be frozen – require immediate air drying when wet.

Fire protection

Detection and extinguishing methods. Possibility of fire requiring the use of fire hoses by fire guards.

Disaster protection

Emergency Protocol (EP)

Person responsible for EP (suggestion – head of the unit). Staff awareness and training. List of EP contacts. EP cooperation with other units.

- ventilation, air conditioning
- climate control loggers / meters
- humidifiers / dehumidifiers
- ceiling lining
- lighting – type and numbers
- floor covering
- furniture / storing system (including distance from the walls and the ceiling)
- staff activity (with evaluated average presence)
- social space, plants, water containers, not storing furniture
- history of water presence / activity
- list of emergency contacts
- other remarks

The evaluation team compares the present condition of the storage room with binding regulations of safety and standards e.g. ISO-11799

The final evaluation should contain risk assessment and tasks for the upcoming period till the next evaluation.

It offers different risk modules:

- incorrect relative humidity (high, low, fluctuations)
- incorrect temperature (high, low, fluctuations)
- fire (electrical sources, gas leaks, flammable liquids, arson)
- criminals and vandals (break and enter, theft, souvenir hunting, graffiti)
- pests (insects, rodents)
- contaminants (dust, dirt, air pollutants, faulty restorations)
- radiation (UV, VIS, IR)
- water (leakage, pipe burst, spillage, cleaning)
- physical forces (earthquake, vibration wear and tear, break, scratch)
- dissociation and curatorial neglect (misplacing objects, no inventory, removing labels)

Risks from environmental conditions are assessed by analysing data prevailing in a space in which an object is displayed or stored. The effect of moving an object from one environment to another, frequent when loans are made, can be also assessed.

There are several risk calculators available online, e.g. <https://herie.pl/>

HERIE is a digital decision-supporting platform providing remote access to data manipulation tools and to quantitative assessment of risks to heritage assets. The platform is organised in the framework of ten independent modules corresponding to ten agents of deterioration.

HERIE is freely available for conservation professionals and decision-makers.

Since the greatest danger for collections is fire extinguished with water and subsequent flooding of collection the HERIE provides *The fire risk tool*:

In the quantitative assessment of fire risk, the occurrence of fires and their anticipated effects should be taken into account. Mathematically, fire risk is expressed as the product of the probable number of fires from the present to the assumed future point called the time horizon and its effects, which are understood as the percentage loss of value of the collection.

The impact of fire depends on several factors:

- loss of material or material damage as a result of various agents - combustion and high temperature, smoke and water during fire extinguishing action and depending on the sensitivity of the materials from which objects are made to these factors,
- size of the fire, which may be limited to material, a room, a level, or cover the entire building,
- parts of the collection from those in the room, on the level or in the building affected by fire, which were actually affected by its effects.

The formula defining magnitude of risk for a given group of objects takes form:

$$MR = P * \left[\sum_j^{fire, smoke, water} f(V_j) \sum_k^{firesize} EF_k * PM_{kj} * ML_{kj} * PC_{kj} \right]$$

Where

MR - magnitude of risk expressed as the expected loss of collection value. It is assumed that the value of the collection is currently 1. *MR* will be a fraction of this value. The greater the risk, the greater the loss of value,

P - likelihood of fire in the selected time horizon,

j - summation index for three factors causing damage: fire - combustion and high temperature, smoke and water as a result of the extinguishing operation,

k - summation index for fires of various sizes: limited to material of origin, a room, a level or covering the entire building,

f(V_j) - correction function depending on material sensitivity *V_j* to various agents,

EF_k - contribution of fires of various sizes,

PM_{kj} - part of the material (collections and other museum equipment) affected by the fire for fires of various extent and for various agents,

ML_{kj} - loss of the material caused by combustion and high temperature, or by smoke or the effects of fire extinguishing action causing material damage equivalent to the loss of material, for fires of varying sizes,

PC_{kj} - the probability that it is the collections and not other material which is affected by the effects of fires of various sizes, for various agents.

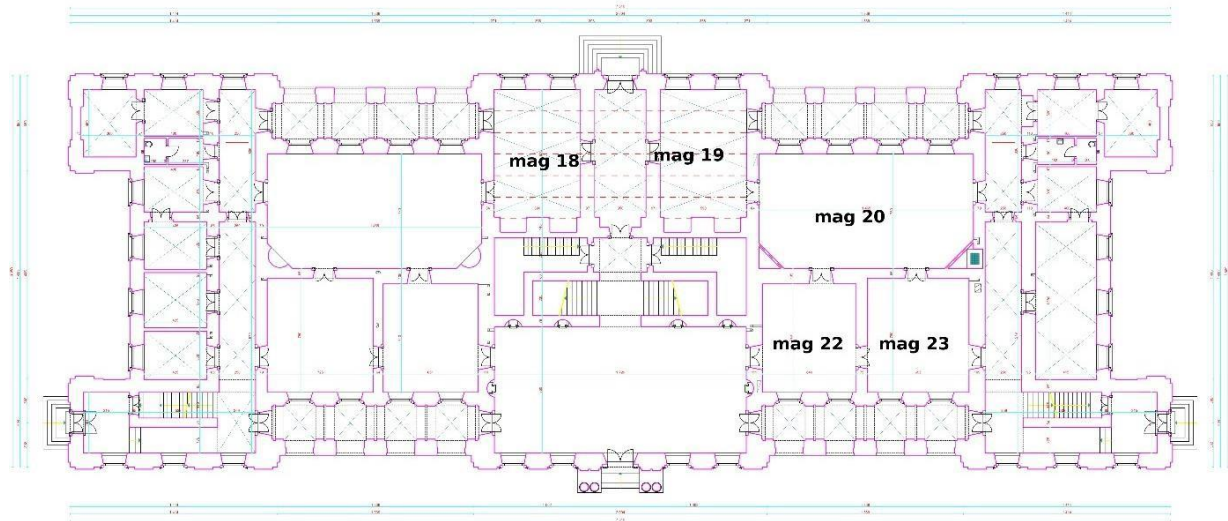
<https://herie.pl/Home/ManualFire>

Annex 5 Training and simulation *in situ*

Testing Emergency Protocol in simulated disaster scenarios based on storage room evaluation and storage room risk assessment.

A possible scenario:

(former) storage rooms 18, 19, 20, 22, and 23 of the Early Prints Department of the National Library (NLP) of Poland in Krasiński Palace got fire extinguished with water. Objects are wet.



The building:

Built 1677-1695. Heavy fire in 1782. Damaged during November Uprising. Damaged in September 1939. On 27 August 1944 (Warsaw Uprising) bombed by Luftwaffe. During heavy fights in the following days burnt almost to the ground. After the war, the building's destruction level was estimated to be at 85%. Rebuilding started in 1948 and finished in 1961. Since 1958 owned by the National Library of Poland. No fire evidence since 1944.

Rooms:

Wooden floors, wooden stacks of shelves up to 3.5 metres. Ladders for staff. Windows to the outside (18, 19) and to closed arcades (the other ones).

Objects:

There are approx. 60,000 volumes (early prints, many bound in leather or parchment) on 3,000 metres of wooden shelves. With one (statistically average) object of 23x16x5 cm and approx. 2 dm³, the volumes add up to 120 m³. Assuming objects are wet it means the same in tons. Since room 20 is twice as big as the other

ones, there are about 20,000 volumes there and 10,000 volumes in every other room.

The operation (tabletop exercise):

Removing all of the objects for freezing to a commercial freezing storage. Subsequent salvage operations will start from the point: freeze dry.

The removal:

We can introduce up to 3 removing teams (to avoid interfering) per storage room (6 teams for storage room 20).

The removing team:

One person removing volumes from the shelves.

Two persons with carts receiving the volumes. They move the objects with the carts outside the storage room and help to pack them into containers. The usual maximum payload of the library cart is approx. 60 kg.

One person with the camera for visual documentation of the relocation. No time for written documentation. This should be one of the staff of the unit that preserves the objects.

The ratio:

The team should reach the ratio of 100 volumes removed from the storage room per hour.

Thus: 300 volumes removed per hour, 10,000 in approx. 34 hours.

The container team:

One person packing the objects into a container (with help of the one with the cart of the removing team).

One person with the camera for visual documentation.

The most important conclusion:

If we assume the microbiological outbreak within 48 hours, the teams should start relocation no later than 14 hours after the completion of the fire extinguishing. 12 hours should be the target.

The transportation:

Rented forklift adapted plastic containers of 650 dm³ (inner) volume and 120x100x78 cm (outer) dimensions. Since the objects are of different sizes, there should be about 200 volumes per container, 300 containers are needed. The weight of the loaded container would be approx. 450 kg.

The containers are too big to move them around inside the storage rooms.

The average semitrailer has a maximum load of about 22 tons and an inner size of 13x2.4x26 m. Assuming 2 layers of containers, one shuttle of semitrailer means 52 containers. Approx. 7 shuttles are needed.

The summary: human resources per one storage room with 10,000 volumes:

One 8-hour-long shift:

3 removing teams of 4 people + 1 packing team of two people = 14 people = 2,400 volumes

Full operation for 12,000 volumes:

5 x 8-hour-long shifts – 70 people.

Full operation for the assumed 60,000 volumes:

350 people. 210 if we use the same staff after a 16-hour break (should be confronted with local labour law).

We can see that there is no way of achieving the goal with the staff of the preserving unit or the conservation unit. Consider the outsourcing staff (military forces, civil defence).

Additional staff (assuming using the same staff after a 16-hour break):

2 (6 for the whole operation) forklifts operators (one at the disaster's site, one at the freeze storage)

2 (6 for the whole operation) drivers for the trucks with semitrailers

1 (3 for the whole operation) coordinator

1 (3 for the whole operation) coordinator's assistant

2 (6 for the whole operation) people at the freeze storage room (guard and controller of unloading containers and locating them in the storage area)

The resources:

Secured freeze storage space for approx. 300 m³

300 forklift adapted plastic containers of 650 dm³ (inner) volume and 120x100x78 cm (outer) dimensions

2 trucks with semitrailers

2 forklifts

20 library carts

20 compact digital cameras with extra memory sticks and batteries (compact cameras working with AA or AAA units are suggested)

At least 20 sources of light + power supply (generators) + headlamps for staff

Protective gear for staff

Additional remarks:

The key is to minimize the time gap between the end of the extinguishing action and the start of the evacuation.

Within these 12 hours (the target) the following must be achieved:

- the safeguarding of the site (construction, fire, electricity, labour safety),
- activating freeze storage, transportation, forklifts, containers delivery, staff,
- financial and administration securing of the operation,
- activating outsourced staff (military, police, fire guard)

The most difficult activities will be:

- removing volumes from the shelves
- packing the volumes from the carts to the containers

Make sure to delegate physically strong people for these activities.

No interleaving of objects is considered. If included, it would be polyester fibre:

- 300 m² for the bottom of each container
- 50, 000 x A4 – 21x30 cm – 3,150 m² (no need to cover the top object)

That is 3,450 m², approx. 39 rolls of 90 cmx100 m. Right now (spring 2022) the cheapest roll on the market is about 153 EUR.

It means that an “emergency kit” is a myth, we need an emergency store. Or a very quick buy.

Apparently, even if these rolls are available at once, someone has to cut them into A4 leaves starting at the moment learn we about the fire.

“The containers are too big to move them around inside the storage rooms.”

There is of course the possibility of using smaller plastic containers, e.g. 60x40x32 cm with the inner dimensions 54x36x32 cm (0.06 m³). 120 m³ of volumes would be 2,000 containers “net”, by estimation, we would need 3,000 containers. The maximum height of the stack is 4 containers or 100 kg weight of the stack. With the 20 volumes (40 kg) per

container, the third layer of the container becomes “problematic”.

The experience of the NLP (transportation of heritage of Czeslaw Milosz) shows, that the third layer of this kind of container usually damages the second layer, and the fourth one is not an option (damage guaranteed).

Important:

Perform a three-hour simulation of three removing teams and one container team action.

Verify the 100 volumes/hour/removing team assumption.

Discuss the results and observations.

Use “dispensable” volumes for the simulation.

Annex 6 Emergency Kits

The conclusion of **Annex 5 Training and simulation *in situ*** is clear:

“Emergency kit” is a myth, the emergency store is the goal.

Based on the *Logistics and responsibility - parallel to daily routine and organization chart* and the emergency protocol for every organization unit, the units should secure the means for emergency actions.

A simple example of the need for polyester fibre for interleaving (as described in **Annex 5 Training and simulation *in situ***) shows that there are very limited options for providing in advance the full coverage of materials required during emergency operations.

Based on **Annex 5 Training and simulation *in situ*** for a 36-hour-long rescue activity an institution should prepare (have or be ready to buy within 12 hours):

- 500 sets of disposable protective gear (aprons, gloves, masks, glasses, caps)
- one pair of protective shoes for each member of the rescue action
- 20 cameras with extra memory sticks and batteries (compact cameras working with AA or AAA units are suggested)
- At least 20 sources of light + power supply (generators) + headlamps for staff
- 20 library carts
- agreements for services: transportation, forklifts, freeze storage, outsourced staff

Suggested equipment (based on risk evaluation):

- cleaning and water removing sets (mops, buckets, rubbers, sponges, pumps, etc.)
- containers (suggested agreement on emergency supply; renting, not buying)
- materials for securing objects “dry immediately” and oversize ones (large format hard backings, filtration papers)

A location for operation “dry immediately” should be chosen and secured.

Annex 7 Analysis of access to the packed materials

The packed objects present lower risks of:

- fire damage
- water damage
- dust and pest (invertebrates) penetration
- mechanical damage
- room climate changes

Easier handling of wet/damp objects (boxes and cases will be handled, not objects themselves):

The disinfected batches in the ethylene oxide chamber of the National Library of Poland (NLP) in the years 2002 – 2012. **Chests, cases, and boxes only. No one handles single objects.**

year	NLP Unit/Department	External contractor	total
2002	30	41	71
2003	12	42	54
2004	57.5	21.5	79
2005	44.5	33.5	78
2006	20.5	48.5	69
2007	24	84	108
2008	29	56	85
2009	35.5	46.5	82
2010	45.65	32.35	78
2011	81.25	3.75	85
2012	68	15	83
total	447.9	424.1	872

The most important conclusion:

Objects should be stored in boxes or cases ready for relocation

Disadvantage – more difficult access:

Main collections – general Reading Room – up to 100 readers per day.
They have access only to the second copy, not the archival one.

Estimated access to special collections of the NLP per working day

unit	readers / objects	staff / objects
Iconography	1/10	4/10
Cartography	1/5	4/10
Manuscripts	2/20	9/5
Early prints	4/36 in 2021*	13/80 per week

* - access for readers is exceptional

Access to digital images:

Digital images as default access to objects' content.

Connecting the digitizing with providing objects with boxes.

Annex 8 Links to useful publications and websites

Sources used for guidelines:

1. Final report of the grant task "OCHRANA ARCHIVNÍCH MATERIÁLŮ PŘED ŽIVELNÍMI POHROMAMI V SÍTI ARCHIVŮ ČESKÉ REPUBLIKY":
https://www.nacr.cz/wp-content/uploads/2019/06/zivelnipohromy_opt1.pdf
2. IFLA Disaster Preparedness and Planning: A Brief Manual <https://repository.ifla.org/handle/123456789/1315>
3. Methodical instruction no. 2/2016 "Metodický pokyn č. 2/2016 na ochranu kultúrneho dedičstva v krízových situáciách" (in Slovak), available on: https://www.culture.gov.sk/wp-content/uploads/2019/12/metodicky_pokyn.pdf
4. **SNL**: "Krizový plán ochrany zbierok v prípade ohrozenia a katastrof", SNK Martin. (Internal document of SNL - in Slovak).
5. KOVÁŘOVÁ, Martina. Průzkum a zhodnocení metod ošetření zmrazených sbírkových fondů po povodních v roce 2002 [online]. Brno, 2007 [cit. 2022-06-17]. Dostupné z: <https://is.muni.cz/th/ed3yu/>. Bakalářská práce. Masarykova univerzita, Filozofická fakulta. Vedoucí práce Pavel HOLMAN.
6. Zasady postępowania z materiałami archiwalnymi : ochrona zasobu archiwalnego / [wybór i oprac. Marek Borowski, Anna Czajka, Anna Michaś] ; Naczelna Dyrekcja Archiwów Państwowych., Warszawa, 2011 (Guide for Preservation and Salvage of Archival Materials by General Direction of the Polish State Archives)
7. Emergency Management Terminology of Conservation Center for Art & Historic Artifacts: <https://cacha.org/resources/emergency-management-terminology>
8. Emergency plan for resolving situations, rescuing people and collections, Moravian Library Brno, Kounicova 65, 601 87 Brno
9. HERle, <https://herie.pl/>, <https://herie.pl/Home/ManualFire>

Sources for case studies:

1. Floods in August 2002 in Prague. Central Europe Flooding, August 2002, Event Report, Risk Management Solutions, https://forms2.rms.com/rs/729-DJX-565/images/fl_2002_central_europe_flooding.pdf
2. Floods in July 1997 in Poland – Daria Nałęcz, *The flood experience*, ARCHEION, XCIX, General Direction of the Polish State Archives, Warsaw 1998
3. Relocation of Iconographic Collections of the National Library of Poland – Bogdan Filip Zerek, *Relocation of Iconographic Collections as a disaster response to water activity in 17th-century palace*, materials of IFLA 2016 Congress materials: <http://library.ifla.org/id/eprint/1353/1/083-zerek-en.pdf> and: Bogdan Filip Zerek, *The Preservation and Protection of Library Collections*, Elsevier, 2014
4. Fire in the Krakow City Archives in February 2021, based on a summary by Magdalena Dyda (University of Warsaw <https://im.biol.uw.edu.pl/> and RDLs Ltd. <http://rdls.pl/>; <http://muzea.rdls.pl/>) based on:
 - https://www.rmf24.pl/fakty/polska/news-pozar-archiwum-urzedu-miasta-krakowa-szczegoly-akcji-wydobryw,nId,5141492#crp_state=1
 - https://www.krakow.pl/aktualnosci/256945,26,komunikat,archiwum_rok_po_pozarze.html
 - <https://gazetakrakowska.pl/mija-rok-od-pozaru-krakowskiego-archiwum-ogromne-straty-winnych-nadal-nie-ma/ar/c1-16030975>
 - <http://www.krakow112.pl/index.php/wydarzenia/1065-06-02-2021-pozar-archiwum-urzedu-miasta-krakowa-ul-na-zaleczu>
 - International Academic Conference; 25–26 November 2021; National Archives in Kraków, Poland: [Protecting the cultural heritage against particular hazards – climate, environment, pandemic, and fire risks. Best practices](#)
5. P. HOLL, Adrien A restaurátor szemével Levéltári Szemle 70. évf. 3.sz 2020 pp73-79 <https://www.epa.hu/03000/03048/00019/pdf>

Other sources:

1. <https://www.connectingtocollections.org/collections-emergency-kits/>
2. http://www.arcsinfo.org/content/documents/emergency_supply_program_development_manual.pdf
3. <https://www.culturalheritage.org/resources/emergencies/alliance-for-response>
4. <https://www.nedcc.org/free-resources/disaster-assistance/>
5. https://www.culturalheritage.org/docs/default-source/default-document-library/resource-document-for-small-institutions_apr2021.pdf?sfvrsn=59231420_0
6. *Salvage at a Glance*, Betty Walsh, British Columbia Information Management Services, <https://cool.culturalheritage.org/waac/wn/wn19/wn19-2/wn19-207.html>
7. <https://www.lib.washington.edu/preservation/disaster>
8. <https://libguides.ala.org/disaster/preparedness>
9. https://www.tnstate.edu/library/library_disaster_plan.aspx
10. <https://plconnect.slq.qld.gov.au/managing-my-library/operating-library/disaster-planning>