IVCR+i
Institut Valencià de Conservació, Restauració i Investigació

GUIDE TO BEST PRACTICES FOR DOCUMENT MANAGEMENT OF MOVABLE CULTURAL ASSETS IN EMERGENCY SITUATIONS

UNIVERSIDAD PABLO DE OLAVIDE SEVILLA


GENERALITAT
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Fenix


MINISTERIO
DE CIENCIA
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UNIVERSIDAD
PABLO DE OLAVIDE
SEVILLA

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Acknowledgements:
FENIX "Artificial intelligence and new technologies applied to the prevention and management of fires and natural disasters in movable and immovable cultural heritage" (PID2019-107257RB-I00), which has been funded by the State Programme for the Generation of Knowledge and the Scientific and Technological Strengthening of the R+D+i System (MCIN/AEI/10.13039/501100011033 FEDER "A way to build Europe").
Firefighters, national and local police, civil protection and local authorities who have participated in the activities developed within the Fenix project.

First edition
ISBN 978-84-09-61850-7
Printing: The printer's

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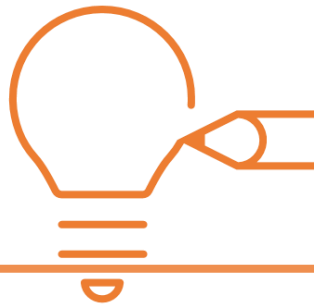

GUIDE TO BEST PRACTICES FOR DOCUMENT MANAGEMENT OF MOVABLE CULTURAL ASSETS IN EMERGENCY SITUATIONS

INITIAL REFLECTIONS

The Valencian Institute of Conservation, Restoration and Research has the protection, preservation, restoration, research, innovation and dissemination of the assets of which Valencian cultural heritage is comprised among its functions. In this sense, and being aware of the pressing problems that climate change is generating and its consequences on cultural heritage, we believe that preserving this cultural legacy left to us by our ancestors must be a priority for this institution.

We therefore wish to transfer the research we have carried out within the field of cultural heritage preservation in emergency situations in order to find the most suitable methodologies and tools for working in this area. Thanks to the projects in which we have participated with the Pablo de Olavide University, through the FENIX project (PID 2019-107257RB-I00) and FENIX 4.0 (PDC2022-133157-I00), we have realised the need to make these lessons known through this guide so that it can be useful to other institutions responsible for preserving and safeguarding heritage.

The guide you have in your hands is a first contribution to this field, which we hope to expand and perfect in future editions, since disasters, such as flooding in archives, are events that have been occurring with increasing frequency, not always as a result of natural disasters.

This work brings together the experience of a multidisciplinary team of technicians who, in addition to their usual duties, offer their knowledge in order to advance in a rarely-explored area that is considered absolutely essential. This involves the development of protocols, roles, tools and methodologies, such as those used by security forces, with whom we work in collaboration, which have protocols that are continuously tested and improved to rescue affected people, assets and the environment. However, in its variety and immensity, cultural heritage lacks rescue and safeguarding protocols despite the fact that it constitutes one of the key infrastructures that needs to be protected.

In the digital age, the threats to our cultural legacy are innumerable, ever-changing and generate great uncertainty. For this reason, the Valencian Institute of Conservation, Restoration and Research (IVCR+i) launched the Identification, Prevention and Action Group

against Heritage Crimes and Emergencies in 2022, with two units, the Heritage Counterfeit Expertise and Detection Unit and the Heritage Rescue Unit (GIPADE). The latter has participated in numerous drills, which has allowed participants to accumulate an experience that they now want to share with society in an educational way.

This guide is an open model with the hope that it will serve other cultural heritage managers, as a tool to be used by restorers and conservators, heritage managers, authorities and security forces committed to safeguarding our cultural heritage, to contribute to improving our collective resilience.

Gemma Contreras Zamorano
Director of the Valencian Institute of Conservation, Restoration and Research (IVCR+i)

FOREWORD

This guide to best practices for the document management of movable cultural assets in emergency situations is part of the FENIX Project "Artificial intelligence and new technologies applied to the prevention and management of fires and natural disasters in movable and immovable cultural heritage" (PID2019-107257RB- I00), which has been funded by the State Programme for the Generation of Knowledge and the Scientific and Technological Strengthening of the R+D+i System (MCIN/AEI/10.13039/501100011033 FEDER "A way to build Europe").

The fire at Notre Dame Cathedral in Paris remains in the collective memory of the 21st century as a milestone that is difficult to forget, as we tend to remember where we were that day, feeling the loss of cultural heritage as a personal impact. Unfortunately, this image is not unique, and is linked to forest fires or floods, which are becoming more violent or frequent with climate change, which entail incalculable natural and cultural losses; or to other natural threats such as earthquakes and volcanoes; or the worst of the dangers that threaten our cultural heritage: war. Being prepared to protect cultural heritage in the face of these emergencies has led us within the FENIX project to investigate new management and communication methodologies to provide an effective and sustainable response to safeguarding tangible and intangible cultural heritage.

Among the main objectives of the FENIX research project has been the development of protocols, models and tools to help prevent the potential loss of cultural heritage during emergencies. This guide to best management practices is one of the fruits of this work, which is presented as an adaptable model for emergency response, the result of the implementation of safeguarding plans and rescue forms in fire, earthquake and flood drills in Spain in different cultural heritage buildings, such as the Museum of Fine Arts in Valencia, the Museum of the City of Antequera, the Municipal Archive of Antequera and the Monastery of San Zoilo, where the Municipal Library of Antequera and the Brotherhood of Students are located.

FENIX is a research project led by the Pablo de Olavide University (UPO) in collaboration with the Valencian Institute of Conservation, Restoration and Research (IVCR+i) of the Generalitat Valenciana (The Regional Government of Valencia), the University of Seville, the Andalusian Institute

of Historical Heritage and the Ministry of Culture and Historical Heritage of the Junta de Andalucía (The Regional Government of Andalusia), which has been the meeting point for researchers, cultural managers and security and emergency bodies for the analysis of risks and responses to emergencies in cultural heritage, which has enabled the sharing of protocols, vocabulary and models of response to emergencies in cultural heritage, with the ART-RISK 4 model being the result of this guide.

Within the framework of the FENIX research project, this guide has been evolving since its first draft for the fire drill at the Museum of Fine Arts of Valencia in 2022 and has been used in different scenarios, incorporating the improvements that, from an interdisciplinary and multidisciplinary approach, were gleaned from the dialogue and reflection of the different teams involved in the FENIX drills, such as firefighters, national and local police, civil protection, conservators and restorers, cultural managers, researchers, authorities, etc.

This guide also draws upon the complementary research of the projects, FENIX 4.0 "Feasibility analysis and end-user testing of APPs for the prevention and management of fires or natural disasters for the preservation of movable and immovable cultural heritage" (PDC 2022-133157-I00), which has been funded by the state programme to promote Scientific-Technical Research and its Transfer (MCIN/AEI/10.13039/501100011033 and by the European Union Next Generation EU/PRTR); and RESILIENT-TOURISM "New technologies applied to the prevention and management of emergencies in cultural heritage and emergency response in pandemic conditions" (PYC 20-RE-034 UPO), which has been funded by the Ministry of Economic Transformation, Industry, Knowledge and Universities of the Junta de Andalucía AND the European Regional Development Fund "A way to build Europe".

The studies, the results of which are included in this guide to best practices, have taken into account a wide variety of threats, materials and designs that we have found in movable cultural heritage. This guide does not aspire to be anything more than a management and communication model that has been validated and used in various safeguarding plans and forms and that is intended to be shared with the community in general so that it is useful for other cultural institutions, as an example of flows, roles, forms or recommendations.

For all these reasons, in this book by the Valencian Institute of Conservation, Restoration and Research (IVCR+i) and the Pablo de Olavide University, its authors reflect on the assessment of risk, threats and vulnerability based on materials, offering worksheets and models for management and response to emergencies.

This guide, within the philosophy of a science open to all, aims to transmit, disseminate and transfer the acquired knowledge to serve culture, quality of life, and economic and social development, since the management of cultural heritage requires models that are sustainable and integrate into the security and self-protection plans of institutions, the safeguarding plan being drafted from an economic, social and environmental perspective in order to be resilient and able to respond to emergencies.

From the FENIX project, we would like to thank the collaborators of the Valencian Institute of Conservation, Restoration and Research (IVCR+i) who have participated in the preparation of this book and its editing, as well as the firefighters, members of civil protection, national and local police, cultural managers, restorers and conservators and observers, whose comments and observations have been crucial to the debate, for their effort and dedication to disseminating knowledge regarding risk analysis and emergency response in cultural heritage.

Pilar Ortiz Calderón
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INTRODUCTION

When an emergency occurs, it can trigger complex degradation processes in collections due to prolonged changes in humidity levels, extreme temperatures or contaminating agents that act on heritage materials, altering their physical and / or chemical balance. The diversity of objects and the complexity existing within cultural heritage requires the planning of different strategic actions for the collections of a natural history museum, an art gallery, an archive, a library and an archaeological collection.

The safeguarding plan is the document that establishes the strategic actions for managing emergencies and risks to the cultural assets of an institution. This includes the analysis of the main risks, the organisational structure of the emergency response teams, the methodology, procedures and guidelines to be followed. Its purpose is to ensure the comprehensive protection of cultural heritage in museums, archives and libraries, identifying the main risks and establishing a clear strategy to prevent an emergency from becoming a disaster.

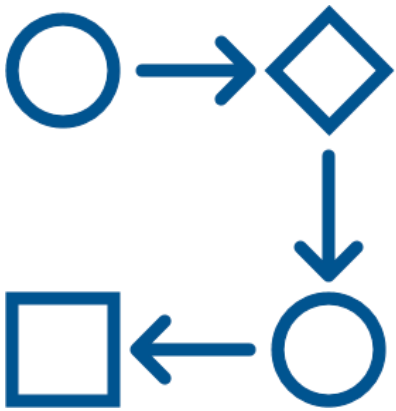
The safeguarding plan and the actions that are part of the emergency response must be able to adapt universal technical procedures to the characteristics and needs of a Cultural Institution, its collections, available resources and experts who work there, while also ensuring the safety of the people who frequent these spaces.

The safeguarding plan must be functional for both rescue and evacuation and for on-site protection tasks, activities that involve rapid decision-making under pressure. Having protocols and procedures for document registration provides a clear and organised structure for documenting the actions to be carried out, which facilitates coordination between the teams involved in emergency situations. This ensures that each team member knows what to do and when to do it, minimising confusion and chaos during the emergency.

Testing the operability of proposed procedures by conducting drills helps to identify weak points in the workflow and train rescue teams to avoid situations and decisions that increase the risk to people and collections.

Restructuring emergency response mechanisms based on failures detected during drills facilitates the implementation of continuous improvements in the appropriate assignment of tasks and responsibilities. It also enables the assessment of the overall effectiveness and performance of the rescue team.

In this way, standardised protocols and documentation models provide a clear structure for intervention and data recording, while drills validate and ensure effective coordination between the teams involved.



HOW TO USE THIS DOCUMENT

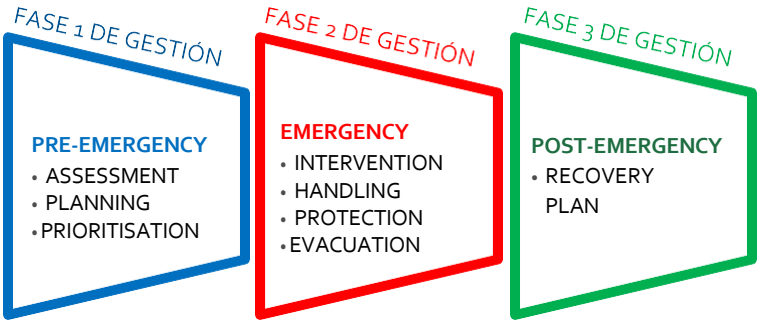
This guide to best practices has been developed by the Valencian Institute of Conservation, Restoration and Research (IVCR+i) with the aim of generating a comprehensive tool for document management in response to emergency situations. Its purpose is to provide technical support and specific documentation and action methodologies that promote the preservation of movable cultural assets during risk management.

It establishes protocols to prioritise strategies and improve preparation and coordination in the face of potential emergencies that may affect the resilience of museums, archives and libraries. These protocols can be consulted and incorporated in a practical way into safeguarding plans, complex and extensive files that standardise the emergency response of cultural organisations and institutions.

Consequently, this guide stands as a valuable resource in the training of professionals specialised in emergencies, thefts or events that may result in the destruction of cultural heritage. It is also expected to optimise prevention strategies with innovative and sustainable approaches and methodologies.

To facilitate understanding, this guide is structured into three large blocks that correspond to each of the phases involved in risk management in cultural institutions: pre-emergency, emergency and post-emergency.

Conceived as a technical reference, in each of these three sections the guide includes templates, examples and references, which will be of great help in developing and improving the documentation protocol for emergencies, making the training for emergency response included in the annual training plans more accessible, and making visible those figures that play key roles in emergency management, such as the emergency director or the coordinators of the different rescue operations (on-site protection, evacuation, triage, etc.).



It is recommended that this document be used as a practical guide and that the tools and protocols it offers be adapted to the specific facilities and needs of each institution. In turn, it is necessary to integrate the procedures included for the safeguarding of collections into the building's self-protection plans or other existing plans for emergency management at local and territorial levels.

The document registration model proposed in this guide has been validated within the context of the FENIX research project. In this project, the models and protocols included in this guide have been tested through their application during the different drills and exercises carried out. This guide thus brings together the know-how acquired during the multiple earthquake drill with fire and flood at the Antequera City Museum (MVCA) and the Municipal Historical Archive of this city; the earthquake drill at the Royal Monastery of San Zoilo in Antequera; the fire drill at the Museum of Fine Arts in Valencia and the Great Drill 2018 organised by the Generalitat Valenciana with the Valencian Agency for Security and Emergency Response in Torrevieja (Alicante).

These synergies have made it possible to identify the main difficulties faced by organisations and institutions that manage cultural heritage and to generate procedures to resolve them and minimise the risk associated with communication problems and protocol integration. In turn, the experience gained in these drills, rescue exercises and saving collections has allowed us to improve the registration and documentation models initially designed to obtain this guide of best practices, which among other improvements proposes the inclusion of form templates for the safeguarding and triage of heritage assets, with pictograms approved for colour-blind people.

The dissemination of this work has been possible thanks to the work of a great interdisciplinary team, the commitment of the Identification, Prevention and Action Group against Heritage Crimes and Emergencies (GIPADE) and the technicians of the Valencian Institute of Conservation, Restoration and Research.

If you would like guidance on using this guide, you can consult the website of the Valencian Institute of Conservation, Restoration and Research: www.icvri.es. For further information about the Fenix project, please visit the website www.upo.es/investiga/art-risk.

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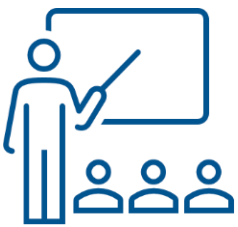
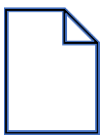
RESILIENT-TOURISM and Fenix 4.0





CHAPTER 1

Functional organic framework

Inmaculada Chuliá

Safeguarding plans and self-protection plans are essential tools for managing risk within an institution, as they enable emergency situations to be anticipated, promoting the safety and protection of occupants, and ensuring the preservation of physical and cultural heritage.

1.1. Concept of self-protection

Self-protection is the set of actions and measures established by an institution to prevent and control risks that may affect people and property. Self-protection plans serve to implement self-protection policies in coordination with Civil Protection Plans. Their objective is to provide an adequate response to potential emergency situations, guaranteeing the integration of these actions into the public Civil Protection system.

At the state level, the current regulations governing self-protection are found in Royal Decree 393/2007, dated 23 March. This decree approves the Basic Standard for Self-Protection of centres, establishments and facilities dedicated to activities that may experience emergency situations. Within this complex framework, drills are mechanisms designed to ensure compliance with the provisions of Article 20 of the emergency measures of Law 31/1995 on the prevention of occupational hazards and, depending on the activity, other specific sectoral regulations that must be complied with.

1.2. Emergency safeguarding plan: definition and scope

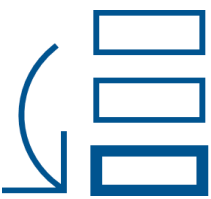
The safeguarding plan is the protection, rescue and emergency response plan, which defines the set of preventive measures and action models implemented to protect the cultural heritage assets that are safeguarded by an institution in high-risk situations.

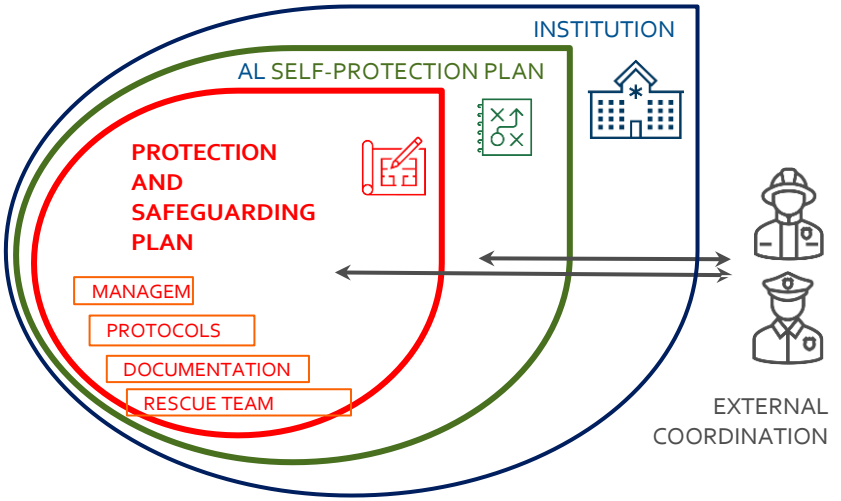
Since heritage buildings and their collections are susceptible to damage from threats such as fire, water infiltration, earthquakes, accidents or vandalism, among others, the safeguarding plan prepares the institutional response to protect heritage collections from the effects of minor and serious disasters. Despite the importance of having a safeguarding plan, currently only 20% of institutions have such plans.

Having a safeguarding plan in place and implementing it through the managers and administrators of an institution means starting to make decisions to understand the existing risks and improve the characteristics and protection systems of the building, exhibition rooms and storage facilities. This reduces the risk associated with earthquakes, floods and water leaks, poor climate control systems, pests, fires and theft. Furthermore, the measures proposed in the plan serve to prioritise the importance of the collections, design conservation proposals with quality criteria and, ultimately, develop strategies that make the collections less vulnerable and more resilient.

Although the safeguarding plan does not always prevent an emergency from occurring, it always minimises the likelihood of serious damage to cultural assets during the management of the emergency. In this way, it serves to prevent losses, which could be significant and irreplaceable.

While it is true that the safeguarding plan concerns the cultural sphere of an institution, integrating it into the legislative framework of the institution, the municipality and the country, it allows for the development and establishment of appropriate response models to deal with emergencies of varying severity. This is particularly important in serious emergencies, where the complexity of management they present requires the support of external services, such as civil protection, firefighters or police. For this reason, the safeguarding plan must be articulated in the configuration of other plans available to manage the risk, such as the self-protection plan. It must also be coordinated with the plans of the different local and territorial administrations, in order to facilitate coordination, the effective use of public civil protection policies and territorial and social cohesion.





This integrated management structure makes it possible to establish a contingency programme with clear response mechanisms that facilitate communication between the different social agents responsible for managing and dealing with emergencies.

It is important to note that a safeguarding plan must include prevention protocols, as well as action and recovery protocols. Some key components that should be worked into the plan are:

- Contact list of personnel responsible for safeguarding operations
- List of contacts for service providers and suppliers
- Building plans
- Rescue hierarchy and priorities
- Forms and files with procedures and documentary records for safeguarding collections in emergency situations
- Location of facilities for temporary storage and "first aid" treatment of recovered movable cultural assets
- Procedures for the long-term storage or treatment of damaged movable cultural assets

It is common for the procedures included in the plan to be structured in the order in which they are likely to be used, distinguishing three phases: preparation and prevention before the emergency; management during the emergency; and assessment and treatment in the post-emergency period.

All these protocols must be backed by an ethical code where human safety prevails in all rescue and recovery actions of movable cultural assets.

CHAPTER 2

Risk management and the importance of safeguarding heritage in emergency situations

Inmaculada Chuliá
Mónica Moreno

2.1. The relevance of risk assessment from the perspective of a safeguarding plan.

In the field of cultural heritage assets, risk management has become an essential aspect for their preservation. Currently, the acceptance and implementation of this line of research by the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) and the International Council on Monuments and Sites (ICOMOS) has led to the development of numerous general reference works regarding risk in heritage spaces.

Risk, understood as the probability of an adverse event occurring and the potential losses, is a term closely linked to dangers and vulnerability. Its application to the management of cultural heritage involves knowing the dangers existing within an institution and assessing the degree of vulnerability presented by the movable cultural assets under its custody.

A danger is defined as any adverse phenomenon, whether natural or man-made, that could affect the normal functioning of an environment. To understand the main dangers faced by a cultural institution, in addition to the intensity of the danger, it is also necessary to know its duration and its probability of occurrence.

Vulnerability, on the other hand, refers to the susceptibility of a heritage asset to being affected by a danger. Within the context of cultural heritage, vulnerability is closely related to the material nature of objects, their manufacturing techniques, their state of preservation and the display and storage measures.

For an emergency to occur, there must be a danger and vulnerable heritage assets. If an emergency is not properly controlled, it can lead to a disaster.

Today, preventive preservation approaches include assessing the risks present within cultural institutions and proposing measures to plan and implement improvements to rooms, furnishings and packaging in order to prevent or minimise damage to cultural heritage.

Thus, the preventive preservation plan of a cultural institution can share many sections in common with the safeguarding plan, especially in those points related to the initial risk assessment and pre-emergency management.

While it is important to have a preventive preservation plan that considers and minimises risk, this does not eliminate the need to also have a safeguarding plan. The latter provides a solid and consensual structure for effective management during the occurrence of emergencies, since it is a document specifically designed to operate in critical situations and under adverse conditions. In addition to identifying risks and proposing preventive measures to minimise them, the safeguarding plan defines the specific tools that will be used for communication during the emergency, as well as action protocols and efficient allocation of resources before, during and after an emergency. Its objective is not limited to risk prevention, but also seeks to ensure a quick and coordinated response in unusual situations, where routine protocols for preventive preservation and collection management are not sufficient.

Below is a list of the main risks present within a cultural institution and the damage they can cause to the most vulnerable collections and those most exposed to risk. In light of the risks involved, the safeguarding plan must be able to establish workflows and action protocols to mitigate damage during and after emergencies caused by high-risk situations.

TREMORS, COLLAPSES AND OTHER PHYSICAL FORCES: A CHALLENGE FOR THE INTEGRITY OF HERITAGE

The origin of these risks may come from earthquakes, armed conflicts, collisions, excavations, construction works, traffic, overloading and, of course, from the inappropriate display, handling and / or storage of heritage assets. The effects they produce on objects, known as impact, shock, vibration, pressure and / or abrasion, generate damage, like rotation, deformation, pressure or tension.

Sometimes the impact of these dangers goes unnoticed because they only cause small cracks and tiny losses, chips or scratches to the object, although it is also possible that they cause the material to be crushed, compressed, punctured or broken and, in the most extreme cases, completely destroyed.

FIRES

Although there have been notable advances in fire prevention, no institution can be considered immune to this risk. Fires are mainly caused by the presence of flammable materials and / or electrical systems that may cause short circuits.
Damage caused by fire includes complete combustion of the work, the appearance of blisters, fissures, cracks, chromatic changes and peeling caused by the action of heat.

Furthermore, the presence of smoke can cause stains and deposits that act chemically on the surface, compromising the integrity and aesthetics of the artworks displayed in the museum.
In this sense, it is essential that institutions responsible for preserving cultural heritage recognise the need to adopt preventive measures and make a commitment to allocate resources for fire protection.

FLOODS AND WATER LEAKS

Water hazards in heritage collections can be caused by external flooding affecting the building or by a leak or burst pipe. In the presence of water hazards, rapid intervention is essential to prevent biological contamination within the collection.

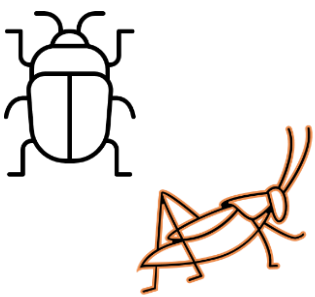
Since most components of heritage assets are highly vulnerable to the effects of water, simple contact can significantly accelerate their degradation. The damage caused varies greatly depending on the support or composition materials and typology of the works.

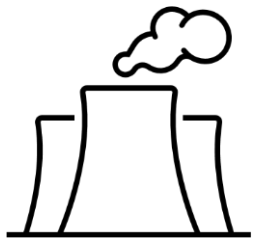
The consequences include a broad spectrum of conditions such as: smudging of documents, stains, runoff, weakening of structures, deformations, corrosion, efflorescence, biological growth, dissolution, swelling and increased loading, collapses and other possible damages.

PESTS

Pests, which originate from local fauna, constitute a danger that often goes unnoticed. Active organisms, such as insects, birds, rodents, bats, spiders, centipedes, wasps, as well as airborne fungi and bacteria, have the potential to cause damage ranging from deformation and staining to loss or perforation of materials, and even the complete destruction of an artwork.

To eradicate their activity, it is essential that they are correctly identified. This involves carrying out regular and detailed operations, as well as having experts in this field capable of accurately identifying invading organisms. Once pests have been identified, appropriate strategies must be applied to eradicate them, using methods that minimise the impact on cultural heritage and preserve the integrity of the works.





CONTAMINATION: AN INVISIBLE THREAT

Contamination has various origins: dust, particle leaks from machines or facilities, outside gases, malfunctioning extraction systems, among other factors. Particles are particularly hazardous due to their penetrating and corrosive capacity, and can even encourage fungal and / or bacterial development.

Contaminants, whether gases, aerosols, liquids or solids, degrade objects, even in low proportions, and can even trigger chemical reactions with the material components, forming acids. One example is found after a fire, where the emissions of smoke, gases and solid particles, when associated with water and fine dust, form aerosols of SO_3 (sulphuric acid) at room temperature.

VISIBLE LIGHT, ULTRAVIOLET RADIATION AND INFRARED RADIATION

The presence of light is essential for the display of collections. For this reason, to ensure proper preservation, it is crucial to consider light sensitivity.

Furthermore, ultraviolet and infrared radiation pose a significant hazard to most organic and some inorganic materials as it can cause cumulative and irreversible damage to objects.

Irreversible damage caused by light can range from the alteration of certain pigments, binding agents or varnishes, to the weakening of the support in the case of documents, discolouration in textiles and photographs, as well as affecting other materials used in the mounting as supports. Among the most light-sensitive materials, which require priority attention in classification and treatment, are paper, photographs, textiles and printing inks.

It is important to note that there is no restoration treatment that can return objects to their original condition.

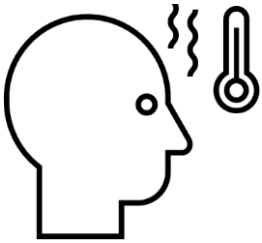
THEFT AND VANDALISM: AN UNESCAPABLE PRIORITY

Collection security is essential for any institution, as it constitutes a fundamental part of its risk management programme.

Taking security into account is essential both in emergency situations and in crisis control.

Theft and vandalism represent a constant threat to cultural heritage. The loss or damage of valuable works of art can have a devastating impact on the cultural identity and history of a society. Therefore, it is necessary to implement effective security measures to prevent and minimise these risks.

This involves installing physical security systems, such as surveillance cameras, alarm systems and access controls, as well as hiring and training qualified security personnel. In addition, appropriate security procedures must be put in place, such as the creation of up-to-date inventories, the implementation of physical protection measures for artworks and collaboration with local law enforcement authorities.



INCORRECT HUMIDITY AND TEMPERATURE

The preservation of cultural heritage depends largely on precise and constant control of humidity and temperature. Only through careful and responsible management of these environmental factors can we ensure the long-term preservation of collections.

Adequate control of these factors plays a decisive role. Extremely low or high temperatures can affect the structural behaviour of the building material, accelerating intrinsic deterioration processes.

When relative humidity and the presence of water vapour in the environment is high, chemical reactions and decomposition processes can be activated. On the other hand, dehydration is promoted under low RH conditions. RH levels have varying effects on the physical and chemical characteristics of materials.

Sudden fluctuations and large deviations in temperature and RH are what cause the most damage and promote the development of microorganisms such as bacteria and fungi.

Following the occurrence of a flood or fire emergency, temperature and relative humidity parameters will be abruptly altered, so it is essential to have a rapid stabilisation protocol.

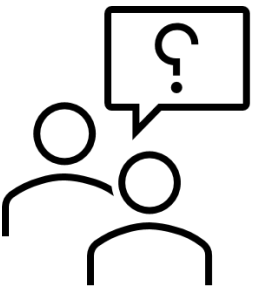
DISSOCIATION: THE THREAT TO THE DOCUMENTARY, LEGAL AND INTELLECTUAL ASPECTS OF HERITAGE.

The dissociation or loss of information records associated with a heritage object is a very particular danger. It differs from the previous agents in that it affects both the legal and the intellectual and cultural aspects of an object.

Lack of a complete inventory, as well as incorrect or inadequate identification, can lead to serious losses after an emergency. Lack of traceability makes it difficult to properly manage heritage assets and their documentation, causes the loss of information, deprives the public of access to valuable information about a particular asset, and can even lead to the loss of a work or an entire collection.

Lack of a complete and accurate inventory can lead to disorganisation and loss of important records. In addition, incorrect or inadequate identification of objects can negatively affect the research, cataloguing and interpretation of the objects.

To avoid dissociation and its harmful consequences, it is essential to have an appropriate management and documentation system.



This involves creating and maintaining a complete and up-to-date inventory, as well as implementing accurate identification and cataloguing standards. In addition, clear cultural heritage management policies must be established and public access to relevant information about objects must be guaranteed.

During an emergency, the protection of cultural heritage depends not only on the physical preservation of objects, but also on the proper management of their information and their intellectual and cultural context.

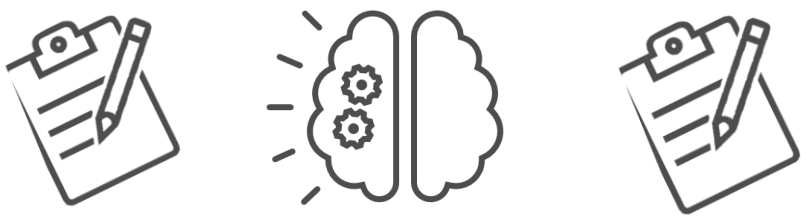
2.2. How to organise existing risk information to better manage emergencies

Gathering available information about the risks that a cultural institution has historically faced is an extremely useful activity to minimise damage caused by emergencies. Knowledge of the most serious and most common risks allows for the establishment of a solid basis for analysis and the improvement of preventive preservation and response mechanisms for collections that are regularly exposed to risk.

In practice, having a structured and complete record of the potential dangers and main vulnerabilities of the heritage assets under protection facilitates informed decision-making and promotes the planning of effective preventive measures and emergency responses.

Thus, having a documentary risk recording system not only allows for a better understanding of potential emergencies that could affect cultural heritage, but also helps to prioritise the most urgent actions and allocate resources efficiently to protect and preserve heritage collections for future generations. In addition, a well-organised document record can serve as a reference and a continuous learning tool, allowing the institution to adapt and improve its risk management approach over time.

Below is a series of effective strategies to identify, document and analyse the main hazards, vulnerabilities and risks of a cultural institution.



HAZARD REGISTER

This includes the study of potential natural and man-made hazards that can cause damage to heritage collections.

Strategies for hazard recording:

✓Classifying the identified hazards into specific categories, such as natural disasters (e.g., earthquakes, floods, etc.), environmental risks (climate change, humidity conditions, etc.), human threats (theft, vandalism, etc.) and internal hazards (equipment failures, human errors, etc.). Then identifying the probability of occurrence and the magnitude or capacity to cause damage of each of these hazards. Relating probability and magnitude to assess hazard intensity.

✓Establishing standardised forms or templates to record and monitor changes in the main hazards identified.

✓Using Geographic Information Systems (GIS) and maps to visualise which areas are most at risk.

✓Maintaining a historical record of past incidents. This record can provide valuable information about the most common types of hazards within the institution.

VULNERABILITY REGISTER

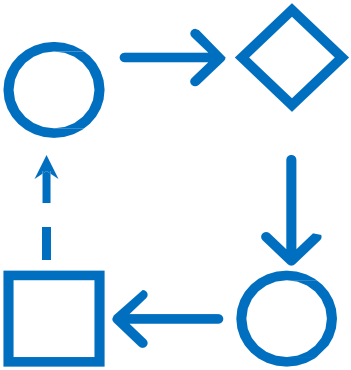
This part of the register analyses the susceptibility of cultural heritage to the hazards identified. It considers characteristics such as location, conditions of use, storage or display, material nature and state of preservation.

Strategies for vulnerability recording:

✓Conducting detailed physical inspections of the facilities where the heritage collections are located to identify the most vulnerable points (organic materials, large-scale works, etc.).

✓Defining what factors make a collection more vulnerable. Classifying and prioritising the vulnerability of collections by using standardised data collection matrices and vulnerability indices.

✓Maintaining detailed records of observations and assessments made during the vulnerability study, including photographs, reports and other relevant documents. This provides a database for ongoing analysis and planning of mitigation measures.



RISK ANALYSIS and MANAGEMENT

This part of the register examines the interactions between potential hazards and the vulnerabilities of heritage assets. Risk analysis serves to identify the institution's current challenges and to propose informed and proactive risk management policies.

Strategies for risk recording:

✓Developing a matrix that prioritises the most critical risks and highlights the resources needed for their management and mitigation.

✓Discussing hypothetical risk scenarios caused by potential emergencies, such as a fire, flood or theft, with staff. Thinking through these scenarios helps to visualise and understand the potential impacts of hazards to collections and to jointly plan effective responses.

✓Providing regular training to staff on how to respond to an emergency.

✓Conducting regular drills and analysing the problems that arise during them.

✓Fostering collaboration between different departments within a cultural institution (preservation, security, collections management and facilities management, etc.) to ensure comprehensive information gathering and a shared understanding of risks.

✓Promoting collaboration and regular visits by firefighters, police and civil protection to the institution's storage facilities and exhibition rooms.

Online tools to monitor hazards, vulnerability and risk:

- Atlas: Art Risk 5.0. Climate hazard mapping https://artrisk50.users.earthengine.app/view/art-risk5
- Art-Risk 3.0: Evaluates the vulnerability and risk in churches https://www.upo.es/investiga/art-risk-service/art-risk3/
- Terra Inspector: Art-Risk 1.0: Evaluates the vulnerability of earthen wall fortifications. https://www.upo.es/investiga/art-risk-service/art-risk1/artrisk1

VULNERABILITY OF THE MAIN CONSTITUENT MATERIALS OF MOVABLE CULTURAL ASSETS

MOST VULNERABLE MATERIALS

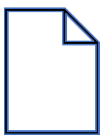
- ✓Paper, books,
- ✓Parchment, vellum, semi-tanned or untanned leather
- ✓Wooden materials and plant products
- ✓Ivory
- ✓Textiles with soluble dyes
- ✓Objects with water-soluble colours.
- ✓Furniture with veneers and decorative inlays.
- ✓Objects decorated with gold leaf.
- ✓Ceramics fired at low temperatures.
- ✓Iron or unstable archaeological metals.
- ✓Objects prone to mould growth or with active mould present

LESS VULNERABLE MATERIALS

- ✓Metals other than iron or stable archaeological metals
- ✓Most glass objects
- ✓Most ceramics
- ✓Most stone objects

MATERIALS WITH HIGHER AND LOWER PROBABILITY OF BEING RECOVERED

- ✓Portable and easily accessible materials have a greater chance of being recovered.
- ✓Collections that are difficult to access and objects that are excessively heavy must be protected and assessed at their site of origin.



CHAPTER 3

Why include a documentation system in the emergency safeguarding plan?

Inmaculada Chuliá

WHY INCLUDE A DOCUMENTATION SYSTEM IN THE EMERGENCY SAFEGUARDING PLAN?

During emergency management, a large amount of data is collected and accumulated, which requires proper management through standardised models and documents. Therefore, it is crucial that every institution establishes a document management plan that facilitates the efficient handling of data related to the operations of emergency teams.

Having a document management system not only facilitates data collection, it also plays a fundamental role in understanding the procedures followed and reinforces their operability. This is because it describes the workflows and functions of each member of the emergency team and also includes specific documentary models, which standardise data collection in difficult situations, such as the immediate surroundings of an area that has experienced a disaster.

A document management system must be able to efficiently collect the information necessary for risk management from the perspective of the safeguarding plan, and handle rescue operations during the first 72 hours of an emergency. It must take into account all relevant variables to resolve situations involving the mobilisation of multiple damaged works, and develop a general triage model to assess the damage.

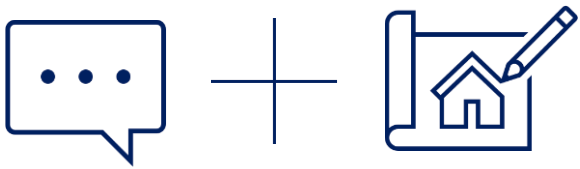
A documentary model can be implemented by recording on sheets of paper, in computer databases or through the development of applications (APPs), which, through their graphic interfaces, allow the consultation of forms and protocols on computers and mobile devices, facilitating contact between members of the rescue teams.

In addition, it must describe and record all response protocols adapted to different types of incidents and operational situations necessary for recovery.

The use of a document management system before, during and after the management of an emergency guarantees the subsequent integration of the information collected. To do this, it is necessary to have at least three forms (pre-emergency, emergency and post-emergency), which must be completed by the members of the safeguarding team.

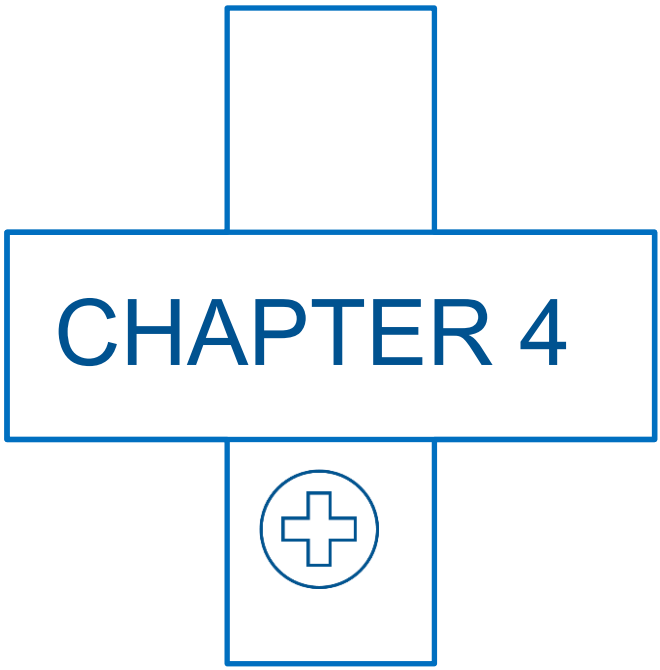
Throughout chapters 4, 5 and 6 of this guide, a template with these 3 forms will be presented, as well as different protocols and procedures, which can help cultural institutions to implement them.

The pre-emergency form contains all necessary information about the collections to provide support in critical evacuation and emergency intervention cases. The emergency form standardises decision-making during the emergency for the classification and triage of affected cultural assets. The post-emergency form collects information regarding temporary storage, stabilisation and recovery of materials.



Each of these three forms contains sections and fields that adapt to most types of movable cultural assets. Furthermore, they strive to present the content in a clear and understandable manner, using standards and pictograms wherever possible.

It is highly recommended that institutions using the three proposed forms be able to establish a clear and direct connection between the information contained in these forms and the general catalogue of the institution. Any modification, new storage facility or loan of the artworks must be registered in both places to be useful in emergency situations. It is also recommended that these forms be printed so that they are available and accessible for use by safeguarding teams during emergency management. This guarantees a rapid and effective response to any eventuality.



Assessment, planning and documentation in the pre-emergency stage

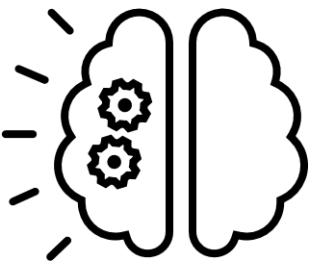
Inmaculada Chuliá

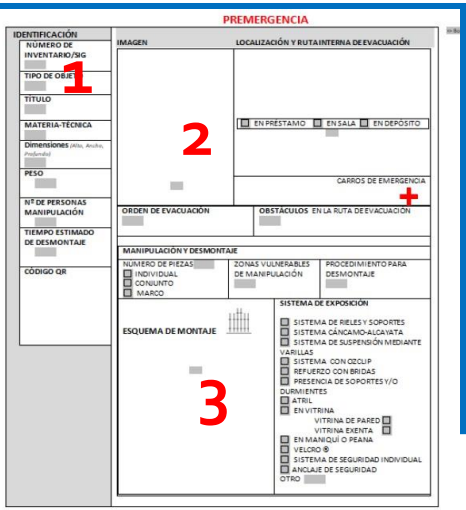
4.1. Content and use of pre-emergency forms

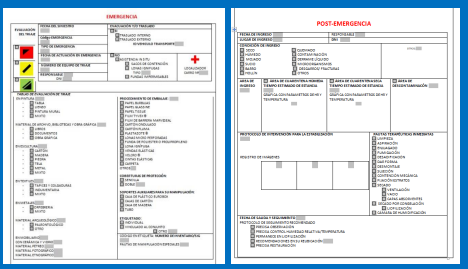
Documentation during the pre-emergency stage is essential to carry out an adequate assessment and planning of rescue operations before the actual emergency occurs. This phase includes the identification of hazard factors, the assessment of the vulnerability of heritage works and the prioritisation of the most important collections, which favours an adequate and efficient response and evacuation in the event of any eventuality.

In order to facilitate the collection of data regarding the characteristics that determine the preservation and mobilisation of movable cultural assets, the pre-emergency form is presented. This form collects information about the location of the work, the existing infrastructure for its exhibition and other factors that are decisive for examining, protecting or moving the work in future and possible emergency scenarios. Its use allows for an initial assessment of the main vulnerability factors of a work and the identification of the problems that could arise during its on-site protection, handling or evacuation during an emergency.

Throughout this chapter, the sections and fields that make up this form will be described in detail and the tasks of prioritising collections by importance will be briefly explained. The prioritisation of collections is an essential activity to structure the order in which the affected collections will be assessed and rescued, so it is an essential aspect that must be agreed upon prior to the emergency and included in this form.







The pre-emergency form consists of three sections intended for collecting data regarding a movable cultural asset. The fields included in each of these sections must be completed by the emergency team of each institution before an emergency occurs, thus constituting a preventive action that must form an integral part of the development of the safeguarding plan. It is recommended that all information collected through this form be stored in a database for later use with digital technology, which will facilitate access and use at critical times.

In this form, section 1. IDENTIFICATION includes the inventory number of the movable cultural asset to ensure traceability and minimise the risk of dissociation during an incident. This section also includes its dimensions, weight and the technique used to create the work. Based on these aspects, the institution's specialists must calculate the number of people needed and the estimated time to disassemble the work and include this data in the form.

FORM CODES
(Field to fill with text = [ ]) (Field to mark = (X))

SECTION 1:
IDENTIFICATION

- Inventory number / ACRONYM
- [ ]
- Object type [ ] Title [ ]
- Material and technique [ ]
- Dimensions [ ]

1

- Weight or load in kg. [ ]
- Number of people required for loading and handling the work [ ]
- Estimated disassembly time [ ]
- QR code (field to insert)

1

Section 2 DESCRIPTION OF THE WORK facilitates the recognition and location of the heritage work. This section includes a photographic record, as well as a diagram or plan indicating its precise location within the building. This will facilitate the identification of the characteristics of the room in order to install an on-site protection system and the safest evacuation routes in the event that it is required. The plan can indicate both the internal route established for evacuation and an alternative route that allows the work to be removed from the building. However, it is important to be aware that routes may change depending on damage to infrastructure caused by an emergency. Whenever possible, it is important to also indicate in these plans the location of supply stations or emergency carts containing the supplies necessary for initial contact with the work and disassembly in the event of an emergency.

SECTION 2: DESCRIPTION OF

- Photo of the work (field to insert an image)
- Location of the work on the building plan and evacuation route (field to insert plan, image or diagram)
- Location or geolocation On
- loan (X)
- On display (X)
- In storage (X)
- Floor plan, room number and location within the room [ ]
- (Depending on the system: markers or GPS) [ ]
- Location of emergency carts and supplies [ ] (Markers or GPS)

2

Section 3 HANDLING AND DISASSEMBLY helps rescue teams to tackle disassembly whether in the display room or in a storage facility. Includes the numbering assigned in the rescue hierarchy to indicate the order of evacuation of the object with respect to the rest of the evacuated collections. In addition, a diagram describes the main characteristics of the installation of the work, indicating the attachment points, the display system and the presence of individualised security systems. In the case of complex installations, specific instructions may be given regarding the dismantling procedure and the most vulnerable areas of the movable cultural asset. It also includes mentions of any potential obstacles along the evacuation route in order to prevent accidents during the rescue process.

SECTION 3: HANDLING AND DISASSEMBLY

- **Evacuation order**: number reached in the collection hierarchy [ ]
- **Obstacles** along the evacuation route [ ]
- Number of pieces comprising the work (field to enter the number) [ ])
  - Individual (X)
  - Set (X)
  - Frame (X)
- Vulnerable areas when handling [ ]
- Instructions for the disassembly procedure [ ]
- **Diagram of the installation** of the work in the display room

([ ] field to include text, images and / or diagrams)

3

To facilitate and standardise the collection of data regarding the mounting systems used in the exhibition of heritage works, this section of the form includes fifteen options of available mounting systems.

SECTION 4: DISPLAY / MOUNTING SYSTEM

- Rail and bracket system (X)
- Eyebolt-hook system (X)
- Suspension system using rods (X)
- Oz clip system (X)
- Reinforcement with clamps (X)
- Presence of sleeping supports (X)
- With lectern (X)
- On a mannequin or pedestal (X)
- In a display case (X)
  - Wall-mounted display case (X)
  - Central display case (X)
- Velcro ®(X)
- Individual security system (X)
- Safety anchor (X)
- Other [ ]

- **Storage facility** / location / storehouse [ ]

3

Together, the data collected in the three sections of the pre-emergency form provide the basic information necessary to address preliminary assistance needs in the event of an emergency.

Although it is possible to adapt this form and add more fields, it is recommended to keep the information collection as simple as possible to facilitate quick understanding.

While it is true that the works of greatest importance and value within an institution should be prioritised when starting to fill out this form, in the long term it will be necessary to generate as many forms as there are movable cultural assets within the institution. Consequently, each institution will have to create its own database using the information collected from the pre-emergency forms. This database will help identify the most vulnerable or difficult-to-move works during an emergency and allocate resources appropriately based on this information.

ORDEN DE EVACUACIÓN
2

OBSTÁCULOS EN LA RUTA DE EVACUACIÓN

MANIPULACIÓN Y DESMONTAJE

NÚMERO DE PIEZAS
☐ INDIVIDUAL
☐ CONJUNTO
☒ MARCO

ZONAS VULNERABLES DE MANIPULACIÓN

TODAS LAS ESQUINAS DEL MARCO

PROCEDIMIENTO PARA DESMONTAJE

PARA SU TRASLADO ES NECESARIO DESMONTAR MARCO.
PROTECCIÓN IN SITU

ESQUEMA DE MONTAJE

SISTEMA DE EXPOSICIÓN

☐ SISTEMA DE RIELES Y SOPORTES
☒ SISTEMA CÁNCAMO-ALCAYATA
☐ SISTEMA DE SUSPENSIÓN MEDIANTE VARILLAS
☐ SISTEMA CON OZCLIP
☐ REFUERZO CON BRIDAS
☐ PRESENCIA DE SOPORTES Y/O DURMIENTES
☐ ATRIL
☐ EN VITRINA
VITRINA DE PARED ☐
VITRINA EXENTA ☐
☐ EN MANIQUÍ O PEANA
☐ VELCRO®
☐ SISTEMA DE SEGURIDAD INDIVIDUAL
☐ ANCLAJE DE SEGURIDAD
OTRO

PRE-EMERGENCY FORM TEMPLATE

IDENTIFICACIÓN

NÚMERO DE INVENTARIO/SIG
TIPO DE OBJETO
TÍTULO
MATERIA-TÉCNICA
Dimensiones *(Alto, Ancho, Profundo)*
PESO
Nº DE PERSONAS MANIPULACIÓN
TIEMPO ESTIMADO DE DESMONTAJE
CÓDIGO QR

IMAGEN

LOCALIZACIÓN Y RUTA INTERNA DE EVACUACIÓN

☐ EN PRÉSTAMO ☐ EN SALA ☐ EN DEPÓSITO

CARROS DE EMERGENCIA

ORDEN DE EVACUACIÓN

OBSTÁCULOS EN LA RUTA DE EVACUACIÓN

MANIPULACIÓN Y DESMONTAJE

NÚMERO DE PIEZAS
☐ INDIVIDUAL
☐ CONJUNTO
☐ MARCO

ZONAS VULNERABLES DE MANIPULACIÓN

PROCEDIMIENTO PARA DESMONTAJE

ESQUEMA DE MONTAJE

SISTEMA DE EXPOSICIÓN

☐ SISTEMA DE RIELES Y SOPORTES
☐ SISTEMA CÁNCAMO-ALCAYATA
☐ SISTEMA DE SUSPENSIÓN MEDIANTE VARILLAS
☐ SISTEMA CON OZCLIP
☐ REFUERZO CON BRIDAS
☐ PRESENCIA DE SOPORTES Y/O DURMIENTES
☐ ATRIL
☐ EN VITRINA
VITRINA DE PARED ☐
VITRINA EXENTA ☐
☐ EN MANIQUÍ O PEANA
☐ VELCRO ®
☐ SISTEMA DE SEGURIDAD INDIVIDUAL
☐ ANCLAJE DE SEGURIDAD
OTRO

4.2. Hierarchy of collections to facilitate the order of rescue

In emergency situations, chaos and confusion can make decision-making difficult. Establishing an order to manage the rescue of heritage collections during an emergency provides a clear workflow, which helps to avoid improvisation, minimises the risk of causing additional damage to the works and ensures the safety of the rescue teams. It also ensures that resources and efforts are devoted first to the most important works.

This order, generally represented by a numerical value, corresponds to the importance that the work has within the collection. Importance is determined by aspects such as original integrity, state of preservation, economic and symbolic value, rarity or uniqueness of the work, its status as one of the world's finest masterpieces, whether it is part of a set, its importance for the collection, its originality, or its documentary or historical value, among other significant criteria. In this way, a classified list of the most significant objects for an institution is created.

Regarding the number of works that should be included on this hierarchical list that structures the order to follow for the rescue of collections, it is suggested that the starting point be the initial identification of approximately 10% of the most important works of an institution. For works considered more important, a pre-emergency form must be kept. This list may contain works or sets that cannot be evacuated after an emergency occurs and that require an on-site protection system. This topic will be addressed in the next point of this guide.

It is important to remember that, during the rescue of movable cultural assets affected by an emergency, despite their vulnerability and importance, those belonging to other institutions and on loan or in temporary storage will be the first to be attended to. The works will then be rescued according to the collection hierarchy designation. Finally, the rest of the works will be attended to, in accordance with the technical prioritisation criteria established by the coordinator of the rescue team, taking into account the possible harm caused to the materials by the development of the incident.

4.3. Fundamentals of on site *protection*

Following an emergency, heritage assets should not be moved unless strictly necessary. This situation makes it essential to have an on site protection protocol. This protection protocol is essential for responding to minor emergencies or for those movable cultural assets that cannot be relocated or evacuated due to the complexity of their handling or their location within the institution.

For these reasons, one step to include in the strategy for action in a disaster-stricken area is to seek isolation solutions that protect the works from the complications arising from the emergency. To achieve this, resources must be available to enable the on-site protection of vulnerable works, avoiding contact with harmful agents.

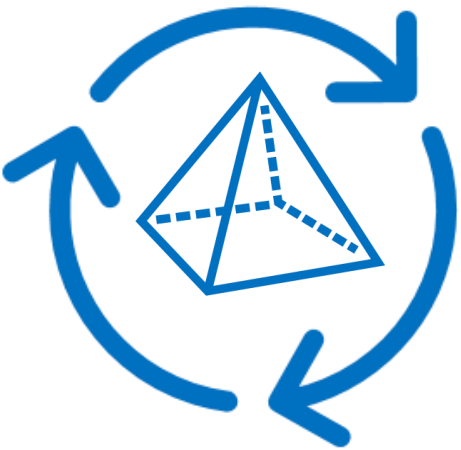
In the event of flooding, sandbags can be used to create barriers and redirect water. To mitigate the impact of high temperatures caused by fires, fireproof tarps or blankets can be used that are resistant to high temperatures and harmful agents. In spaces exposed to the presence of contaminants, it is important to have dissemination and neutralisation mechanisms, or in the event that contamination appears combined with high levels of humidity, it may be necessary to decontaminate the water and / or absorb it and dehumidify the spaces where movable cultural assets are located.

✓After a fire, manual gas measurements have been found to be useful in assessing the situation. Mechanical ventilation combined with the use of portable air cleaners equipped with filters and activated carbon has been shown to be effective in dispersing and capturing airborne particles.

✓ This system allows for the decontamination and absorption of airborne particles of harmful agents, such as mineral dust, acid mists, soot and fumes, as well as the absorption of gaseous contaminants that could generate secondary contaminants through thermal, chemical or photochemical reactions. These airborne particles, in addition to having irritating and carcinogenic respiratory effects, can cause damage to heritage materials and act as catalytic surfaces to accelerate degradation processes. For example, sulphur dioxide can be oxidised to sulphur trioxide, which when dissolved in water forms a sulphuric acid mist.

It is therefore necessary to have a list of the movable cultural assets in a collection that, due to their formal characteristics, state of preservation or location, do not enable their movement and make it a priority to have an on-site protection plan that is capable of dealing with recovery after an emergency without moving the works.

The safeguarding plan must indicate the procedures and materials necessary to protect the works on site from the impact of new risks triggered by an emergency. Whenever possible, protective materials used should be fireproof, hydrophilic and shock-absorbing for light impacts.



CHAPTER 5

Organisation of the crisis zone and record of activities during the emergency

Inmaculada Chuliá
Mónica Moreno

5.1. Principles for the organisation of the crisis area

When an emergency occurs, one of the immediate actions that must be carried out is the implementation of an initial assessment of the impact caused and the organisation of the affected areas. During this first phase of damage assessment, it is crucial to establish the document registration system that will be used during the assessment, rescue and recovery activities. This means that all participants in the rescue process are familiar with the forms that will be used to document the diagnosis of damage and the triage of movable heritage assets, as well as the protocols for recording the handling of collections and the priorities established for the long-term recovery of the affected works.

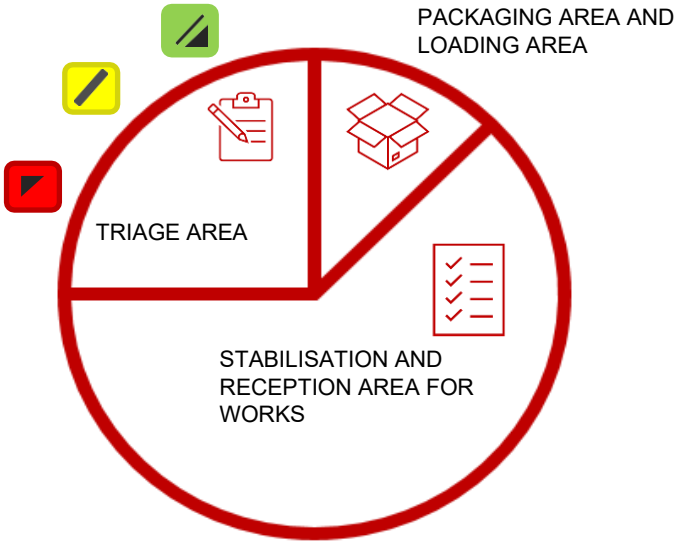
In order to convert a crisis area into a functional work space, it is necessary to set up four action areas within the vicinity of the disaster area. This will allow the works to be moved, assessed and protected in safe, spacious spaces with good access from the affected area. These four areas of action are:

1. Assessment and triage area: this area is used for the initial assessment of damage to the works, their initial diagnosis and to determine the necessary quarantine and recovery procedures.
2. Packaging area: used to adequately protect works that require temporary transport or storage.
3. Loading and transport area: this is designed to facilitate the safe loading of packaged works and their transport to a safe place.
4. Stabilisation area and transit storehouse: established to provide a safe quarantine space.

To keep a practical record of the activities carried out within these four work areas, this guide proposes the use of emergency forms.

In situations where the number of damaged collections is very high, a more extensive institutional response may be required and other rescue teams may be mobilised after the incident has been reported. In these cases, it is advisable to complete the use of the emergency form with the rest of the protocols and records that ensure correct communication between all members of the rescue teams.

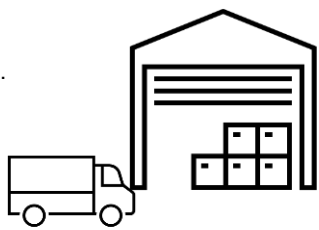
In addition, if the severity of the damage so requires, a security perimeter must be delimited to ensure the protection of personnel and the isolation of spaces with affected collections.



The perimeter of the crisis area should not be limited solely to the epicentre of the incident, but should include the entire restricted area where rescue teams will organise reception, triage, packaging, loading and transport, as well as temporary stabilisation or quarantine areas. During emergency management, access to this area must be restricted exclusively to accredited rescue team members.

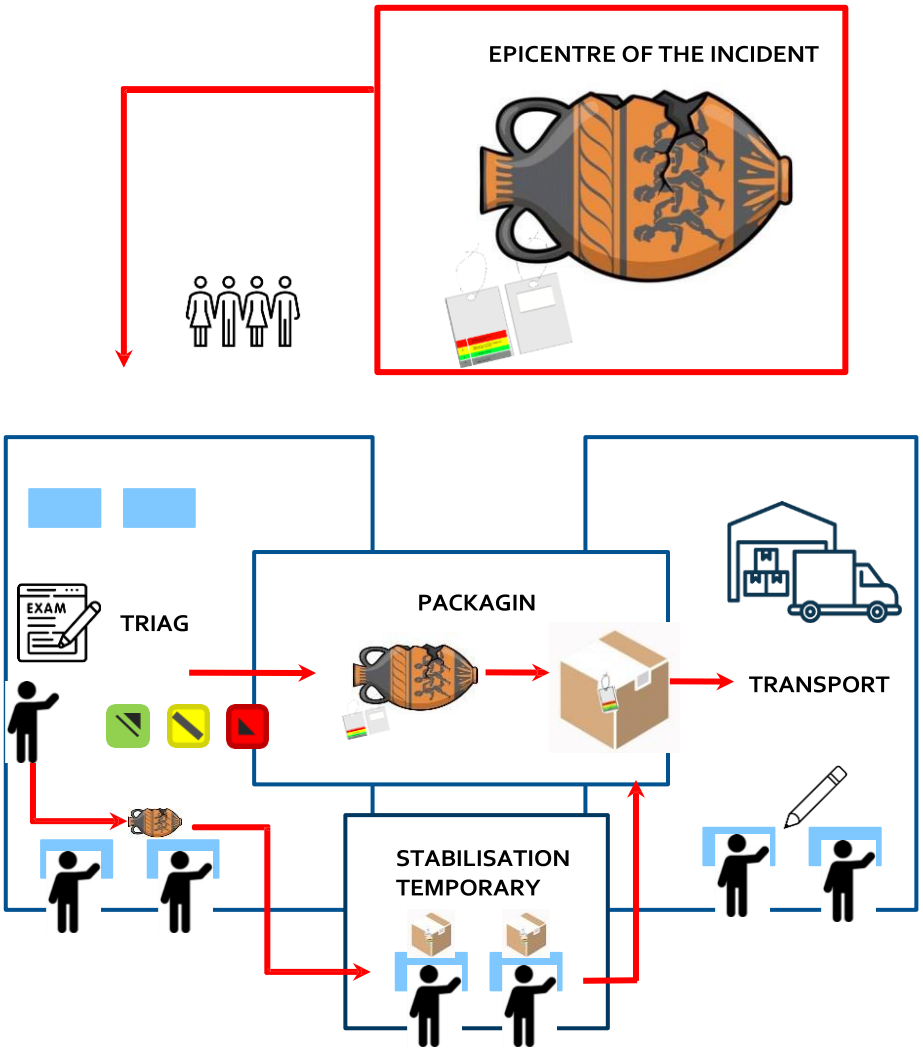
Outside the security perimeter of the crisis area, the location of a temporary storage facility or transit storehouse will be determined. This storage facility may be located at another nearby institution that meets the quality standards necessary to ensure the safe preservation of the evacuated movable cultural assets. If necessary, quarantine spaces will be set up within this storage facility. These spaces will be organised by category, based on the damage suffered:

1. Wet quarantine with freezing capability: for material that is wet or saturated and which must be frozen to prevent further damage.
2. Wet quarantine without freezing capability: for material that is damaged by water, but not saturated, and material that cannot be frozen.
3. Dry quarantine for materials with mould spores.
4. Dry quarantine for materials without mould spores.
5. Quarantine for materials affected by fire (not wet).



TYPES OF CRISIS

WORK FLOW AND DISTRIBUTION OF THE FOUR FUNCTIONAL WORK AREAS



KEY ASPECTS FOR BEGINNING THE RESCUE OF COLLECTIONS

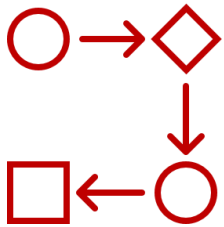
✓Procedures for the rescue of movable cultural assets will not begin until all staff and visitors are safe and appropriate authorisation is available.

✓It will be vitally important that the rescue of the works does not interfere with the oversight of the emergency situation.

✓The rescue of collections faces two possible scenarios: the search for a safe space within the damaged building itself or the transfer of affected works to an external storehouse due to the serious damage suffered by the building. Before commencing the rescue, it must be decided which of these scenarios the team is facing.

✓Before starting the rescue, the necessary resources will be determined and the route to the triage area and temporary storage facilities will be planned. To avoid congestion during the transfer, a route will be designed with separate entrances and exits.

✓For movable cultural assets that, due to their physical characteristics, cannot be evacuated or moved to the triage area, a procedure for on-site diagnosis and protection will be ensured. This type of movable asset includes bells, altarpieces in museums or churches, choir stalls, heavy sculptures, bulky furniture and works located in areas that are difficult to evacuate, among others.

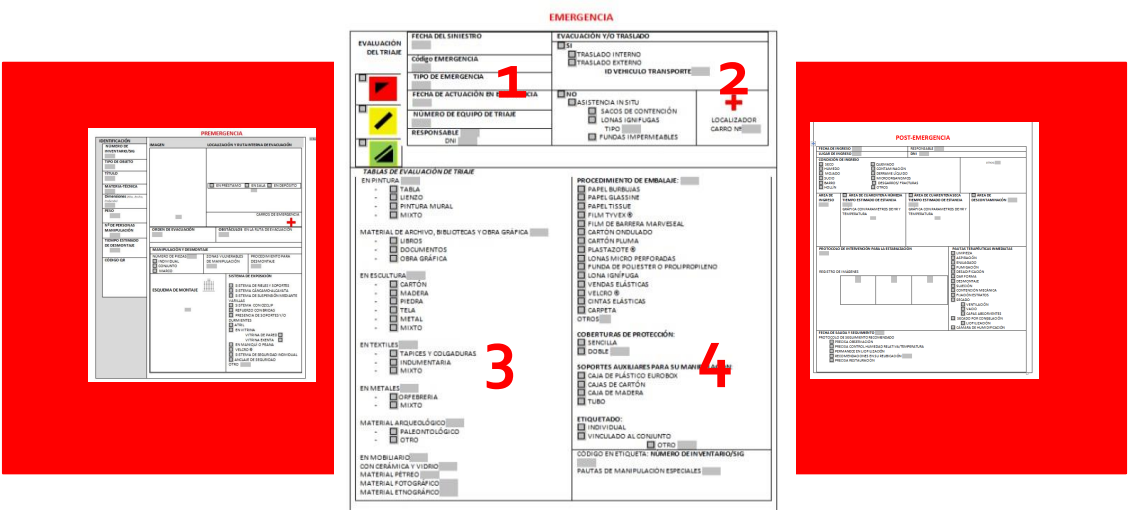


✓It is imperative for rescue teams to use personal protective equipment (PPE) before undertaking any action.

✓The rescue team coordinator is responsible for defining the location of work areas and informing all rescue team members of their duties.

✓When the number of people allows, rotating shifts will be established among rescue teams to avoid fatigue and prevent accidents. This measure will ensure a more effective and safer intervention.

movable



5.2. Content and uses of the emergency form

The emergency form is made up of 4 sections that are filled out in the 4 functional work areas as the procedure for rescuing a movable cultural asset progresses. This form must be completed for each of the works affected by the emergency, which allows traceability to be maintained between the work file and the damage recorded in the form.

Section 1 records basic details about the type of emergency that has occurred and data relating to evacuation equipment, on-site protection and triage.

FORM CODES
(Field to fill with text = [ ]) (Field to mark = (X))

SECTION 1:
DATE OF THE INCIDENT [ ]
EMERGENCY CODE [ ]
TYPE OF EMERGENCY [ ] (drop-down field to select the option)

- Water alert
- Alert for incorrect temperature / humidity
- Alert for collapse of structures
- Biological / pest alert
- Seismic alert
- Flooding
- Fire / contamination / smoke

DATE OF EMERGENCY ACTION [ ] **TRIAGE TEAM NUMBER** [ ]
Team Leader's DNI ID / PASSPORT [ ]
EVACUATION / ON SITE PROTECTION TEAM NUMBER [ ]
Team Leader's DNI ID / PASSPORT [ ]

1

To maintain traceability of information, it is recommended to include a field called emergency code, which includes a code composed of the inventory number of the object plus the result of its evaluation code in the triage area. For example, 939-1 (inventory no. -1 corresponding to the red emergency threshold). Section 5.3 of this guide indicates how to obtain the triage evaluation code.

When circumstances require establishing several triage teams and several handling teams, they will be assigned a numerical code that allows each team to be recognised. In these cases, it is advisable to include a field called "triage team number" and another called "handling team number". In addition, the person in charge of each team will include their DNI National ID Document No. in the appropriate field.

Once access to the affected area has been permitted for the rescue of collections, the first contact with the collection is made by the evacuation / on-site protection teams, who are responsible for the protection of the affected works or, if necessary, the transfer of the damaged works to the assigned triage area. The person in charge of the handling team must complete sections 1 and 2 of this form.

Before deciding to evacuate, it is important to consider that any movement over damaged or wet objects may require the use of auxiliary supports. In such cases, it is necessary to have auxiliary supports or trays of adequate size, shape and strength to reduce the risk of further secondary damage.

SECTION 2:
EVACUATION AND / OR TRANSFER [ ] (indicate the reception location)

- Yes (X)
- Internal transfer (X)
- External transfer (X)
- NO (X) ON SITE

CARE (X)

Sand bags (X) Fireproof tarpaulins (X)

Material type [ ]

Waterproof covers (X)

Material type [ ]

- Red (X)
- Amber (X)
- Green (X)

2

Triage teams are responsible for completing the "triage assessment code" field in section 2 of the form, as well as completing section 3 in its entirety. To calculate the triage assessment code, a chart with alert thresholds is available, which is explained in detail in section 5.3 of this guide. In addition, in section 3, they must indicate the typological characteristics of the affected work.

SECTION 3:
TRIAGE ASSESSMENT CHARTS
(Fields to indicate the type of object)
Standardised triage chart

PAINTING
- Table (X)
- Canvas (X)
- Mural painting (X)
- Mixed (X)

ARCHIVE MATERIAL, LIBRARIES AND GRAPHIC WORKS
- Book (X)
- Document (X)
- Graphic work (X)

SCULPTURE
- Cardboard (X)
- Wood (X)
- Stone (X)
- Fabric (X)
- Metal (X)
- Mixed (X)

TEXTILES
- Tapestry (X)
- Costume (X)
- Mixed fabrics (X)

METALS
- Goldsmithing (X)
- Mixed pieces (X)

ARCHAEOLOGICAL MATERIAL
- Paleontological (X)
- Other (X)

FURNITURE (X)
CERAMICS AND GLASS
(X) STONE MATERIAL
(X)
ETHNOGRAPHIC MATERIAL
(X) PHOTOGRAPHIC MATERIAL (X) OTHERS [ ]

3

Once the triage of the damaged movable asset has been completed, it will be packaged or protected for transfer to quarantine, stabilisation or temporary storage areas. The packaging team will be responsible for completing section 4 of the emergency form describing the materials used in packaging, labelling and special handling guidelines. The person in charge of this team must determine whether or not it is appropriate to pack specific works for transport based on the damage suffered.

SECTION 4:
PACKAGING PROCEDURE
(mark the fields with the materials designated for their protection and the number of covers required)

- Bubble wrap (X)
- Glassine paper (X)
- Tissue paper (X)
- Tyvex® film
- Marvelseal® barrier film (X)
- Conservation barrier paper (X)
- Corrugated cardboard (X)
- Foam board (X)
- Plastazote® (X)
- Micro-perforated canvases (X)
- Polyester or polypropylene cover (X)
- Fireproof canvas (X)
- Velcro® (X)
- Elastic bands (X)

PROTECTIVE COVERS

- Single (X)
- Double (X)

AUXILIARY SUPPORTS FOR HANDLING

- Plastic Eurobox (X)
- Cardboard box (X)
- Wooden box (X)
- Tube (X)

LABELLING

- Individual (X)
- Linked to a set (X)
- Other [ ]
- Label code: Inventory / GIS number

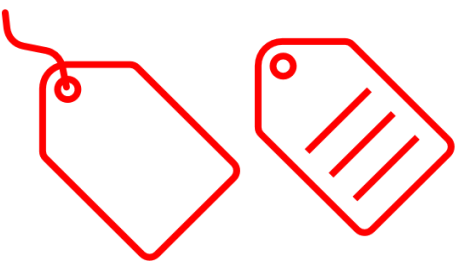
SPECIAL HANDLING GUIDELINES [ ] (field to fill in instructions)

4

In general, it is essential to establish guidelines for proper packaging, which will allow for correct identification of the work afterwards. If a damaged work is not packaged, there is a high risk that it will be damaged further or scratched, or that it will fragment or deteriorate during the rescue process. It is important to note that damage caused during handling of the unpackaged item may not be immediately visible and may take months to manifest. Conversely, packaging an item that is damp may cause new biological damage over a very short period of time. For these reasons, it is up to the restorers to decide whether or not it is appropriate to pack the affected works.

To ensure traceability, it is essential to use previously prepared labels, which allow for a smooth workflow during the rescue of collections. The information contained on the labels or in the QR codes must enable the tracking of the file connected to the affected movable cultural asset, identify the alert threshold and the damage assigned in triage (which can be indicated on the label as a red, amber or green dot), the storage area to which it is directed and whether it must remain in some type of quarantine.

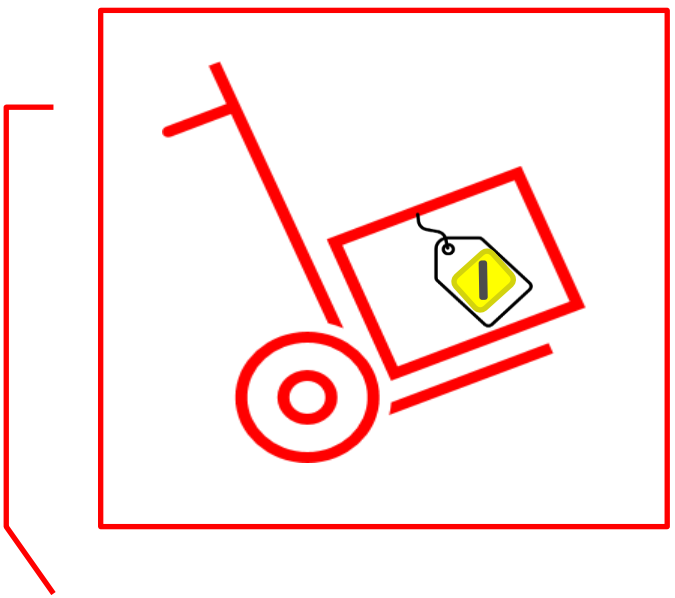
Once the work has been packaged, two situations may arise: it will remain at the institution in a secure area designated for stabilisation, or it will be moved to an external storehouse. Both options are recorded in section 2 of the emergency form and must be consulted by the transport team before moving the evacuated works.



Finally, it is important to consider the fragility of the material and the difficulty of transport when selecting the protective covers and packaging necessary to prevent damage from impacts and vibrations and to maintain adequate temperature and relative humidity conditions.

Not all protective materials are suitable, some may stain surfaces or affect the long-term preservation of evacuated movable assets.

Materials used in packaging must be neutral, chemically stable and provide adequate support, stability and security. Precautions must be taken with certain packaging materials that can stain delicate objects, such as marble or introduce acidity, as can occur in the case of paper.



EMERGENCY FORM TEMPLATE

EVALUACIÓN DEL TRIAJE

☐ 

☐ 

☐ 

FECHA DEL SINIESTRO	**EVACUACIÓN Y/O TRASLADO**
Código EMERGENCIA	☐ **SI** ☐ TRASLADO INTERNO ☐ TRASLADO EXTERNO **ID VEHICULO TRANSPORTE**
TIPO DE EMERGENCIA	
FECHA DE ACTUACIÓN EN EMERGENCIA	☐ **NO** ☐ ASISTENCIA IN SITU ☐ SACOS DE CONTENCIÓN ☐ LONAS IGNIFUGAS TIPO ☐ FUNDAS IMPERMEABLES LOCALIZADOR CARRO Nº
NÚMERO DE EQUIPO DE TRIAJE	
RESPONSABLE DNI	

TABLAS DE EVALUACIÓN DE TRIAJE

EN PINTURA
- ☐ TABLA
- ☐ LIENZO
- ☐ PINTURA MURAL
- ☐ MIXTO

MATERIAL DE ARCHIVO, BIBLIOTECAS Y OBRA GRÁFICA
- ☐ LIBROS
- ☐ DOCUMENTOS
- ☐ OBRA GRÁFICA

EN ESCULTURA
- ☐ CARTÓN
- ☐ MADERA
- ☐ PIEDRA
- ☐ TELA
- ☐ METAL
- ☐ MIXTO

EN TEXTILES
- ☐ TAPICES Y COLGADURAS
- ☐ INDUMENTARIA
- ☐ MIXTO

EN METALES
- ☐ ORFEBRERIA
- ☐ MIXTO

MATERIAL ARQUEOLÓGICO
- ☐ PALEONTOLÓGICO
- ☐ OTRO

EN MOBILIARIO
CON CERÁMICA Y VIDRIO
MATERIAL PÉTREO
MATERIAL FOTOGRÁFICO
MATERIAL ETNOGRÁFICO

PROCEDIMIENTO DE EMBALAJE:
- ☐ PAPEL BURBUJAS
- ☐ PAPEL GLASSINE
- ☐ PAPEL TISSUE
- ☐ FILM TYVEX ®
- ☐ FILM DE BARRERA MARVESEAL
- ☐ CARTÓN ONDULADO
- ☐ CARTÓN PLUMA
- ☐ PLASTAZOTE ®
- ☐ LONAS MICRO PERFORADAS
- ☐ FUNDA DE POLIESTER O POLIPROPILENO
- ☐ LONA IGNÍFUGA
- ☐ VENDAS ELÁSTICAS
- ☐ VELCRO ®
- ☐ CINTAS ELÁSTICAS
- ☐ CARPETA

OTROS

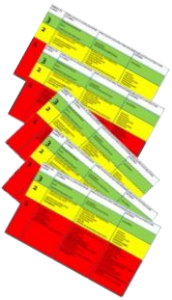
COBERTURAS DE PROTECCIÓN:
- ☐ SENCILLA
- ☐ DOBLE

SOPORTES AUXILIARES PARA SU MANIPULACIÓN:
- ☐ CAJA DE PLÁSTICO EUROBOX
- ☐ CAJAS DE CARTÓN
- ☐ CAJA DE MADERA
- ☐ TUBO

ETIQUETADO:
- ☐ INDIVIDUAL
- ☐ VINCULADO AL CONJUNTO
- ☐ OTRO

CÓDIGO EN ETIQUETA: **NÚMERO DE INVENTARIO/SIG**

PAUTAS DE MANIPULACIÓN ESPECIALES



5.3. Triage or priority assessment

Triage or priority assessment is a crucial process in emergency management, which allows for the prioritisation of care based on the severity of the damage to the affected cultural assets. To do this, a complete and exhaustive examination must be carried out, which is capable of offering an accurate diagnosis and easily quantifying the damage.

Conducting an assessment or triage several months after the incident has occurred negatively impacts the recovery of collections. A late diagnosis favours the appearance of new deterioration caused by the impact of the emergency, such as the proliferation of fungi or the decrease in mechanical strength in wet materials. For this reason, it is important to have a simple methodological model that allows for the triage of cultural heritage during the initial stages of emergency management.

Having an early diagnosis of the damage caused by the emergency allows us to define what actions are necessary to stabilise the affected collections and the resources needed to ensure their recovery.

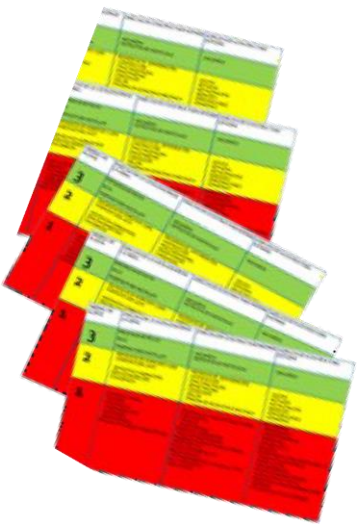
As an example, in scenarios where collections are affected by a fire, the initial triage or diagnosis will enable the recovery of the assets most affected by the fire to be prioritised. These are usually the objects most exposed to flames and those made of organic materials such as paper, wood, textiles and bone, which are the most vulnerable to this type of risk.

To facilitate the triage of movable cultural heritage affected by an emergency, this guide offers a triage chart as a methodological tool. However, it is crucial to have a team of trained professionals who can correctly diagnose the affected works so that the codes obtained from this table are reliable.

The triage chart actually consists of a list of potential damages ordered according to their magnitude or capacity to endanger the integrity of the work. This chart is structured into three columns. The first corresponds to the analysis of the scene of the events and the location of the work, allowing the evacuation / on-site protection teams to carry out an initial triage. The next two columns allow for the examination of the internal and external structure of the affected asset in the triage area and the performance of a more exhaustive diagnosis.

This chart allows restorers to jointly consider the symptoms of deterioration and the damage caused by the emergency, in order to have a clear vision of the situation and to determine the level of urgency or severity in each case.

Once the affected object has been diagnosed following the triage chart, it is assigned an emergency threshold for its recovery that ranges from 1: very serious damages that endanger its preservation, 2: serious damages and 3: minimal damages, which corresponds to a traffic light-type colour code (red-amber-green and a code of lines and triangles adapted for colour-blind people). In this way, based on the correlation of the damages identified in the work and the pathologies classified in the triage chart, the collection of triage data can be standardised.



- Emergency threshold 1 and the red colour code indicate an emergency situation that endangers the long-term preservation of the asset.
- Emergency threshold 2 and the amber colour code establish a critical situation with serious damage.
- Emergency threshold 3 and the green colour code establish a moderate situation, with slight damage.

COLOUR CODE AND COLOUR-BLIND CODE FOR ALERT THRESHOLDS ON TRIAGE FORMS

ALERT THRESHOLD 3 =
MINIMAL DAMAGE with the possibility of stabilisation through preventive preservation measures.

ALERT THRESHOLD 2 =
SERIOUS DAMAGE requiring constant observation and request for quarantine due to deterioration.

ALERT THRESHOLD 1 =
SEVERE PRESERVATION DANGER with deterioration requiring urgent stabilisation treatments and quarantine requirement.

TRIAGE ASSESSMENT CHART

ALERT THRES HOLD	ANALYSIS OF THE LOCATION OF THE WORK:	ANALYSIS OF THE INTERNAL STRUCTURE	ANALYSIS OF THE EXTERNAL STRUCTURE
3 	PRESENCE OF DUST DRY TEMPERATURE UP TO 40°C	NO DAMAGE, PRESENCE OF DEPOSITS AND PARTICLES	NO DAMAGE
2 	PRESENCE OF MOISTURE (+75%) TEMPERATURE >60°C COMBUSTION DEPOSITS, CRACKS / MOISTURE, DEBRIS	DEFORMATION, SHRINKAGE, FRACTURE / FISSURE, BIODEGRADATION, CORROSION, SOOT, LOSS OF MECHANICAL STRENGTH	KNOCKS, BREAKS, DISCOLOURATION, STAINS, PERFORATIONS, PEELING
1 	HOSTILE ENVIRONMENT: MOISTURE, FIRE, CONTAMINATION, COLLAPSE BIODEGRADATION, PRESENCE OF INSECTS / RODENTS	DEPOSITS OF MUD, FUEL OR GREASE, MOISTURE, BIODEGRADATION, BURNING / COMBUSTION, CREASES / LOOSENING, DECAYING BY MICROORGANISMS, PERFORATION / OXIDATION BY METAL ACID INKS, BLOCK CAKING (BY H_2O / BY MELTING), EXPANSION	ABUNDANT TEARS, BLISTERING, BURNS, WET, FUEL DEPOSITS, MUD, GREASE, REACTIVE PRODUCTS, EXFOLIATION , DELAMINATION, EFFLORESCENCE, CRUSTS, DISSOLUTION OF INKS, STAINS CAUSED BY MICROORGANISMS, SPORES, INSECT / RODENT ATTACK

Below are those cases or damages that have been considered capable of endangering the preservation of the work and therefore indicate a red alert threshold (1).

ALERT THRESHOLD 1 =
SEVERE PRESERVATION DANGER with deterioration requiring urgent stabilisation treatments and quarantine requirement.

ANALYSIS OF THE LOCATION OF THE WORK	ANALYSIS OF THE INTERNAL STRUCTURE	ANALYSIS OF EXTERNAL STRUCTURE
HOSTILE ENVIRONMENT: - MOISTURE - FIRE - CONTAMINATION - COLLAPSE - BIODEGRADATION PRESENCE OF INSECTS / RODENTS COMBUSTION DEPOSITS, CRACKS / MOISTURE / DEBRIS	DEPOSITS OF MUD, FUEL OR GREASE, MOISTURE, BIODEGRADATION, BURNING / COMBUSTION, WRINKLES / LOOSENING, DECAYING BY MICROORGANISMS, PERFORATION / OXIDATION BY METAL ACID INKS, BLOCK CAKING (BY H_2O / BY MELTING), EXPANSION	ABUNDANT TEARS, BLISTERING, BURNS, WET, DEPOSITS OF FUEL, MUD, GREASE, REACTIVE PRODUCTS, EXFOLIATION, DELAMINATION, EFFLORESCENCE / CRUSTS, DISSOLUTION OF INKS, STAINS CAUSED BY MICROORGANISMS, SPORES, INSECT / RODENT ATTACKS

Below are those cases or damages that have been considered capable of generating an amber alert threshold (2).

ALERT THRESHOLD 2 = SERIOUS DAMAGE requiring constant observation and request for quarantine due to deterioration.

ANALYSIS OF THE LOCATION OF THE WORK	ANALYSIS OF THE INTERNAL STRUCTURE	ANALYSIS OF THE EXTERNAL STRUCTURE
PRESENCE OF MOISTURE (+75%) TEMPERATURE >60ºC COMBUSTION DEPOSITS, CRACKS / MOISTURE / DEBRIS	DEFORMATION, SHRINKAGE, FRACTURE / FISSURE, BIODETERIORATION, CORROSION, SOOT LOSS OF MECHANICAL STRENGTH	KNOCKS, BREAKS, DISCOLOURATION, STAINS, PERFORATIONS, PEELING

Finally, those cases or damages that have been considered indicative of a green alert threshold (3) are shown.

ALERT THRESHOLD 3 =
MINIMAL DAMAGE with the possibility of stabilisation through preventive preservation measures.

ANALYSIS OF THE LOCATION OF THE WORK:	ANALYSIS OF THE INTERNAL STRUCTURE	ANALYSIS OF THE EXTERNAL STRUCTURE
PRESENCE OF DUST **DRY** **TEMPERATURE UP TO 40ºC**	**NO DAMAGE, PRESENCE OF DEPOSITS AND PARTICLES**	**NO DAMAGE**

This codification into three alert thresholds of the triage system has been successfully used within the healthcare field for emergency management, which supports its incorporation into the triage of damage to collections of movable cultural assets.

The adaptation presented in this triage chart has been developed by experts in various types of materials from IVCR+i. It is expected that the pathologies included in the three columns will allow the symptoms and causes of deterioration to be grouped into generic categories, thus simplifying the classification of damage and the hierarchisation of the alert threshold that these damages involve. Its application enables the organisation of damaged works according to a hazard scale to prioritise the recovery of works that are at greater risk of loss if intervention is not forthcoming.

5.4. Rescue of movable cultural assets through the use of grids

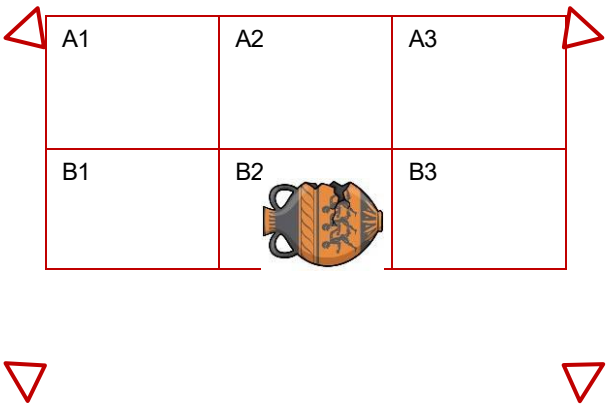
During rescue operations, if a movable cultural asset is found to be completely fragmented and covered by debris, the use of excavation grids can minimise additional losses due to decontextualisation and facilitate its rescue.

Grid excavation is a systematic method commonly used in archaeology to explore and study archaeological sites. Incorporating this recording method into risk management serves to divide the affected area into rectangular or square units, creating a grid that allows for precise documentation of the affected works and the strata or layers of debris that cover them. In emergency situations caused by earthquakes, the analysis of these layers of earth or debris provides valuable information to understand the temporal sequence of collapses suffered within the building.

To implement a rescue protocol using grids, it is essential to define the number of grids required and to assign an alphanumeric code to each of them. Once the grids have been defined, the debris can begin to be removed, respecting the different stratigraphic levels, and the fragments of the movable cultural assets can be collected, recording their original location. Ideally, a differential GPS or total station would be used to ensure accurate georeferencing of the recovered parts. In the absence of such equipment, a sketch may be useful to record the location of each fragment. If a similar protocol has not been carried out previously, it is recommended to seek the advice of an archaeologist with experience in emergencies.

During extraction and rescue, it is important to take general photographs of each grid and the different layers of soil and debris identified. The code assigned to each fragment, as well as the number of the stratum and the corresponding grid, can be overwritten on these images. This will facilitate the traceability and identification of the recovered fragments, as well as the tasks of piece identification, damage assessment, fragment assembly and post-rescue restoration.

For storage, recovered fragments can be separated according to their material nature into individual bags. This will prevent further damage during transport and storage. Debris must be removed and stored in a designated area for later disposal.



CHAPTER 6

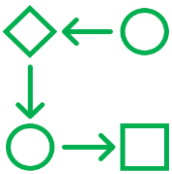
Organisation of quarantine areas and post-emergency documentation at temporary storage facilities

Inmaculada Chuliá

6.1. Procedures for the organisation of quarantine areas and temporary storage facilities

In temporary storage facilities or storehouses set up during the post-emergency period, the correct organisation of quarantine areas is crucial for the recovery of collections back to preservation standards prior to the incident. The number of potential works affected, their diversity and severity will determine the organisation of spaces for their stabilisation.

It is appropriate to find a space that meets the following characteristics and that allows the distribution of quarantine (wet and / or dry), observation, stabilisation and storage areas:



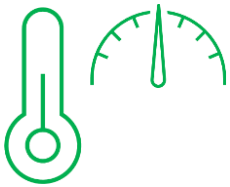
- ✓Open and spacious, it must be equipped with water and sink facilities, which will enable cleaning and decontamination tasks to be carried out efficiently.
- ✓It must have a powerful electrical system, capable of sustaining fans, dehumidifiers and a variety of instruments. These devices are essential for regulating humidity and temperature, ensuring optimal conditions for the preservation of the works.
- ✓With windows that can be opened to facilitate air circulation in a stable environment conducive to the preservation of the works.
- ✓With a temperature and humidity control system, allowing temperature and humidity levels to be monitored and adjusted precisely.

It is recommended that the safeguarding plan consider the need to have adequate spaces for these storage facilities, which must be isolated from the institution's normal activities. If an outdoor location is required and, therefore, the transfer of collections to other institutions, the best option is to establish an inter-institutional support network with security guarantees.

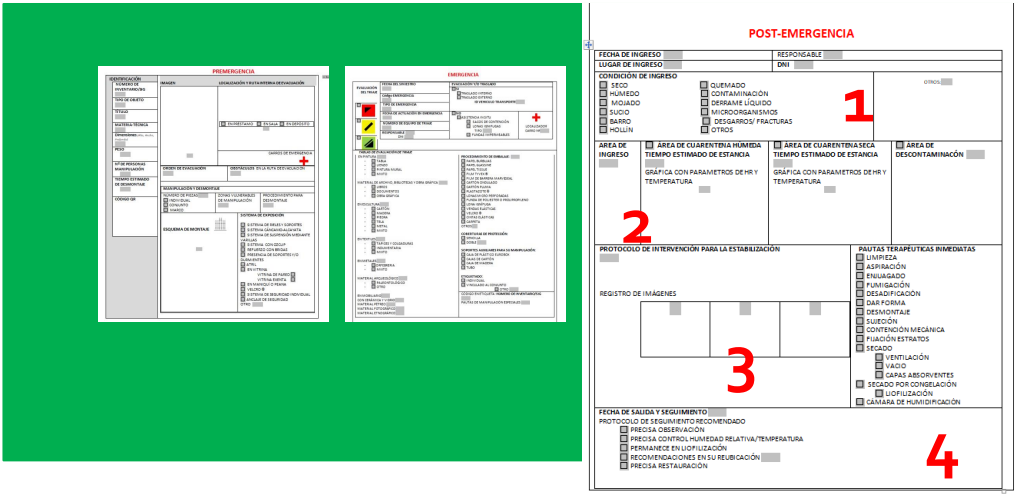
Whether the storage facility is located inside or outside the building, it is essential to establish an entry and exit circuit for the works, as well as to implement a document registration system that enables their monitoring during transport and storage.

To stabilise materials, the characteristics of the incident and the different quarantine zones required must be considered. It is essential to establish climate control in these areas and coordinate preliminary rehabilitation tasks to avoid further physical and chemical damage. In addition, relative humidity and temperature parameters must be determined until the materials recover their previous preventive preservation values.

A temporary storehouse or storage facility is a space intended for the recovery of collections. It must have sufficient technical staff, adequate infrastructure that guarantees safety and environmental control, as well as analysis laboratories. Once the works reach their initial levels of preservation, they must be returned to the corresponding institution and storage facilities.



The most modern hygrometers, which measure temperature and relative humidity, have evolved to be the size of a USB stick and are fully digitalised.
They allow thousands of records to be kept, so it is possible to store information for continuous monitoring of stays over a long period of time.



6.2. Contents and use of the post-emergency form

The post-emergency form has four sections and is designed to allow technicians in charge of the temporary storage facility to record the treatments decided upon for the recovery of damaged objects.

Section 1 of the form collects data about the condition of the work upon admission.

FORM CODES
(Field to fill with text = [ ]) (Field to mark = (X))

SECTION 1:
DATE OF ADMISSION [ ]
PLACE OF ADMISSION [ ]
TEAM LEADER [ ] **DNI ID / PASSPORT** [ ]

CONDITION UPON ADMISSION
Dry (X) Damp (X) Wet (X)
Dirty (X)
Muddy (X)
Sooty (X)
Burnt (X)
Contamination (X) Liquid spill (X) Microorganisms (X) Tears / fractures (X)
Others [ ]

1

SECTION 2: ADMISSION AREA

WET QUARANTINE AREA / ESTIMATED TIME OF STAY (X) (assign an estimated period)
Relative humidity and temperature parameters graph [ ]

2

Section 2 indicates the admission area required for structural stabilisation (wet quarantine, dry quarantine or decontamination area). Works damaged by water and not suitable for freezing are admitted to the wet quarantine area. The space must be monitored 24 hours a day with specific guidelines to gradually reduce humidity levels and achieve material stabilisation.

It is important to note that excessive moisture build-up can damage internal structures. Since ventilation is closely related to humidity levels, non-heat generating drying techniques, such as dehumidifiers or fans, will be used.

The option to freeze collections depends on the materials damaged and the severity of the incident. This decision must be made by a specialist in the field. Freezing objects requires technical knowledge of how to package the objects to protect them during the freezing process. Not all materials can be frozen.

In the dry quarantine area, works generally do not require immediate intervention, but rather observation in order to analyse potential secondary damages.

SECTION 2: DRY QUARANTINE AREA / ESTIMATED TIME OF STAY (X) (assign an estimated period) Graph with RH and T parameters [ ]

DECONTAMINATION AREA (X) (assign an estimated period)

2

All materials affected by microorganisms, such as fungi and bacteria, which represents a risk of pulmonary or systemic fungal infection for people, all materials damaged by mud or any collections damaged by smoke deposits, are admitted to the decontamination area.

A rapid method to analyse and reduce microbial contamination levels or detect the presence of residues from organic sources is through swab sampling using adenosine triphosphate (ATP) bioluminescence. This method provides objective information on the level of biological matter on a surface or in water.

It is important to note that ATP-based tests performed on an object serve to assess cleanliness levels, but are not a direct indicator of the presence of pathogenic microorganisms. To correctly interpret the results, it is crucial to establish reference thresholds. However, if contamination is suspected, the object must be isolated from the rest of the collection, as high ATP levels may be associated with an increased risk of contamination developing.

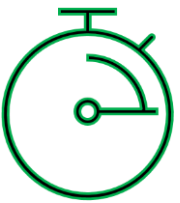
To identify possible contaminated areas that are not visible to the naked eye, the pH values of the material can also be observed and an examination performed under ultraviolet (UV) light. The accuracy of these methods will depend on the equipment used for the determination.

Section 3 of the post-emergency form includes the treatment guidelines that must be carried out to stabilise the affected heritage asset.

SECTION 3:
INTERVENTION PROTOCOL FOR STABILISATION
Image registration [][][]

IMMEDIATE TREATMENT GUIDELINES

Cleaning (X) Suction
(X) Rinsing (X)
Fumigation (X)
Deacidification (X)
Shaping (X)
Disassembly (X)
Attachment (X)
Mechanical restraint (X)
Priming of strata (X) Drying
(X)
Draining (X)
Ventilation (X)
Vacuuming (X)
Absorbent layers (X) Freeze-
drying (X) Lyophilisation (X)
Humidification chamber (X)



3

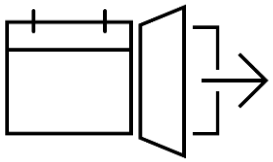
Among the immediate treatment recommendations proposed in section 3, mechanical restraint plays a fundamental role in helping to maintain the stability and union of the elements. This technique ensures the attachment or union of various elements of a work, preventing them from separating, deforming or splitting.

Velcro tapes or cotton tapes can be a practical and effective solution for temporarily restraining items, due to their easy handling. However, for complex immobilisations to be effective, it is crucial that technicians are familiar with the appropriate attachment systems for each type of work or item. Some of the recommended systems include the immobilisation of the pictorial strata in polychromes with an adhesive compatible with the preservation of the original technique. This method consists of using a coating and an adhesive on the surface of the elements to be joined, ensuring their temporary fixation by means of an intermediate protective layer that prevents damage or unwanted reactions.

As regards the immobilisation of construction and structural elements, specific attachment techniques must be used to guarantee their stability and preservation. These techniques avoid the dissociation of three-dimensional ensembles.

Other treatment recommendations included in this section are related to surface cleaning, and include suction cleaning or setting up a washing line to remove mud from objects. These interventions may vary depending on the institution and the collection type.

Finally, section 4 of this form also includes the recommended follow-up protocol once the heritage object is relocated to its final storage facility.



SECTION 4:
DEPARTURE DATE AND TRACKING

RECOMMENDED FOLLOW-UP PROTOCOL

Precise observation (X)
Requires relative humidity and temperature control (X) Remains in freeze-drying (X)
Recommendations for relocation (X) Requires restoration (X)

4

POST-EMERGENCY FORM TEMPLATE

FECHA DE INGRESO	RESPONSABLE
LUGAR DE INGRESO	**DNI**

CONDICIÓN DE INGRESO

- ☐ SECO
- ☐ HÚMEDO
- ☐ MOJADO
- ☐ SUCIO
- ☐ BARRO
- ☐ HOLLÍN
- ☐ QUEMADO
- ☐ CONTAMINACIÓN
- ☐ DERRAME LÍQUIDO
- ☐ MICROORGANISMOS
- ☐ DESGARROS/ FRACTURAS
- ☐ OTROS

OTROS:

AREA DE INGRESO	☐ **ÁREA DE CUARENTENA HÚMEDA TIEMPO ESTIMADO DE ESTANCIA** GRÁFICA CON PARAMETROS DE HR Y TEMPERATURA	☐ **ÁREA DE CUARENTENA SECA TIEMPO ESTIMADO DE ESTANCIA** GRÁFICA CON PARAMETROS DE HR Y TEMPERATURA	☐ **ÁREA DE DESCONTAMINACÓN**

PROTOCOLO DE INTERVENCIÓN PARA LA ESTABILIZACIÓN

REGISTRO DE IMÁGENES

PAUTAS TERAPÉUTICAS INMEDIATAS

- ☐ LIMPIEZA
- ☐ ASPIRACIÓN
- ☐ ENJUAGADO
- ☐ FUMIGACIÓN
- ☐ DESADIFICACIÓN
- ☐ DAR FORMA
- ☐ DESMONTAJE
- ☐ SUJECIÓN
- ☐ CONTENCIÓN MECÁNICA
- ☐ FIJACIÓN ESTRATOS
- ☐ SECADO
  - ☐ VENTILACIÓN
  - ☐ VACIO
  - ☐ CAPAS ABSORVENTES
- ☐ SECADO POR CONGELACIÓN
  - ☐ LIOFILIZACIÓN
- ☐ CÁMARA DE HUMIDIFICACIÓN

FECHA DE SALIDA Y SEGUIMIENTO

PROTOCOLO DE SEGUIMIENTO RECOMENDADO

- ☐ PRECISA OBSERVACIÓN
- ☐ PRECISA CONTROL HUMEDAD RELATIVA/TEMPERATURA
- ☐ PERMANECE EN LIOFILIZACIÓN
- ☐ RECOMENDACIONES EN SU REUBICACIÓN
- ☐ PRECISA RESTAURACIÓN

RECOMMENDED EQUIPMENT FOR STOREHOUSES AND / OR TEMPORARY STORAGE FACILITIES

PPE
(caps, gowns, cotton and latex gloves, mould masks, Tyvek® suits, among others.),
Basic Lab equipment (Analysis and Preservation), 96º Alcohol,
Distilled water,
Boxes (different types),
Heavy-duty folding tables,
Industrial fans and dehumidifiers,
Thermo-Hygrometers,
Steamless irons,
Permanent markers,
Pencils,
Box labels, Rubbish bags, Absorbent pads and sponges,
Polyethylene sheets,
Hollytex® Blotting paper,
Scissors,
Plastic aprons,
Rolls of cellulose paper or kitchen paper, Water sprayer,
Activated carbon filters for VOCs,
A briefcase with basic preservation / restoration tools, Germicidal soap,
A bolt cutter,
Tape measure

CHAPTER 7

Identification, Prevention and Action Group against Heritage Crimes and Emergencies (GIPADE)

Inmaculada Chuliá

7.1. Risk management in the Counterfeit Expertise and Detection Unit and the Emergency and Rescue Unit

The preservation of historical, cultural and artistic heritage is a fundamental obligation of institutions according to Article 46 of the Spanish Constitution.

To comply with this fundamental obligation, we have observed a growing need in recent years to improve preparedness and protection against risks to cultural heritage. From this perspective, measures have been taken to respect and preserve the greatest possible number of heritage assets, in addition to verifying the authenticity of these preserved remains, identifying possible additions, alterations, erroneous cataloguing and counterfeits.

From this perspective, the National Plan for Emergencies and Risk Management in Cultural Heritage, approved by the Spanish Historical Heritage Council in 2015, establishes the creation of Cultural Heritage Emergency Management Units as a first line of action within the Autonomous Communities, which should be coordinated with Civil Protection agencies.

In the Valencian Community, its statute of autonomy and specifically Article 31, grants the Generalitat Valenciana exclusive jurisdiction over historical, artistic, monumental, archaeological and scientific heritage and over archives, libraries, museums, newspaper libraries and other cultural storage centres that are not state-owned, notwithstanding the reservation of jurisdiction in favour of the state over the defence of cultural, artistic and monumental heritage.

For this reason, the administrative entities of the Valencian Community, responsible for protecting this public cultural heritage, collaborate closely with professionals from various security and emergency bodies to ensure compliance with these principles.

Specifically, the Valencian Institute of Conservation, Restoration and Research (IVCR+i), the Identification, Prevention and Action Group against Heritage Crimes and Emergencies GIPADE (made up of the Emergency and Rescue Unit and the Counterfeit Expertise and Detection Unit), the General Directorate for Security and Emergency Response and the General Directorate for Cultural Heritage of the Generalitat Valenciana, are the main agents that actively address the safeguarding of cultural heritage in the event of emergencies and guaranteeing it in terms of its authenticity.

COUNTERFEIT EXPERTISE AND DETECTION UNIT

Police investigation groups for the protection of Spanish Historical Heritage are recognised as such by Royal Decree 111/86 of 10 January, which partially develops the Spanish Historical Heritage Act. Its main function is to prosecute all aggressions that threaten historical, artistic and cultural heritage, whether from a criminal or administrative perspective. One of the main crimes related to historical heritage is counterfeiting. Due to the increasing appearance of counterfeit works on the art market, these Heritage Units are seizing more and more fake works destined for the national and international black market and for foreign investors. Some even become part of public collections. This represents a financial scam for the affected party, which in the case of public institutions affects society as a whole. One of the greatest difficulties faced by these research groups is obtaining conclusive expert reports that can prove to the courts that these works are false.

The Counterfeit Expertise and Detection Unit of the Valencian Institute of Conservation, Restoration and Research has been working regularly since 2016 with the Historical Heritage Group of the National Police Unit attached to the Valencian Community to combat this criminal activity. The IVCR+i receives the pieces that this Police group take under judicial review, and the technicians of this unit, specialised in preservation and restoration and in the analysis of works of art, study, evaluate and decide which material and scientific investigations must be carried out to arrive at conclusive results in the optimal manner. To do this, the particular characteristics of the work, the period, the artist and the artistic discipline are studied, and the elements that will contribute to clarifying whether the pieces are authentic or false, or whether there is some cataloguing error, are analysed. Once the results of each of the analyses have been obtained, sometimes these are conclusive in themselves since they rule out periods or authorships simply through dating. Other times it is necessary to turn to works of indisputable authenticity by the artists being investigated, pieces that have been previously analysed and the results of which have been published. Since the information available is usually scant, it is often necessary to go to the museums that house works by these creators to carry out the same analyses on purpose, in order to be able to draw firm conclusions.

Not all of the works that are researched and investigated turn out to be fake; sometimes they are highly restored pieces that, *a priori*, raised doubts about their authorship, or they are works that were unknown because they belonged to unregistered private collections. This sometimes allows unknown art to be brought to light and, in many cases, broadens knowledge of the career of the artist in question. These discoveries have sometimes been useful in proposing future purchases by the Generalitat, thus expanding the public assets with new acquisitions that also have the guarantee of having been previously investigated.

All the information extracted from each scientific investigation is reflected in expert reports that the IVCR+i prepares *ex officio*. These are detailed and explicit arguments that set out conclusions regarding the authenticity or falsity of the piece in question. These reports are sent to the corresponding court.

EMERGENCY AND RESCUE UNIT

This unit is dedicated to the development of programmes, plans, protocols, studies and procedures for action aimed at preventing and resolving high-risk situations, minimising damage associated with emergencies in heritage environments.

In addition to responding effectively to emergency situations, training exercises are promoted through drills of the actions of the intervention teams. These drills are designed to improve coordination and communication during the emergency management and response phase, leading to more efficient emergency and risk management.

With regard to the coordination of the different planning levels, the emergency and rescue unit works on its integration within the emergency coordination system and within the plans of the different public administrations and the Civil Protection agency. This ensures a consistent and coherent approach to emergency management.

Moreover, the Generalitat Valenciana recognises this Heritage Emergency and Rescue Unit articulated within the Basic Damage Assessment and Recovery Unit integrated into the Territorial Emergency Plan of the Valencian Community (text approved by Decree 243/1993, of 07 December).

The GIPADE group thus provides the technical resources and the organisation that must be established in the event of an emergency to provide a rapid response to Valencian heritage, establishing the methodology of action and the coordination mechanisms with the different institutions that intervene in emergency situations.

In this way, the basic planning guidelines for the Valencian territory are established.

7.2. Structure of a movable cultural heritage rescue team during an emergency

The rescue team structure recommended in this guide has been designed based on the experience of the GIPADE group and includes the following roles:

1) Intervention team coordinator
2) Security manager
3) Rescue operations manager
4) Material resources manager
5) Moved object inventory manager
6) Triage and assessment manager
7) Packaging and transport manager
8) Storage facility manager: quarantine, temporary storehouse
9) Documentation manager

Conservators and restorers of cultural assets are professionals specialised in the preservation of historical heritage. They obtain a university degree specialising in this area of research and possess skills in line with those required for the management, organisation, handling and diagnosis of heritage assets during emergency management.

In addition to their academic training, these teams must be prepared and trained in the development of technical and operational response strategies for the evacuation of damaged materials, transportation, use of support materials and preliminary tasks to rescue collections in different media.

Continuous training of teams is essential, and their training should include the coordination of joint actions with other intervention groups that may be necessary during the alarm phase, especially from the medium-high emergency level. For this reason, it is crucial that conservation teams are prepared to collaborate effectively and in a coordinated manner in emergency situations with firefighters, police or civil protection personnel.

The main functions of the different roles that must be part of the rescue team are described below.

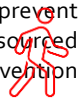
Intervention team coordinator

Whenever possible, the coordinator should be a restorer and conservator of cultural assets who is part of the institution, since they are the ones who best know the typology of the cultural assets affected, their different formats and materials, as well as the requirements for rescue and the best way to handle them, even in situations that require auxiliary elements to protect the objects during complex emergencies.

The coordinator has the authority to make decisions about object prioritisation and may serve as a liaison with other emergency experts. They are also empowered to authorise the use of suitable spaces for temporary storage within the institution. They are responsible for managing the incident and scaling the organisation of the rescue areas, assigning teams and maintaining communication with the emergency services, as well as handling all external consultations. They also monitor the bigger picture to ensure that key decisions are recorded.

Security manager

They are responsible for ensuring the integrity of the people and the building, directing and monitoring the recovered assets and verifying the traceability of the movements, guaranteeing the chain of custody. Their functions include managing security cordons and controlling those areas affected by the incident to prevent theft. They designate the persons responsible for the security of outsourced collections. Their responsibilities also include the accreditation of intervention teams.



They are responsible for object rescue operations

Following the consent of the emergency services, they are responsible for managing the removal of heritage objects from the disaster area; they must supervise the movement of the works and provide protection to those that remain within the disaster area, without exposing them to new risks. They liaise with the triage team and direct the transport of items to the triage area. Among their responsibilities, they prioritise the order of the objects to be rescued and control access to the disaster.


Material resources manager

This person will be responsible for maintaining a list of suppliers, distributors and art transport companies in order to obtain materials and services in the event of a catastrophe. Their function will be to ensure that the institution has the basic material resources to deal with any emergency intervention.

Documentation and moved object inventory manager

They are responsible for the registration and custody of all emergency files. They are therefore responsible for the correct implementation of the document registration system from the beginning. During the activities carried out in emergency management, many files will be generated with labels, forms, boxes, reports, emails, authorisations, organisational charts, lists of suppliers, intervention teams, etc. For this reason, the manager helps to collect all of the information and acts as a liaison with the safety manager and with the institution's registry.

Collection triage and assessment manager

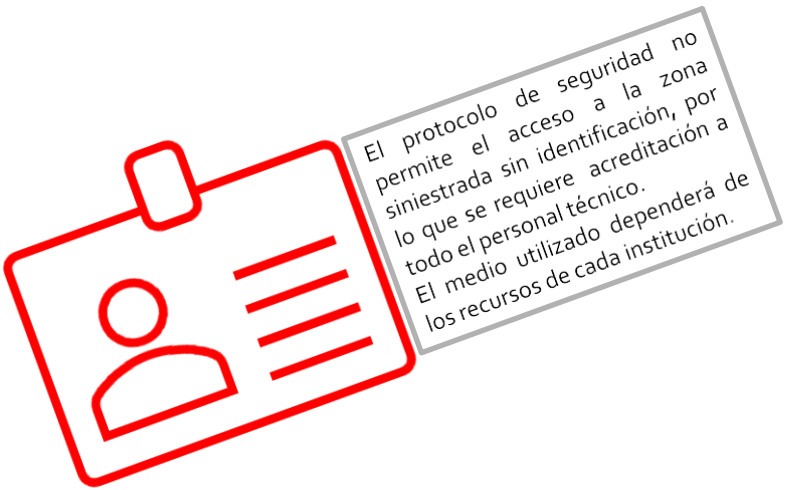
They coordinate the assessment team for the affected works, ensuring compliance with the following *actions:* labelling, stabilisation and evacuation. The procedures, designated in the protocol, must be included in the emergency forms. Only specialist restoration technicians should take on these functions, as they are responsible for determining the treatment priority and the state of preservation of the affected material, as well as determining the first cleaning, drainage, encapsulation or attachment treatments depending on the incident that has occurred.

Packaging and transport manager

Their job is to prepare supplies and supervise the actions of the work packaging team. They will keep a record of operations and, alongside the safety manager, will ensure the correct identification of the affected works. Both will also coordinate the entire transport service to the new location, in the event of transferring part or all of the collection.

Storehouse manager: quarantine and temporary storage

In the event of the establishment of an external storehouse to house the affected collection, a manager is responsible for confirming the arrivals at the storehouse, organising the incoming works and allocating their destination (damp, contaminated or physically damaged). Their function is to coordinate preliminary rehabilitation tasks, monitor quarantine areas, establish climate control within the storage facilities to prevent additional physical or chemical damage, and design stabilisation procedures.

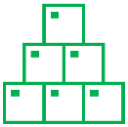


CHAPTER 8

Best practices

Inmaculada Chuliá

Annex 1



Annex 1: Description and recommendations for packaging supplies for movable cultural assets.

The likelihood of damage and alterations to a heritage object increases considerably during handling and transport. For this reason, it is essential that a collection safeguarding plan includes the packaging guidelines necessary to prevent the appearance of new damage after an emergency occurs.

To decide whether it is advisable to pack a work and what is the most suitable packaging, it is essential to carry out a detailed study of key aspects such as:

1- The state of preservation after the incident.
2- Typology of the object and its constituent materials (metal, wood, ivory, etc.).
3- Degree of fragility.
4- Dimensions and weight of the cultural asset
5- Characteristics of the means of transport that will be used for the transfer.

Conducting a detailed study of its volume, weight and dimensions is essential to ensure proper handling. Particular attention should be paid to its structural fragility and the presence of protruding elements, such as handles and grips, gilding, joints and welds.

The packaging of movable cultural assets requires three levels of protection: pre-wrapping, shock-absorbing insulation and the container or box. Of the three levels of protection, the first layer comes into contact with the surface to prevent abrasions. The second layer protects it against the effects of movement and mechanical damage. The third layer of protection, which corresponds to the use of boxes or similar items, allows for long-term storage of the heritage object.

On the outside of the packaging, it is essential to include conventional symbols indicating the position and fragility of the contents, as well as a label indicating what the packaged object is, the area designated for its stabilisation and the urgency threshold assigned in triage.

When objects are severely damaged, the packaging must ensure adequate immobilisation. If the objects are fragmented or scattered, it is necessary to wrap them separately, but avoiding dissociation. To do this, the total number of pieces must be indicated and a number assigned to each of them to facilitate their subsequent re-assembly.

RECOMMENDED PACKAGING MATERIAL

AS THE FIRST LAYER OF COVER:

✓**Acid-free paper (Glassine paper):** This is a transparent, smooth paper, free of salts, additives, and chemical treatments. It has a pH of approximately 7.0 and contains no alkaline reserve. It is easy to fold and adapts to any shape due to its lightness. Ideal for occasions that require some transparency. Its use is suitable for the protection of graphic artworks. It is available in rolls and sheets.

✓ **Acid-free protective fabric:** It must be an acid-free material, with a neutral pH (between 7 and 8.5), which does not chemically interact with the object. This fabric is useful for packaging three-dimensional works, such as sculptures, as well as for insulating frames and easel paintings. Polyester fabrics, such as Sontara® or Tyvek® can be used, which are non-woven fabrics (packaging tissue) with a polyethylene face.

✓**Acid-free tissue:** This is an acid-free fabric with a thickness of 0.001 and a weight of (16 gr/m²). It is composed of acid-free polypropylene (cellulose) and polyethylene (plastic material) to give it consistency. In addition, it is coated with 3% calcium carbonate, which acts as a buffering agent and prevents the migration of acidity into the tissue. It is available in sheets or rolls.

✓**Cell-aire®:** Polyethylene foam sold in coils, sheets and bags.

✓**Photo sleeves:** Mylar® preservation polyester.

AS THE SECOND LAYER OF COVER:

✓**Bubble wrap:** Bubble wrap is made up of polyethylene sheets joined together using mechanical and thermal methods. These bubbles have excellent cushioning and insulation properties. Bubble wrap is available in different thicknesses, transparent and flexible, and is even sold in metallised polyester for heavy and bulky objects. It can also be integrated with Kraft paper.

The bubble wrap film provides cushioning against potential impacts caused by falls, sudden movements or accidental liquid spills. It can also be useful for filling interior spaces.

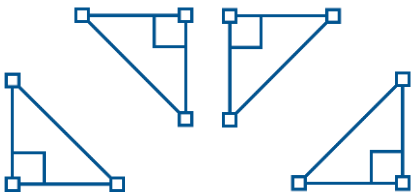
✓**Marvelseal® film**: This is a material composed of polyethylene-vinyl acetate (hot melt adhesive), polyamide and aluminium. It comes in rolls with a thickness of 5 mm and variable length. This material is resistant to the transmission of water vapour and other atmospheric gases. It is flexible and economical, used for passive humidity control in storage and transport bags or boxes. It is ideal for covering transport containers, display cases or shelves. It is also used for airtight sealing or to create low oxygen environments to treat insect infestations. In addition, it is highly resistant to punctures.

✓**Elastic microperforated tarps and / or welding blankets:** These materials are used for the thermal protection of large objects in blast areas, such as tarpaulins for covers.

✓**Tyvek® film:** This is a vapour-permeable but airtight paper sheet that provides great protection against condensation and the infiltration of water and air.

✓**pH neutral adhesive tape and high-quality packaging tape:** pH neutral adhesive tape is used to seal the first layers that remain in contact with the work. High-quality packaging tape is used to secure bubble wrap or other outer covering materials.

✓**Cardboard corner protectors:** The corners of artworks are particularly delicate areas prone to knocks and impacts, so it is important to protect them with cardboard corner protectors.



✓**Expanded polystyrene Foamcore (polyethylene or polystyrene), foam board or Plastazote®:** There are different options for rigid supports, such as polyethylene sheets or foam board, which are useful in various scenarios. These supports provide stability and prevent unwanted movement during transport. The use of polystyrene foamcore sheets with a minimum thickness of 2 cm is recommended. If these materials are used, it is necessary to protect the artwork to prevent it from coming into direct contact with the surface of the foam.

It is essential to use foams that are inert, meaning they do not release gases, and are free of acids. Ethafoam® or Styrofoam® type foamcore sheets that meet these characteristics can be used. Plastazote® is a polyethylene foam with a high level of purity and chemical stability. In addition, it has the property of absorbing shock loads, making it a favourable option. Another suitable option is foam board, which also offers inert and acid-free options, such as Fome-Cor ® board.

✓**Cardboard, PVC or Plastazote® tubes:** as for the tubes used, it is recommended that they be as rigid as possible. These tubes guarantee a solid and secure support for different objects. A determining factor for your choice is the weight, with cardboard being the most suitable for rolling up large, heavy works. Plastazote® tubes are more recommended due to their flexibility for rolling up lightweight and low-volume works, or to avoid the formation of folds or creases in an artwork.

✓Elastic cotton bandages: they are commonly used for textile materials, especially for holding them in place.

✓Velcro®: works with a hook-loop closure system

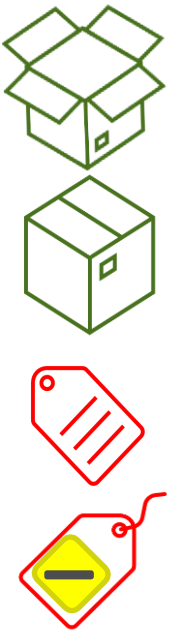
AS THE THIRD LAYER OF COVER

✓Cardboard Boxes: particularly suitable for archaeological collections, books and archives. The use of single, double and triple wall corrugated cardboard is suggested. These boxes offer adequate protection, can be stacked and are sturdy.

✓Corrugated cardboard: used for the manufacture of containers and packaging. This compound material is made up of several layers of paper with a corrugated interior, which gives it a structure of great mechanical strength.

✓Boxes with handles: in the case of boxes with handles, plastic material is preferred as it makes handling and transport easier. This is essentially useful for picking up small fragments or pieces.

✓Fireproof tarpaulins: made of fibreglass or fireproof curtains for protection and thermal insulation. Made of fibreglass with silicone coating on both sides, useful for the on-site protection of elements that cannot be evacuated.



RECOMMENDED PACKAGING MATERIAL
BUBBLE WRAP,
GLASSINE
PAPER, TISSUE
PAPER
TYVEX® FILM
MARVELSEAL BARRIER FILM,
CORRUGATED CARDBOARD
PLASTAZOTE®
FOAM BOARD
MICRO-PERFORATED CANVAS,
POLYESTER OR POLYPROPYLENE
COVER
FIREPROOF
CANVAS, VELCRO®
ELASTIC
BANDAGES
OTHERS

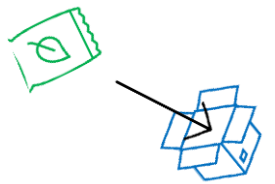
AUXILIARY SUPPORTS FOR HANDLING: PLASTIC
EUROBOX
CARDBOARD
BOXES, WOODEN
BOX, TUBE

LABELLING:
INDIVIDUAL

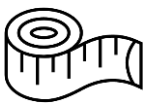
RECOMMENDATIONS

Before proceeding to pack a work, it is necessary to examine various aspects, such as its shape, volume, weight, state of preservation, solidity and thermal insulation, as well as determining whether it has suffered damage, especially caused by water or fire. These factors are essential to ensure adequate protection.

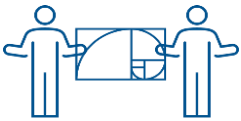
To ensure protection, it is recommended to wrap them in acid-free paper and provide additional coverage with a waterproof layer, such as bubble wrap. This combination of protective covers will help prevent the exposure of the artwork to harmful agents.



It is essential to measure and calculate the proper amount of bubble wrap to provide optimal protection against additional impacts.



To avoid dissociation of collections, it is necessary to label each package with the information corresponding to the object or use QR codes.



GUIDELINES FOR PACKAGING PAINTINGS

✓ Materials that come into direct contact with the artwork must be chemically inert, and for the first covering or pre-wrapping, it is recommended to use pH-neutral papers, such as tissue or tissue paper, in a size sufficient to cover the entire piece. Non-woven fabrics made of polyester, polyethylene, PET (Melinex®) or non-woven fabric based on high-density polyethylene fibres (Tyvek®) can also be used.

✓As a second covering, bubble wrap is recommended, placing the painting face up for better viewing of the work.

✓For paintings without glass or frame protection, the use of tissue paper is recommended. The piece is wrapped in acid-free tissue paper and, if additional protection against moisture is desired, a second covering of bubble wrap is added.

✓It is important to seal the wrapping with packaging tape, without applying pressure to the surface of the work. An informative label for the corresponding triage must be pasted on the outside, along with the corresponding instructions for its transport, such as "FRAGILE" and / or "KEEP STANDING / DO NOT LAY DOWN".

✓In the event of a move without the frame, a PVC or cardboard tube with a diameter of between twenty and thirty cm is used as support. A second, smaller diameter tube is also used inside, depending on the size of the work. Before packaging, it must be ensured that the paint is completely dry. The tube is protected with tissue or acid-free paper, then the painting is placed with the painted surface facing outwards, securing one side with masking tape. It is carefully rolled, coordinating the ends and ensuring that the paper covers the entire surface of the work. It should not be rolled too tightly to avoid damaging the painting. Two layers of tissue and a layer of bubble wrap are added to protect it from moisture and it is sealed with adhesive tape.

✓In the case of wet paintings, be careful with their increased weight; they must be transported horizontally on an auxiliary support, if necessary, because they are vulnerable to tearing or disintegration. They should not be packed immediately. First, drainage and stabilisation are required. The triage team must indicate that they should be placed in wet quarantine so that material stabilisation does not lead to contamination. Temporary protection must be assigned.

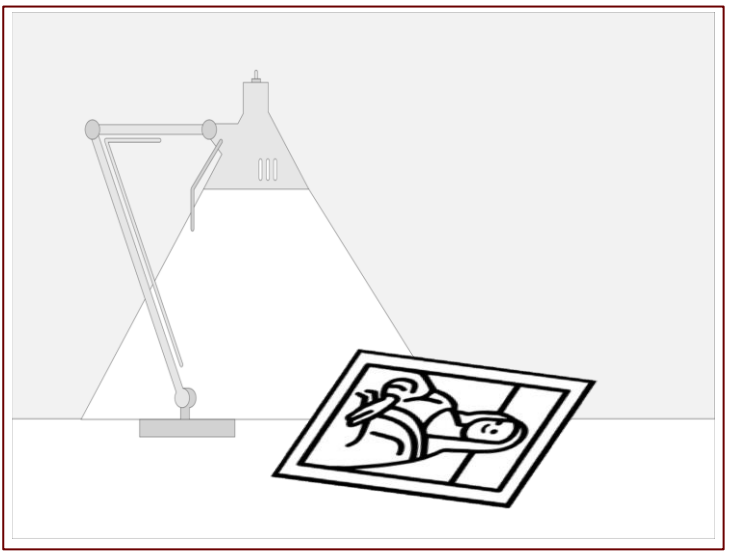
✓When handling works with gilded surfaces, the use of gloves is necessary.

✓In triage, if it is determined that the painting must be transported horizontally, it is advisable to use an auxiliary support at the base, such as a tray, that fits the size of the work. For optimal support, Plastazote® foams can be placed as support elements inside the tray.

✓In the case of paintings affected by a fire and to prevent the filtration of contaminants, it is possible to incorporate activated carbon filters in the first layer within this packaging. A sheet of activated carbon will be sufficient to protect the work until it reaches the stabilisation storehouse.

✓If the surface of the painting is very brittle, it is recommended to move it horizontally with a single covering of tissue paper, thus ensuring its adequate protection during transport.

This extra care in the packaging process will ensure optimal protection of the paintings during transport, particularly in special situations, such as fire damage or fragile surfaces. Maintaining the integrity of artworks during transport is essential for the long-term preservation of their historical and cultural value.



GUIDELINES FOR PACKAGING SCULPTURES

✓Works made of wood or ivory must not be exposed to direct air currents, as they are highly sensitive to changes in environmental conditions.

✓The sculpture must be wrapped with an internal bubble wrap to protect it from scratches and minor bumps.

✓Gold pieces must be protected from rubbing or scratches.

✓It is not recommended to store heavy sculptures directly on the ground, as it is difficult to lift them without auxiliary support at the base. It is necessary for the work to be in its most stable position when it is deposited.

✓If the sculpture has parts that protrude or are particularly fragile, custom-made internal supports will need to be added to hold those parts in place and prevent damage.

✓If the sculpture is stored in a temporary box, it must be secured inside using strapping, special packaging tape, or any other method that ensures it remains in the same position during transport. To prevent the sculpture from moving during transport, any empty spaces inside the box can be filled with cushioning material.

When packaging textiles, it is essential to follow certain guidelines to ensure their proper protection.

✓The first covering must be done with tissue paper in a size larger than the textile work, so that it covers the entire piece. If it is necessary to roll the piece, it must be done with the face facing outwards to avoid damage.

✓Two layers are required to provide full protection. The outer covering is again done with tissue paper, ensuring that it is held and immobilised by means of cotton ribbons tied with a bow, thus protecting the paper of the first covering.

✓In the case of clothing items mounted on mannequins, they are protected by placing tissue paper sleeves over the item. It is important to ensure that the paper sleeves do not put pressure on the piece to avoid the formation of wrinkles or creases.

✓Textiles are particularly sensitive to light, so it is essential to avoid direct exposure. Light damage is cumulative and irreversible, which can affect the integrity and beauty of the piece over time.

By following these guidelines and taking additional precautions, you can ensure that textiles are preserved during storage, transport and display, ensuring that they remain in optimal condition and retain their historical and cultural value over time.

Annex 2

Annex 2: Best practices in the handling of movable cultural assets

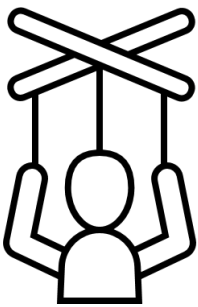
The handling of movable cultural assets inside and outside an institution requires procedures that involve direct human effort (lifting, placing) or indirect effort (pushing, pulling, moving). Handling includes actions of manipulation, transporting and maintaining a raised load, which must be carried out in a properly coordinated manner to avoid additional risks to the preservation of the works. Generally, 20% of object movements are carried out without prior advice from an expert.

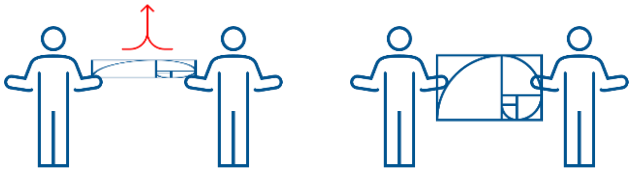
In emergency situations, the risk increases and the usual difficulties multiply, so it is necessary to have a plan for handling collections affected by emergencies.

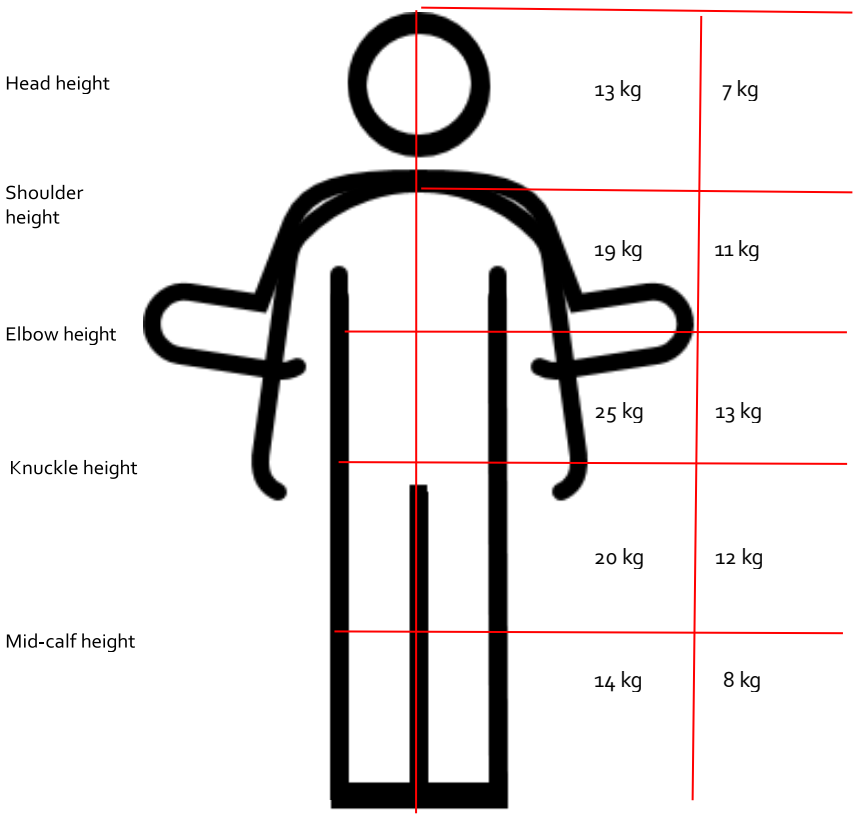
USE EXTREME CAUTION WHEN:

It is important to take into account the following cases in which special precautions must be taken when handling movable cultural assets:

✓When the load of the artwork is too heavy, large or difficult to secure.
✓When the object is not balanced properly or its contents may shift.
✓When the object is placed in such a way that it must be handled at a distance, with twisting or tilting of the same.
✓When the object, due to its external appearance, may cause injuries or blows.







Recommended theoretical weight depending on the handling area.
Data obtained from the Spanish Institute for Health and Safety at Work technical guide, 2003. *Manual handling of loads. (*ROYAL DECREE 487/1997, of 14 April, B.O.E. No. 97, dated 23 April)

AVOIDING DAMAGE RELATED TO TRAVEL

It is crucial to plan in advance all of the movements involved in moving the piece, establishing the safest route possible. This involves ensuring a clear path, keeping doors open and preparing a suitable reception location for the arrival of the piece.

✓When moving certain works or objects, it may be necessary to use auxiliary supports, transport trays or other devices that facilitate their safe and proper transfer.

✓It is essential to note that dragging the works is not permitted. These practices can put both the integrity of the works and the safety of the people involved in their handling at risk. It is important to use appropriate methods, lift works carefully and avoid any action that may cause damage or injury.

CAUTION WITH PHYSICAL EFFORT:

It is important to take precautions to avoid injuries related to physical effort. In emergencies, these are some situations in which additional precautions should be taken:

✓When the pace of work is excessively intense or too fast, it can generate greater physical tension. It is essential to ensure that you manage your time and resources appropriately to avoid overexerting your body.

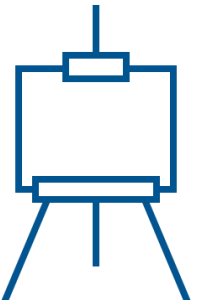
✓When physical efforts involving the spine are too frequent or prolonged. For example, lifting heavy objects or performing repetitive movements frequently or for long periods of time can increase your risk of injury.

✓When the movement is performed in an unstable position. Standing on uneven surfaces or precarious balance increases the risk of injury.

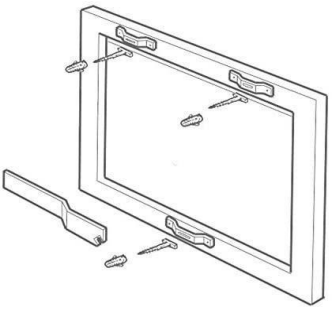
✓When it is required to modify the grip when lifting or lowering a load.

GUIDELINES FOR HANDLING PAINTINGS

✓Whenever a painting needs to be handled and moved, it is recommended that at least two individuals be involved, even if the size of the painting is small. For larger or heavier works, it may be necessary to involve more than two or three people.



✓Before lifting or taking down a painting, you should check that the canvas is correctly positioned in its frame. It is also important to check that the frame is not damaged.

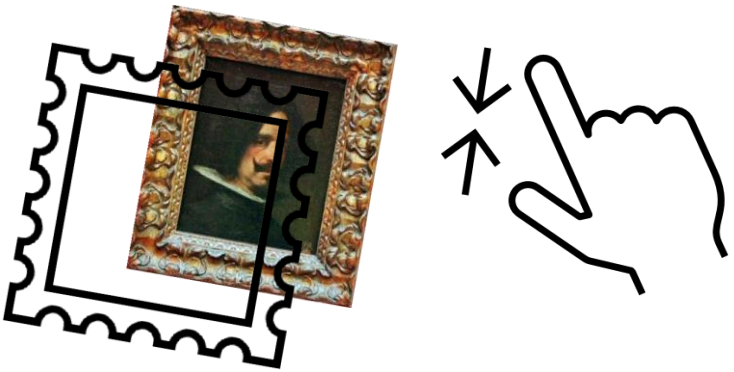


✓It is necessary to verify that there are no blocking systems in the wall mounting, such as anti-theft systems, alarms or other devices. In the event of finding a blocking system, the key or codes for the corresponding system must be placed in the emergency cart.

✓When moving canvases or paintings, it is important to do so in a vertical position, avoiding shaking the canvas and the paint layers. However, if there is a risk of the paint film coming off in a specific area, the transfer must be carried out in a horizontal position.

✓When handling paintings, it is important that the grip points are preferably located on the frame and that it is held with both hands, avoiding touching the painting and ensuring that it is held at the strongest part. Additionally, the position and direction of the arms of both individuals must be symmetrical, with arms extended and uncrossed. This ensures safe handling and minimises the risk of damage to the artwork.

✓It is crucial to maintain visual contact with the face of the painting at all times during transfer to prevent scratches or punctures. Pressure must never be applied to the surface of a painting with your fingers or to the back of the canvas, as this could cause irreparable damage.



✓Paintings must be stored in secure areas with insulation at the base to prevent damage. It is important to avoid stacking paintings, as they could rub against other elements and cause deformations in the canvas due to the pressure of rings or closed eyebolts on the reverse.

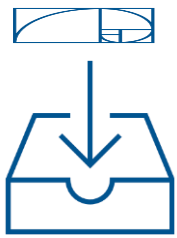
✓When paintings have been protected with glass or other fragile materials, it is crucial to avoid shocks and vibrations during handling. In addition, they should be protected with adhesive tape to prevent possible fractures during transport. This will help prevent any displaced glass shard from affecting the painting surface.

✓In the case of large format paintings that need to be moved rolled up in a tube, it is important to ensure that the painting surface faces outwards. This is done to prevent the paint from cracking, as keeping the surface facing outwards reduces the pressure and stress on the paint layer during transport.

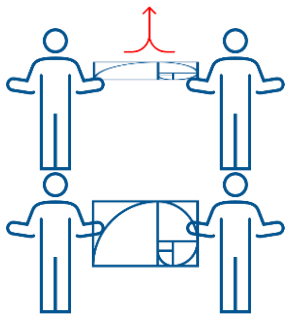
✓When paintings are very wet, it is essential to remove excess moisture before transporting them. The increase in their weight and load makes them more susceptible to disintegration or tears. Before handling them, it is recommended to drain excess water, and it is advisable to remove the frames in the transport preparation area. If the frames are large and heavy, it is recommended to disassemble them *on site* and transport the painting and the frame separately on two separate journeys. This will minimise the risk of damage during transport.

✓If the paintings exhibit combustion deposits they can become brittle. It is important to use maximum caution when handling work exhibiting this condition because there is a risk of collapse or fracture.

✓Works created with pastels, chalk, charcoal or other techniques with pictorial layers that may come off, should always be transported horizontally, with the paint side facing up.



✓For paintings that have lost polychrome parts, or have raised areas, it is recommended to collect and store the paint fragments in a zip-lock bag. This will allow for their preservation and possible restoration in the future.



When moving sculptures, it is essential to have sufficient personnel, just as it is for paintings. Sculptures can be made from a variety of materials, such as cardboard, wood, stone, fabric, metal or a combination of these materials. It is essential to take into account the specific characteristics of each sculpture and to use appropriate handling methods to ensure their safety during transport.

✓The sculptures must be handled in the position in which they are normally found. However, before proceeding with the transfer, it is crucial to examine any loose items or assembled parts, such as bases and accessories (crowns, sceptres, staffs, etc.). These elements must be disassembled and handled individually without being dissociated from the overall ensemble. It is important to pay attention to every detail to ensure a safe transfer and to protect the integrity of the sculpture.

✓Sculptures must not be held or grabbed at vulnerable points, like the head, arms, fingers, neck or legs. These areas are particularly fragile and prone to damage.

✓Do not drag the sculptures on the floor. This type of movement can cause scratches, bumps or deformations in the work.

✓Do not carry or place the sculptures resting on your body or shoulders. This method of transport can be uncomfortable and increases the risk of falls or personal injury.

✓For large or heavy sculptures, move and shift slowly and carefully. Make sure you have the necessary equipment to support and stabilise the sculpture during transport, avoiding sudden movements that could cause damage.

✓When placing the sculptures on the ground, it is recommended to use an insulator or auxiliary element on the base that facilitates its movement without interfering with its stability.

✓When storing a work, it must be placed in its most stable position, to ensure its balance and reduce the risk of falls or involuntary movements that may cause damage.

✓Works made of wood or ivory must be protected from direct air currents, as they are very sensitive to changes in environmental conditions. These materials may expand or contract in response to relative humidity, which can cause cracking or warping. Keep these works in a controlled environment and avoid exposure to extreme fluctuations in temperature or humidity.

✓Gilded pieces require special attention, surfaces with gold leaf are delicate and susceptible to surface damage. It is advisable to use soft materials such as microfibre cloths or cotton gloves when handling these works. They should be stored in a place where they are not exposed to accidental contact or friction with other objects.

GUIDELINES FOR HANDLING ARCHIVAL MATERIAL LIBRARIES AND GRAPHIC WORKS

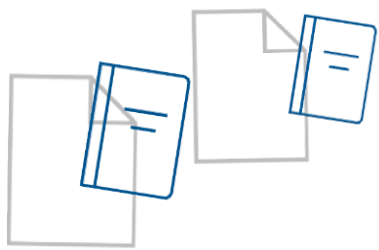
Incorrect handling of archival material, graphic works and books in an emergency situation can have serious consequences due to their specific characteristics. Basic instructions for handling and rescuing paper objects are recommended below.

✓The handling of paper documents must be performed slowly and safely, taking all appropriate precautions, such as wearing clean clothing and gloves. Extreme care is required due to the natural fragility of these materials and their high vulnerability to mechanical forces.

✓If you detect a work in poor condition, for example, with the presence of mould, insects, etc., it is crucial to immediately inform the restoration technicians and / or those responsible for the collection so that they can take appropriate measures to handle it and prevent other collections from being contaminated.

✓Structurally unstable works should always be handled on a rigid base for preservation.

✓One work must never be placed on top of another without adequate separation between them. To avoid damage, it is advisable to use loose sheets or tissue between books or documents to act as a barrier. A handspun or nonwoven polyester fabric, commercially known as Hollytex® or Reemay® can be used.



✓Moving objects abruptly must be avoided.

✓Special care must be taken when handling works mounted with a matte during transport. It is recommended that they be handled and transported horizontally.

✓Works made with charcoal, pencil or other graphic techniques can be altered rapidly, so special attention must be paid to their handling, packaging and transport.

✓Handling of the works must be carried out exclusively by authorised personnel to avoid misplacement and loss of copies.

✓Works with soluble materials, such as watercolours, inks, and historical maps must be frozen or dried quickly.

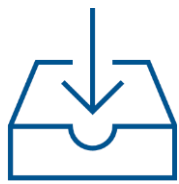
Regarding the damaged area:

✓Never place the artwork on the floor without
any protection.

✓Do not open cabinets, unless the situation is completely under control.

✓Do not open the boxes: under no circumstances should items be removed from their storage boxes.

✓When documents do not have storage boxes, if possible, they will be wrapped in protective paper or plastic before being transported.



✓Always transport documents in an appropriate box or container, avoiding excessive stacking of the material.

Regarding journeys

✓Use rigid auxiliary supports, transport trays, folders or boxes of appropriate quality for the job.

✓When carrying boxes, maintain a horizontal position using both hands. Avoid tilting boxes or carrying them under your arm.

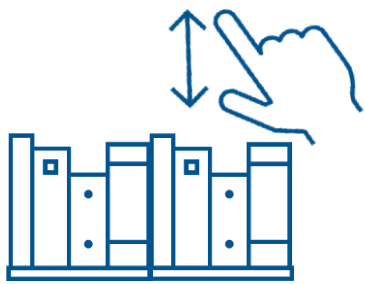
Regarding the position of objects

✓Do not place works face down. Keep the mount flat with the face up.

✓Avoid resting the artwork on its protruding or fragile parts and avoid direct contact with the surface to prevent stains or fingerprints.

✓Wear appropriate gloves for each situation and never handle different materials together, for example, metal and paper.

✓If books / documents are stacked, do not attempt to remove them by pulling on their spines. Instead, carefully separate them.



GUIDELINES FOR HANDLING TEXTILES

Each type of textile has specific handling needs.

✓Many fabrics can be quite heavy, so it is essential to avoid lifting or securing them in just one spot to prevent tearing or detachment of trims and decorations.

✓It is recommended that people handling textiles avoid wearing items that could get caught on the fabric and cause tears.

✓When handling is unavoidable, vinyl (powder-free) gloves must be used due to the sensitivity of the material to sweat, oils and grease.

✓It is advisable to handle textiles on a rigid support covered with Tyvek®.

✓Textiles must be kept on rigid, flat surfaces.

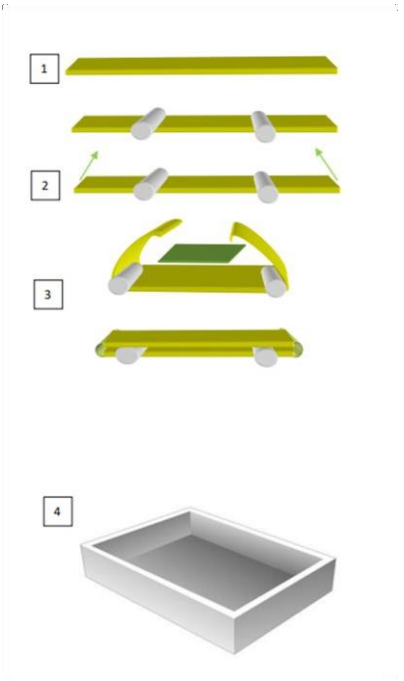
✓If the fabric is too large and needs to be rolled, only plain textiles without embroidery, appliqués or pile should be rolled. This process requires the coordination of all the operators involved. Once rolled, it must be secured with cotton ribbons forming a bow, avoiding the use of adhesive tapes that may leave residue on the artwork. The securing must be established on the outside of the packaging.

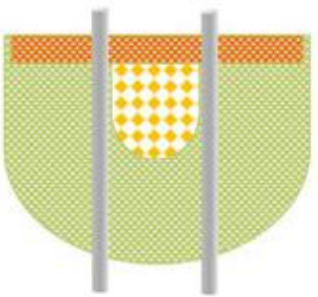
✓It is important to handle the fabric horizontally, using a rigid bed or tray for transport, especially if it has decorations and it must always be protected with Tyvek®.

✓In the case of textiles with volume or three-dimensionality, it is necessary to handle them in their own display system.

✓In the case of pieces inside small boxes, it is advisable to transport them together, without handling the piece itself.

✓If the fabric has been affected by a flood, its weight and load increases significantly. To remove moisture, it is recommended not to apply pressure and to use absorbent materials such as underpads, natural sponges or fleece cloths and remove as much moisture as possible before transport.





GUIDELINES FOR HANDLING GLASS AND CERAMICS

✓It is vitally important to take extreme precautions when handling small, fragile and numerous objects.

✓When moving these items, use containers whenever possible to ensure their protection.

✓Avoid lifting or carrying an object by the handle, edges, decorative motifs, mounting areas, tails, heads or any protruding parts.

✓When handling ceramic or glass objects, especially those with polished, glazed or enamelled surfaces, use cotton or nitrile gloves.

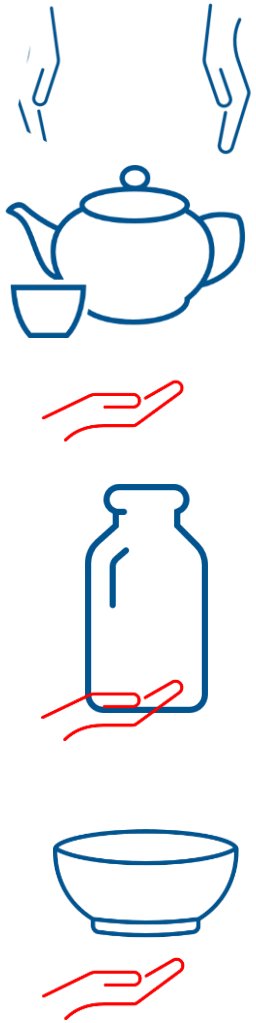
✓Use both hands to lift the object from the base or safest area. Place one hand on the bottom and one hand on the side or near the bottom to provide support and balance.

✓If the object has separable parts, such as lids or stands, remove and transport them separately.

✓Store small items in boxes or trays, wrapping them in tissue paper to prevent damage during transport.

✓If the objects are heavy, use an auxiliary element to move them and ask another person for help. Make sure the cart you use has shock absorption, wheels that are not too stiff, and a padded surface.

✓If any item breaks, collect and preserve the fragments, placing them in zip-lock bags and clearly labelling all information.



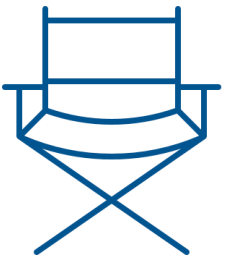
GUIDELINES FOR HANDLING FURNITURE

✓Before moving a piece of furniture, make sure to measure and calculate its correct passage through all points of the route.

✓Avoid dragging or pushing furniture, as this may cause further damage.

✓Do not lift furniture by the arms, legs, backrest or other protruding parts. Find suitable support points to lift them safely.

✓Before moving furniture, remove or secure doors, drawers, lids or any other movable elements to avoid unnecessary movements and accidents during the move.



✓If there are marble or glass slabs incorporated into the furniture, remove them and move them separately to avoid damage.

✓If possible, use a trolley to make moving furniture easier.

✓Please note that exposed parts are not protected from dust, so before covering them, be sure to clean any surface deposits.

✓ When dealing with furniture with raised or loose marquetry pieces, it is preferable to carry out specific securing or immobilisations before transporting it.

GUIDELINES FOR HANDLING PHOTOGRAPHIC MATERIALS, INFORMATION STANDS AND DIGITAL FILES

Correct handling of digital media and photographic collections is of utmost importance, since they are highly susceptible to damage.

Below are some procedures for photographic materials:

✓In the case of photographs with glass or metal supports, it is crucial to handle them separately and carefully.

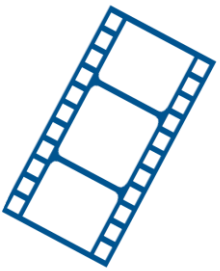
✓It is recommended to use tissue paper or cotton cloth to isolate the material and store them in acid-free cardboard boxes to ensure their protection.

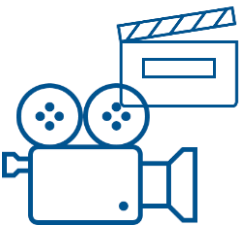
✓With damaged cellulosic negatives, care must be urgent. If time is limited, it is recommended to freeze them until they can be properly stabilised.

✓For photographic materials that are stuck to each other or to the casing, special care must be taken to separate them without causing further damage.

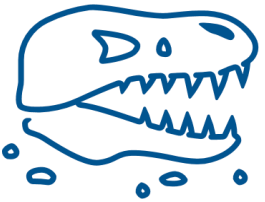
✓ In the case of materials with colours that are diluted and invade other areas, they must be separated and isolated as far as possible to prevent colour migration and damage from spreading.

✓ In the case of cinematographic films, since they are a sensitive material that can easily become contaminated, clean gloves and equipment must be used. Containers or cans must not be opened to avoid bending or twisting the film.



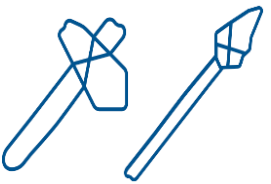


The handling of natural science collections requires extreme caution due to their high vulnerability and complexity. Some objects made of bone, shell or ivory are particularly sensitive to sudden changes in humidity and temperature, which can result in decay, loss of structural integrity or deformation.



✓To ensure proper preservation, it is important to always use auxiliary containers when moving collection items. If possible, it is preferable to use storage drawers as containers to avoid handling smaller parts individually.

✓Avoid dragging or pushing containers, as this could cause irreversible damage to delicate items. It is also essential to refrain from opening the display cases that house the collection without the supervision of a trained specialist.



✓If you are considering moving an individual piece of furniture without removing the entire collection, it is crucial to calculate the dimensions beforehand and ensure that it can easily pass through all the points on the planned route. This will ensure that your transfer is carried out safely, avoiding any risk of damage.

It is essential to take specific precautions when handling metals, especially archaeological and ethnographic materials, as they are sensitive to corrosion. The use of gloves is recommended during handling to avoid the transfer of oils and moisture from the hands, which could accelerate the corrosion of these objects.

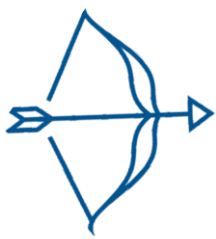
✓Avoid prolonged exposure to moisture, as this is the main cause of deterioration in this type of material.

✓When transporting, suitable containers or auxiliary supports must be used to ensure protection during transport.

✓It is important to take extreme care when handling small and fragile objects. It is recommended to use both hands protected with gloves.

✓When transporting small items, it is advisable to transfer them to boxes or trays and wrap them in tissue paper to provide greater protection during transport.

✓The handling of archaeological and ethnographic materials is complex due to their extreme sensitivity to changes in humidity.



GUIDELINES FOR HANDLING OBJECTS WITH A LIGHT STRUCTURE

Ephemeral architectures are three-dimensional objects built with a light structure not intended for long-term preservation. They are hollow pieces which are very sensitive to being handled. An example in Spain are the Valencian *ninots*, which are burned during the Fallas festival (inscribed on the representative list of the Intangible Cultural Heritage of Humanity by UNESCO in 2016). Since 1934, by popular vote, one *ninot* sculpture has been saved from the fire every year and is kept in the Fallas Museum, and since 1963, the same has been done with the children's *ninot*. Several Valencian towns have Fallas museums where *ninots* that have been spared from the fire are kept, and their collections also include Fallas models and sketches.

Handling this type of collection is very complex. They are made up of a variety of materials, ranging from wooden frames with wires and straw dressed with clothing and accessories, cardboard and straw, burlap, *esparto* grass with an articulated wooden skeleton and dressed with clothing, to figures made with chicken wire mesh or netting, which form the provisional volumes of the figure, later covered with cardboard, wax (heads and hands) or fibreglass and rice paste. In addition, there are *ninots* made entirely of cardboard and figures made of synthetic materials like styrofoam or expanded or extruded polystyrene.

✓Because *ninots* have many protruding parts, it is difficult to determine safe gripping points, so each piece must be assessed before transport to determine the safest areas and prevent fragmentation of the object. It is preferable to grip them from the base to minimise the risk of damage.

✓When transporting *ninots*, it is advisable to use a suitable support to prevent deformation or collapse of the structures.

✓ It is necessary to use cloth or latex gloves to avoid staining the surface during handling.

✓When placing *ninots* on the ground, they must be insulated and their stability must be ensured to prevent possible falls or further damage.

✓To properly handle items such as plaster or plasticine models, gloves must be used and they should be held by the base while being moved, placing them on a secure support.

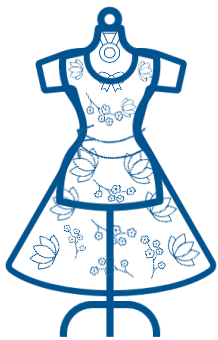
✓In the case of drawings and sketches, it is advisable to follow the basic guidelines for handling archives and documents.

✓For objects related to the construction of a *falla* monument and *ninots* in educational areas, the basic guidelines for furniture must be taken into account.

✓For the handling of old *ninots* with textile garments, the basic guidelines for textiles and fabrics must be followed.

✓It is important to note that calculating the load or weight of objects can be difficult without knowing from which materials they are made.

✓Furthermore, with the incorporation of new material elements, such as digitalisation and 3D printing, it is essential to stay up to date in order to handle and preserve these objects efficiently and carefully.



Annex 3

Annex 3. Health and safety considerations in emergency management.

Emergency situations present scenarios with risks to the health of those involved in response activities. There may be situations involving the presence of certain gases, heat, smoke, contaminant particles, mould, abundant dust, obstacles, slippery areas, lack of light, electronic failures, among other hazards. These situations can put the health of the people involved at risk and, therefore, it is vitally important to protect hands, use clothing that adequately covers the extremities and use personal protective devices for all procedures to avoid injury or illness.

For this reason, first responders, such as firefighters, police officers or specialised units, arrive at the scene of the incident properly equipped with their own personal protection. Likewise, the institution's teams and the heritage rescue unit must ensure that they have adequate personal protection.

Therefore, this material and personal protective equipment, such as helmets, goggles or vests, must be properly disinfected for reuse at the end of the day, while disposable material can be disposed of appropriately. It is essential to follow established protocols and preserve the health of those involved in rescue tasks.

In addition to physical protection, it is important to assess the team's ability to respond in terms of physical endurance, general health and emotional strength. This ensures that the equipment is in optimal condition to deal with the emergency and carry out rescue tasks safely and efficiently.

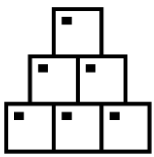
CRISIS SITUATION

ESSENTIALS

PPE (PERSONAL PROTECTIVE EQUIPMENT)

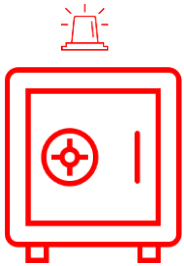
EYE AND FACE PROTECTION,
RESPIRATORY PROTECTION,
FOOT AND LEG PROTECTION,
HEAD PROTECTION,
PROTECTIVE CLOTHING,

RECOMMENDED EMERGENCY MATERIAL



BASIC TOOL KIT, COMPLETE CONTAINERS,
FILE BOXES, AUXILIARY CARTS,
WET VACUUM
CLEANER, FANS,
MOPS AND BUCKETS
HYDROSACK SAND BAGS, WATERPROOF
MARKERS AND NOTEBOOKS, BUBBLE WRAP
AND POLYETHYLENE SHEETS,
LABELS FOR BOXES,
SEALING TAPE, COTTON TAPE AND VELCRO®,
POLYETHYLENE SHEETS AND BIOHAZARD
BAGS,
FLASHLIGHTS AND EMERGENCY LIGHTING,
HOLLYTEX®
BLOTTING PAPER,
FIREPROOF
FABRIC, TYVEX®
FILM
LIST OF EMERGENCY CONTACTS AND
SUPPLIERS

Annex 4



Annex 4. Contents and utility of emergency carts in crisis situations

Emergency carts are portable containers for storing the material and documentation necessary to be able to respond quickly to an emergency situation.

Regarding documentation, the following forms and protocols must be included:

- ✓ Pre-emergency forms with data on the most significant works.
- ✓ Emergency and post-emergency forms and triage charts to record documents during emergency management.
- ✓ A list of suppliers and contacts to be used if necessary.
- ✓ The protocols established for the rescue of collections.

As for personal protective equipment, it must include the following items:

- ✓ Costumes: They are category III teams and are chosen based on the agent they face. They comply with regulated and classified quality and protection standards.

- ✓ Boots: Generally made of nitrile material and PVC, they provide chemical safety, antistatic protection, anti-slip, abrasion resistance and extra ankle protection. They must have high resistance to chemicals.

- ✓ Disposable Personal Protective Equipment (PPE): Also category III, gloves must be resistant to breakage and impact and guarantee protection against different hazards. They can be made of nitrile material, latex or with chemical or biological protection.

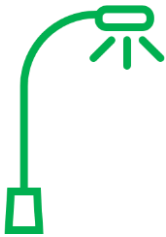
- ✓ Technical fabrics: Technical material with fireproof and hydrophobic properties, reserved for the protection of unique artworks in the collection against extraordinary hazards.

In addition, they may include essential elements for packaging, moisture absorbing materials, materials that absorb contaminating gases and vapours or keys necessary for disassembling the works in the event of an accident.

Annex 5

Annex 5. Items necessary for evaluation and triage

During the evaluation process of an artwork, there is a series of items necessary to be able to determine the state of preservation and carry out a diagnosis.



✓Adequate lighting: Triage work requires optimal lighting to accurately assess the state of preservation and obtain additional details.

✓Clean work surface to protect objects during analysis: this surface must be covered with a padded material and covered with a layer of Mylar® polyester or polyethylene sheet. This ensures a safe environment for handling the objects and minimises the risk of damage during the assessment process.

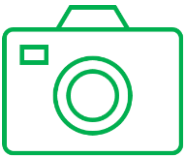
✓Padded mats: these are used to securely hold items, such as ornate frames, and to prevent further damage.

✓Cloth tape measure: useful for taking measurements without causing accidental damage to objects.

✓Binocular magnifier: whether handheld or head-mounted, it allows for detailed observation of objects and potential damage.

✓Ultraviolet (UV) light source and protective goggles: they can reveal certain damages and contaminants not visible to the naked eye. It is important to wear protective goggles to prevent eye damage.

✓Basic kit for the analysis of microorganisms and biological contaminants.



✓Basic tool kit: including pliers, screwdrivers, brushes, cutters, scissors, protective paper, etc., to perform basic preservation actions during triage.

✓Digital camera: essential for recording detailed images of objects and their damage during the assessment process.

✓Pre-emergency forms: it is important to have access to the data collected on these forms in order to follow established procedures and ensure a coordinated response.

✓Notepad, emergency forms and electronic devices: to record information and note observations regarding the state of preservation of each object during triage.

✓Copies of diagrams, images or photographs of the objects: to directly indicate the damage and make notes.

✓Permanent coloured markers: to indicate instructions or point out damage in diagrams or photographs during the

✓Vacuum cleaner with accessories (including soft bristle brushes), to remove dust from damaged works and allow better visibility of surfaces during the assessment process.

✓Tight cotton or latex gloves (hand grease can damage the surfaces of objects, unvarnished contemporary paintings, water-gilded frames, goldsmithing work, etc.)

✓Re-sealable plastic bags with labels for storing fragments that have come loose during the examination (e.g., paper labels, small fragments of the frame surface finish, paint chips, etc.).

✓Complete environmental monitoring equipment.

✓Fine Japanese paper.

✓Natural adhesives and glues in two or three concentrations.

✓Blotting paper (100% cotton fibre, acid-free).

✓Corrugated plastic sheets (polycarbonate).

✓Mylar® (0.5 mm thick).

✓Polyethylene sheets (uncoated).

Annex 6

Annex 6. Basic guidelines for actions in the event of flooding, fire and the presence of smoke and soot

RECOMMENDATIONS IN FLOODED AREAS

These basic guidelines must be adapted to the scale of the incident, the type of collection and the volume of damaged works.

In a flood, the presence of contaminants in the water means that semi-solid materials, including grease, oils, mould or fungi, and other liquids can come into contact with the artworks and permanently damage the materials.

✓ Be aware of whether the flood water is clean or dirty.

✓ Gloves should be used when handling objects, as they can contaminate them and vice versa.

✓Extreme caution is required with regard to serious health hazards associated with mud, mould, smoke or combustion. Wear gloves and protective clothing (Tyvek®), including a respirator if necessary.

✓ The order of high priority collections must be respected (guidelines established in the emergency forms).

✓If possible, objects should be photographed before handling and moving them, and the information should be incorporated into emergency forms.

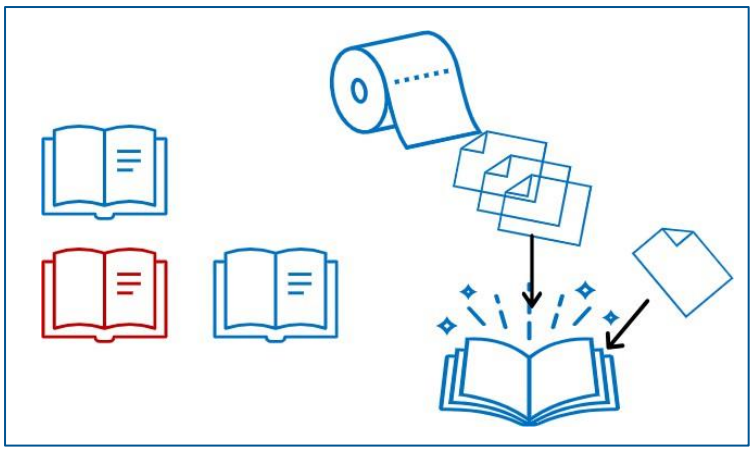
✓It is necessary to analyse whether the materials are damp or wet and the length of time they have remained damp to verify the presence of microorganisms.

✓It is recommended that items that cannot be dried within 48 hours be frozen, but you should first consult the list of items that must not be frozen.

✓In non-ventilated areas with high humidity and temperature (>20ºC and >65% RH), microorganisms will begin to grow on organic elements within 48 hours.

✓Improper handling can have consequences and aggravate the damage.

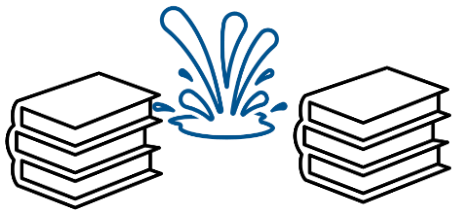
✓In cases where it is necessary to remove mud deposits from surfaces, if possible, the material should be washed with clean water without brushing the surface.



Case study 1 : Rescue of wet documentation after a flood.

Excess water in files can be caused by various factors, whether internal or external. Common internal factors include broken pipes, leaks from damaged air conditioners, and more. Losses resulting from natural phenomena, such as prolonged rainfall and / or flooding, are considered less common external factors.

Both scenarios can cause a range of damages, increase the presence of contaminants and promote the development of bacteria and fungi, underlining the need for drying treatment as soon as possible.



✓Drying large quantities of books on site to remove moisture should be done in an isolated area, if the necessary space is available.

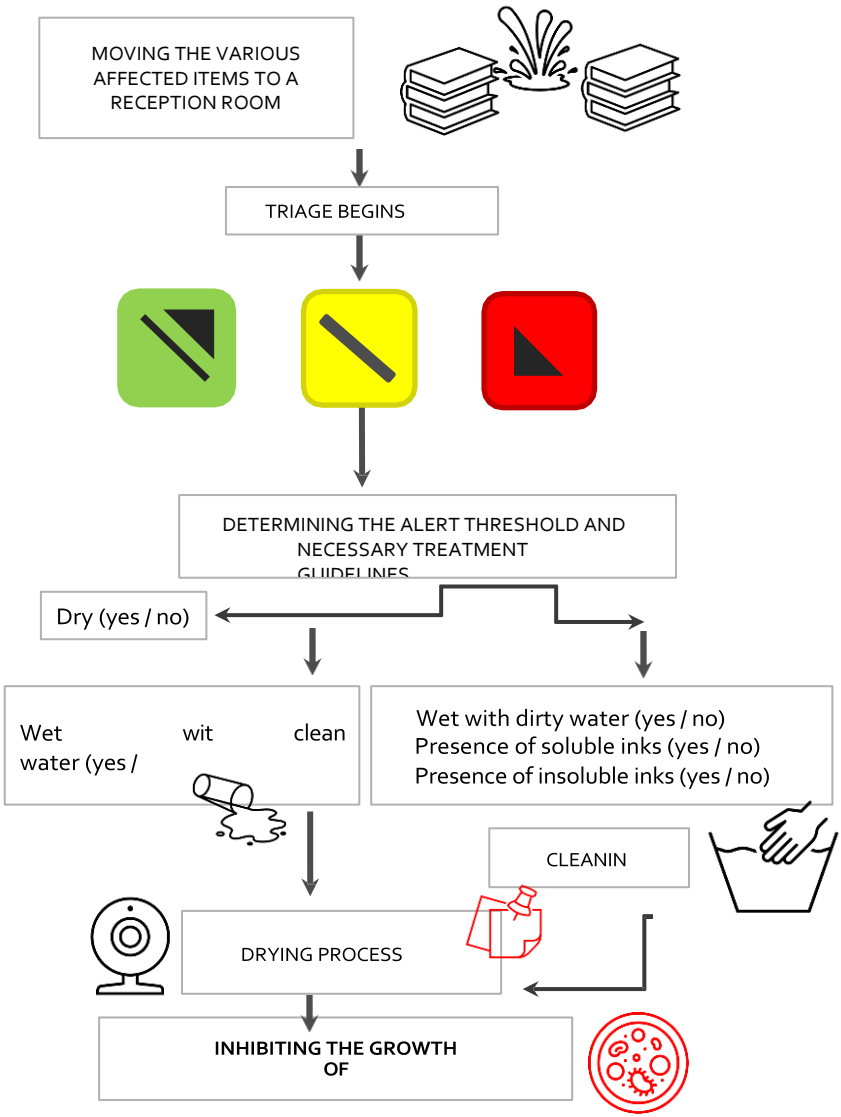
In more critical situations, especially in areas with high moisture levels or where water is present, the use of water extraction pumps is recommended as a first step and to effectively dry the space.

✓In cases where the power and climate control have been interrupted, it is recommended to open doors and windows for air circulation as an alternative to using fans.

✓Excess moisture should be removed by means of drainage; for example, if there is liquid water inside a box or archive, it is appropriate to make a small hole in the bottom of the box, avoiding tilting the box.

The procedure and assessment or triage of the damaged archive would be in accordance with the following procedure for each artwork:

ASSESSMENT WITH FORMS: PRE-EMERGENCY, EMERGENCY AND POST-EMERGENCY.

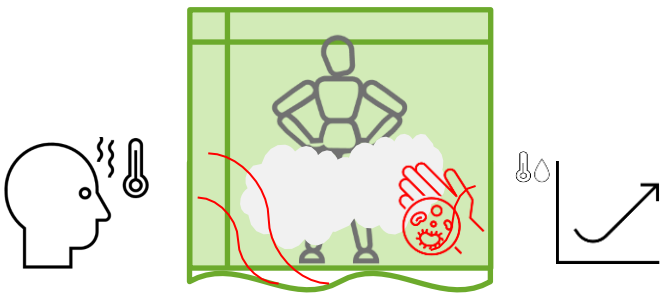


Case study 2: RH and T values above 75% in an easel painting room.

The occurrence of an emergency can cause repeated severe fluctuations of the relative humidity (RH) values within a room. The most alarming consequences include the deformation of the canvas supports of the paintings, bulging at the bottom, the appearance of cracks in the wooden supports of some works, the peeling of some varnishes or the lifting of the paint film, among other damages.

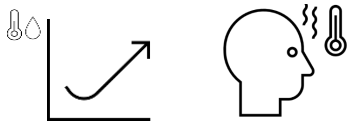
Although it could be considered within the scope of preventive preservation, the magnitude and number of works that may be affected define this situation as an emergency.

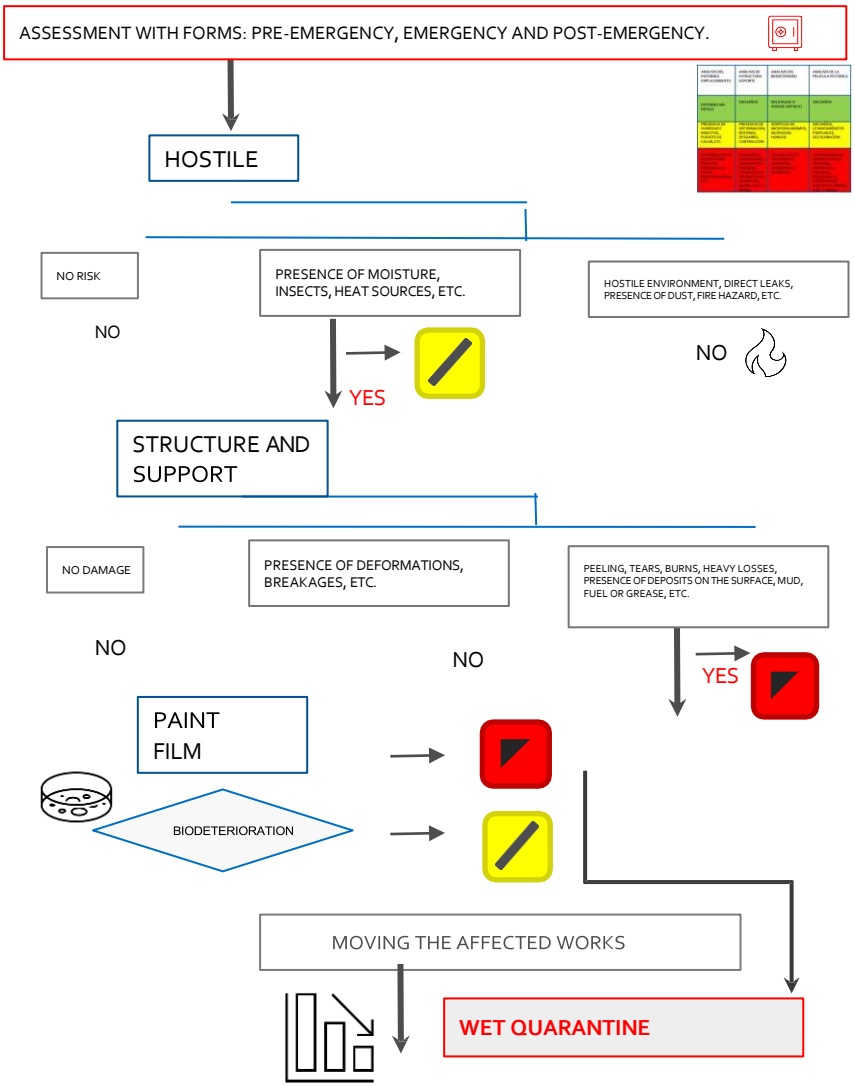
The procedure to be followed would include an initial assessment and triage of each affected work. The resulting report would determine the stabilisation in wet quarantine, and the conditioning interventions that should be carried out only in some works.



After stabilisation, the works could be relocated to the room. As a prerequisite, it is essential to ensure environmental sanitation of the affected rooms before relocating the damaged works.

RH and T values above 75% in an easel painting room.





RECOMMENDATIONS IN AREAS AFFECTED BY FIRE, SMOKE AND SOOT

After a fire, the presence of gases, smoke and contaminants in the air constitutes a serious risk to health and heritage assets. It is imperative to wait for specialists to assess the affected area and to ensure that noxious gases are not present before proceeding to rescue the collections.

✓ Smoke and airborne contaminants pose a serious health hazard.

✓ It is necessary to be adequately protected with the use of Personal Protective Equipment (PPE).

✓ The abundance of soot makes it difficult to identify objects, so it is important to take extra precautions to identify affected objects.

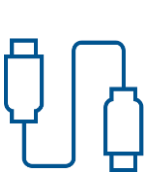
✓ It is recommended to document the arrangement of the objects using photographs and to gather as much information as possible about the environment in which they were found.

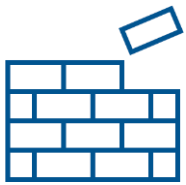
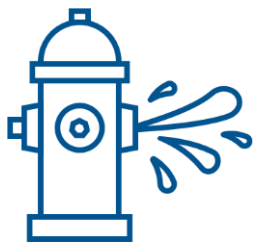
✓ Gloves must be used when handling objects.

✓ It is recommended to vacuum soot from the surface of objects as soon as possible, using a vacuum cleaner equipped with a HEPA filter. To prevent the extraction of small fragments or parts by suction, a stretched cloth gauze should be placed over the opening of the vacuum cleaner nozzle. In order to prevent abrasion or soot stains, it is also important to prevent the vacuum rod from touching or dragging across the surface of the object.

✓Certain building materials pose potential risks to artwork following a fire. These materials include specific insulators, such as polychlorinated biphenyls (PCBs) found in some transformers and older fluorescent light bulbs, lead-based wall paints, and mercury vapor emitted by fluorescent lights, among others.

✓The presence of hydrogen chloride (HCl) generated after a fire caused by the combustion of PVC materials spreads through the smoke and can be extremely corrosive to artistic materials. This contaminant is a form of hydrochloric acid that is generated when the PVC materials present are heated.




CHAPTER 9

Procedures and resources for stabilising damaged cultural assets

Inmaculada Chuliá

Annex 7

Annex 7. Methods and tools for stabilisation.

The stabilisation of damaged works of art involves highly complex procedures, so it is imperative that intervention teams become thoroughly familiar with the corresponding protocols and methodologies in order to successfully address these situations. What is essential is an organised response with a detailed plan and all personnel being trained.

The first procedure to be carried out is identification and the corresponding entry record using the post-emergency form.

Depending on the nature of the incident, it is recommended to establish different quarantine areas according to the stabilisation and recovery treatments required by the affected collections.

Below is a list of essential procedures and resources for stabilising collections affected by floods or fires.

Drying collections: Using proper drying techniques prevents further damage and prevents mould, warping, splitting or cracking.

This requires equipment such as portable dehumidifiers to quickly reduce moisture levels, and absorbent materials, such as blotting paper, polyester fabrics, silica gel or Art Sorb® to effectively regulate moisture levels.

This procedure is applicable to other types of systems.

Controlled ventilation: This accelerates the evaporation of water on damaged objects, allowing adequate air circulation to facilitate the drying process.

Freezing systems: freezing or freeze-drying is a useful option for stabilising large quantities of hides, leather, textiles and water-damaged paper collections. Not all materials can withstand these treatments.

It is essential to avoid freezing composite materials, paints on fabric (especially acrylics), inorganic objects such as metals, stone, ceramics and glass, basketry, as well as materials such as teeth, bone, ivory, horn and shell. In addition, some types of photographs that are very sensitive to low temperatures should be excluded from this process.

Freeze-drying: This specialised dehydration process removes moisture under controlled conditions.

Mechanical restraint: in situations where required, mechanical restraint techniques will be applied to prevent any unwanted shifting or movement of fragile or damaged objects, thus ensuring their protection.

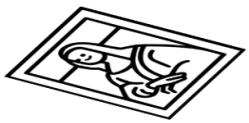
Humidification: for very specific situations where a controlled increase in moisture levels is required with certain materials.

Decontamination: in the event of the presence of chemical or biological substances, specialised and safe decontamination and / or fumigation procedures will be implemented, ensuring the integrity of the works.

Within the context of emergency response, it is recommended to make decisions on post-emergency treatments to be carried out in the initial hours after the damage has been caused. This ensures and prevents potential further damage to affected objects. Speed and accuracy in response are crucial to minimise the impact of initial damage and to facilitate effective stabilisation or restoration of affected artworks.

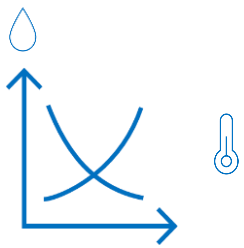
METHOD FOR DRYING PAINTING COLLECTIONS

For paintings, it is essential to remove moisture immediately, completing the process within 24 to 48 hours. During this procedure, it is essential to be aware of important risks, such as shrinkage and deformation of the materials on which artworks are painted, as well as separation and loss of the paint layer. Some binding agents may be sensitive to water and may become altered or dissolve. Wooden frames could also swell, with the added risk of damaging ornamentation. In addition, there is a considerable risk of microorganisms developing in this type of artwork.



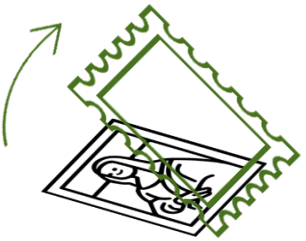
To prevent the paint layer from coming off, the paintings must be placed with the paint surface facing up, on a stretcher prepared with blotting papers to absorb moisture. It is recommended that these blotting papers be sequentially changed to maintain process effectiveness. It is advisable to distribute a uniform weight over the surface using an insulating cover.

✓It is advisable to protect work tables with white cotton sheets or felt fabric to prevent any further damage to the paintings during the drying process.



When laying the painting flat, it is recommended to use suitable materials, such as Mylar® sheets to cover the padding, providing an additional layer of protection.

✓To ensure adequate air circulation and to control moisture levels, it is advisable to place fans and dehumidifiers in the affected area. These devices must be used under constant supervision, following established guidelines depending on moisture levels and the work space.



✓Wet paintings and frames should never be placed against each other, as this allows moisture to be transferred from one work to another.

✓In the event of wet paintings or canvases, it is necessary to remove the frames and place them in a safe, dry place, carrying out their assessment and stabilisation.

✓Wet paintings may exhibit white spots, which sometimes indicate damage to the surface and varnish. In these cases, it is necessary for a restorer to carry out the appropriate treatment once the layers of paint have been stabilised.

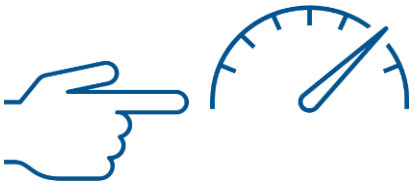
✓It is essential to consider that the viscoelastic properties of the paint materials and their mechanical behaviour can change when they are subjected to severe exposure to water.

✓If the paintings come into contact with salt water, they must not be dried, as drying could cause the salt to crystallise and lift off the paint.

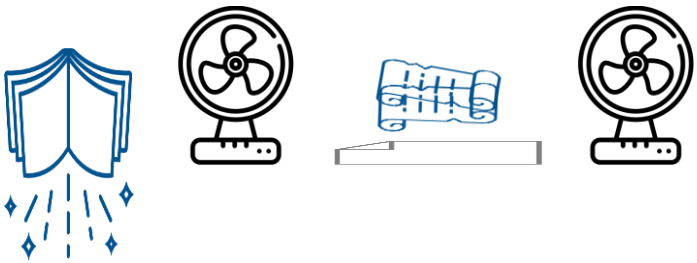
✓In cases where they come into contact with wastewater, mud, contaminants or nitrates, it is recommended to immediately refer them to wet quarantine under monitoring and supervision. Appropriate decontamination treatment is necessary.

✓After controlled drying and mechanical stabilisation, it is recommended to consolidate the paint layer by using suitable adhesives.

✓In situations where paintings cannot be moved due to their location and remain in the affected room or storehouse, it is recommended to use vacuum cleaners in dry / wet mode to remove water from the floor, preventing it from affecting the works of art and helping to maintain a safer and more controlled environment.



The main objective is to apply controlled drying to prevent damage to the materials. By strictly following best practices, a gradual and careful drying process will be achieved, ensuring the preservation of the objects. It is essential to carry out this procedure with caution and to be meticulous to ensure the integrity of the works of art and to prevent any further deterioration during the recovery process.



METHOD FOR DRYING DOCUMENTS AND PAPER MATERIALS

When dealing with collections of documents and paper materials, it is vitally important to safely stop the growth of microorganisms, as their presence can cause serious problems. It is recommended to carry out a classification according to the DEGREES OF MOISTURE: wet, partially wet and damp, and to refer the most complex and highest risk cases to wet quarantine.

If it is not possible to dry a collection within 72 hours, freezing may be an option to buy time. This method will stop any microorganism outbreak that may be beginning and will prevent the deterioration of soluble and metal gall inks.

With works that can be air-dried, it is essential to carry out this process gradually, ensuring that fresh, dry air circulates gently throughout the space used. Drying can be expedited with the help of one or more fans directed at the wall, but never directly at the documents to prevent undue stress.

To do this, first find a cool, dry location with relative humidity similar to the pre-emergency conditions or below 65%.

If possible, improve air circulation by opening doors and windows or using fans.

If spores and hyphal remains are detected, it is advisable to gently vacuum once dry, using a soft, wide brush to gently remove mould dust from the surface of the item. It is essential to be careful not to rub the mould to prevent it from permanently adhering to the paper fibres. To carry out this treatment, it is advisable that it be performed outdoors to prevent the contamination of other items.

Remember that each affected object may require a particular treatment, so it is essential to adapt the drying and stabilisation techniques according to the nature of the material and the degree of damage. The delicacy of the process must always be taken into account to ensure the preservation of the item and prevent further damage.

✓If you find wet items that may cause additional problems, remove them from the affected area (e.g., wooden boxes, books in damp boxes, etc.). Be patient and gently blot wet items to remove excess water.

✓Be sure not to place damaged items on the floor to prevent further damage.

✓Remember, the proper choice of drying method is crucial to effectively preserve and restore affected objects. The right choice ensures that documents are optimally treated and additional damage is prevented during the drying process.

✓ It is recommended that the document be immobilised between two covers, such as Hollytex paper, until the paper is completely dry, so that it is protected during handling.

✓ Once the mechanical risk has been removed, to remove excess water, allow the document to drip slightly at an angle and then place a clean sheet of blotting paper over it, covering it with a second sheet of Hollytex®. The most effective way to eliminate moisture is to place blotting paper or ultra-absorbent white paper between the pages of all documents and books.

✓ It is important to change the blotting paper periodically throughout this process. To make these operations easier, it is advisable to use an auxiliary material, such as cardboard, that allows you to turn the document carefully and safely.

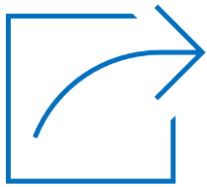
✓Humidity can be regulated to RH values of between 50% and 75%, with stabilisers such as Art Sorb® (silica gel and lithium chloride).

✓Throughout the process, it is essential to take caution without causing additional damage. It is sometimes necessary to apply light pressure until the document is completely dry.

✓The fully soaked volumes are stored individually in transparent polyethylene bags, to facilitate their handling and the subsequent freezing process. This prevents compaction and contamination within the freezer cells.

✓The bags must be sealed and placed on a tray. Storage in boxes or containers is recommended, trying to evenly distribute weights and sizes.

✓Freezing at a temperature of o°C allows the volumes to be adequately safeguarded, stabilising their condition over a very long period of time.



METHOD FOR DRYING ARCHAEOLOGICAL MATERIALS

Water seepage into the cracks in stone can lead to decohesion and microabrasion of the material, causing portions to come off. This problem is most common in clastic sedimentary rocks, such as sandstone and limestone.

✓Surfactants are recommended for cleaning wet surfaces, whereas mechanical cleaning is recommended for dry surfaces.

✓When recovering detached fragments from stone objects, it is important to identify the damaged parts of the original block and proceed to temporarily fix the detached portions using modelling clay, similar to plasticine.

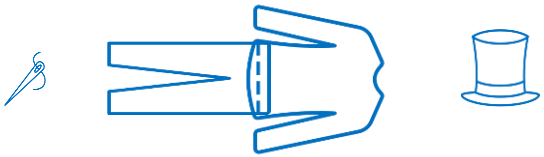
✓For metallic elements, it is necessary to treat them with corrosion inhibitors and apply an oil film on them to slow down the oxidation process. In this case, cleaning can also be carried out

by mechanical intervention.

✓Surface deposits of soot cause chromatic alterations in objects. To remove soot particles, it is recommended to clean by suction and blowing with compressed air, followed by the use of products with diluted alkaline content. In addition, rubbers and sponges with specific chemicals will be used for this task.

✓It is important to note that careful restoration is required to address these issues and preserve the integrity of the affected objects. Therefore, precise and delicate techniques must be applied during the cleaning and restoration process.

In conclusion, it is necessary to carry out a meticulous restoration in order to return the stone and metal objects to their optimal condition, thus guaranteeing their preservation and protecting their historical or artistic value.



METHOD FOR DRYING TEXTILES

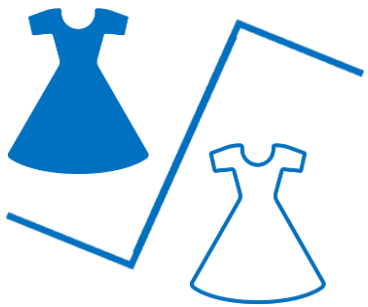
Most textiles can be air-dried with good air circulation. However, it is crucial to take certain precautions into account to prevent further damage.
The material complexity of silk, linen or cotton, among others, and their deterioration is difficult to address, since they react in different ways to the same drying process.

Fabrics with dyes must not be air-dried as this may cause permanent stains. Instead, it is advisable to keep textiles damp until they can be dried properly. If there are a large quantity of items to process and limited resources, some items may be temporarily frozen until controlled drying can be performed.

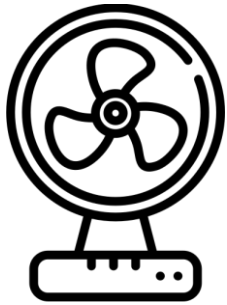
Before starting the drying process, it is important to remove any metal accessories and dry them separately. Accessories that may cause staining (corrosion) or that may catch on textiles but cannot be removed must be isolated from the fabric using materials such as Mylar®, polyethylene sheeting, polyester fabric such as Reemay® or Pellon®, or waxed paper.

✓It is advisable to immediately separate light and dark garments to reduce the risk of stains. If saturated items cannot be easily separated, they can be supported on nylon screening and immersed in cold, clean water to gently differentiate them. In more complex cases, they can be frozen for treatment at a later date.

✓For those items that are still dirty but saturated, rinsing with cold, clean water before freezing or air-drying is recommended. It is essential to perform this specialised process carefully, using gentle sponge movements to loosen dirt.



✓For those textiles that can be air-dried, it is crucial to perform the process gradually and to ensure that dry air circulates gently throughout the space used. Fans can be used to help dissipate moisture and prevent the growth of microorganisms. It is important to avoid placing fans where they are blowing air directly at materials, as this can cause uneven drying and stress on fabrics.

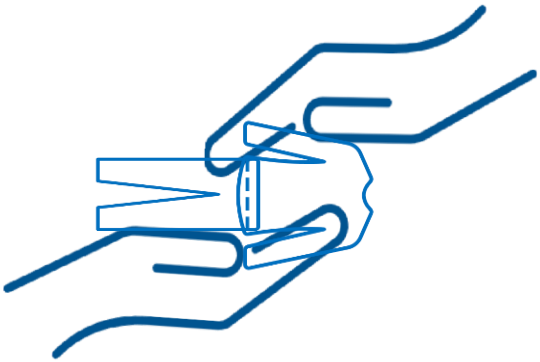


✓ Freezing is an effective method for most wet textiles, especially those with dyes or microorganism growth. Proper cleaning and drying can be carried out at a later stage.

✓Even when textiles appear to be dry, they may still be at risk of developing mould and fungal outbreaks if there is any residual moisture or if the relative humidity is above 65%. To reduce this risk, move items to a cooler, drier environment with humidity below 65% and ensure good air circulation.

✓Check textiles daily for any signs of microorganism growth. If mould is detected, take appropriate health precautions and quarantine affected items for treatment.

Mould growth can permanently damage or stain textiles, and eventually they can lose their strength completely.



Handling wet textiles and large items such as tapestries, carpets and curtains is complex and difficult. These objects can be very heavy and put additional pressure on weak areas. They will exhibit deformation in their weft and warp, so they must be fully supported at all times using rigid boards, such as polyethylene sheets on plywood, rigid plastic sheets such as plexiglass, Cor-X or Coroplast®, or flexible sheets such as polyethylene or screened nylon. Containers like plastic tubes can also be used for this purpose.

AIR-DRYING:

Wet items are spread out on tables with absorbent materials in a space with constant air exchange.

The temperature should be below 20°C and the humidity should be below 50% RH.

The installation of fans in the drying area is required to speed up the process and reduce the growth of microorganisms.

With books, it is necessary to insert absorbent sheets every certain number of pages, starting at the end of the book. Existing moisture is extracted and total drying is accelerated. The interlayered sheets must be changed, completely turning the book each time the task is performed. When the book is dry but cool to the touch, it is closed and placed flat on a table or other horizontal surface and secured with a light weight.

Advantages

No risk of over-drying.

It is a cheap method, no special equipment is required.

Easy to monitor with portable measuring instruments. The collections remain at their institution.

Disadvantages

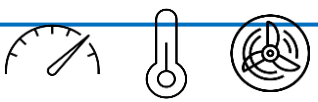
This is a useful procedure for few books and damp or slightly wet documents.

Large, clean, dry and ventilated spaces are required.

If proper technical control is not carried out, there is a risk of the appearance of microorganisms.

It is a very laborious methodology.

Books printed on coated paper cannot be air-dried properly, the distortion process continues, as well as the appearance of water stains.



DRYING WITH DESICCANT AIR

Objects are readjusted for even drying.
The temperature is generally controlled at parameters of 55-50°C with a relative humidity controlled at <20%.
Air circulation must also be active.

Advantages

Moderately damp materials can be dried using a gentle method.
Access is always possible.
Large quantities can be dried.
The drying is much faster than air-drying.

Disadvantages

Some materials cannot be dried properly this way (e.g., coated papers).
The appearance of microorganisms is still possible.
To obtain a good result, good technical control in preventive environmental preservation is needed.

VACUUM THERMAL DRYING

Air is extracted, heat is introduced and the materials are dried above 0°C, so they remain damp while they are dried. In this case, it is necessary to rebind the books and place them back on the shelves, as well as to increase the shelving and storage space.

Advantages

Fast and "less expensive" method.
It can help eliminate smoke / odour.

Disadvantages

Additional wetting and heating allows for renewed swelling, colour bleeding, and severe distortion.
Over-drying may occur and coated papers will stick together irreversibly.
Organic materials age with heat.

Annex 8

Annex 8: Use and benefits of freezing systems in the preservation of cultural assets

One of the priority interventions in emergency situations is the drying of materials, since organic components affected by water constitute a high risk.

There are several methods for drying documents. Constantly evolving, the freeze-drying method is the most effective and efficient, given that no microorganism can develop at temperatures below -10°C.

Freeze-drying is a drying method in which water is removed by freezing the wet product and subsequent sublimation of the ice under vacuum conditions. By supplying heat, the ice sublimates and the vacuum prevents it from passing through the liquid phase. This sublimation process prevents further damage to the documents treated because it respects the structure of the paper and other elements (leather bindings, parchment, wood, etc.).

Freezing wet or damp paper material, books and documents enables the:

- Inhibition of the proliferation of microorganisms.
- Disinfection of the paper material from any insects present.
- Stabilisation of soluble inks and dyes.
- Drastic reduction of chemical and physical reactions, for example, preventing adhesion and limiting the swelling of materials.



FREEZER DRYING

Wet materials are dried by slow sublimation.
The temperature in the freezer should be maintained between 0º and -12ºC.

Advantages

Very gentle method.
Low cost if the equipment is available.

Disadvantages

It is a very slow procedure, from 4 to 18 months.
Poor accessibility to the collection.


VACUUM FREEZE DRYING

The frozen materials are placed in a vacuum chamber. Air is extracted and a heat source is introduced.
The materials are dried at temperatures below 0 degrees, so that they remain frozen throughout the process.
Sublimation takes place: the ice crystals vaporise into a gas without melting.

Advantages

Suitable for most materials.
The only method for water-saturated books.
No wetting, swelling or bleeding of colours.
Coated papers do not stick together.
The dirt falls off.

Disadvantages

Higher initial cost.
Some distortion still occurs.
Collections must be transported off-site.

Annex 9

Annex 9: Mechanical restraint. Techniques and tools for immobilising cultural assets at risk.

Mechanical restraint is an essential strategy to address various problems that may arise in structures and coatings, such as shrinkage, expansions, microcracking of the material, decohesion, cracks, detachments and separations. This technique allows the damage to be contained and prevented from worsening, preserving the integrity of the affected objects and surfaces.

The mechanical restraint process involves careful prefixation of the damaged fragments. For this purpose, strips of adhesive tape and organic adhesives are used, which ensure a firm hold without damaging the original structure. In addition, plasticine modelling clay is used to fill any gaps and cracks, strengthening the whole.

It is important to note that the methods employed during mechanical restraint are reversible, meaning they can be removed without damaging the original material.

It is worth mentioning that the approach used in mechanical restraint may vary depending on the type of material being treated. Restoration experts carefully evaluate the specific characteristics of each material and select the most appropriate methods to ensure optimal and long-lasting results.

In summary, mechanical restraint is a highly effective technique for addressing damage and wear problems in structures and coatings. By implementing this strategy with reversible methods adapted to each material, it is possible to preserve objects while ensuring their stabilisation.

Annex 10

DECONTAMINATION IN INTERVENTION WITH CHEMICAL AND BIOLOGICAL RISK.

Annex 10: Decontamination procedures and measures in interventions with chemical and biological risks

This section deals with the importance of taking appropriate action regarding objects affected mainly by fires and those affected by contaminated water, as well as the need to take specific measures to reduce contamination and ensure safety.

It is advisable to carry out several classifications; among wet objects, classification based on the degree of moisture and dirt is vital: wet, partially wet and damp. In the most complex and high-risk cases, it is necessary to transfer them to a wet contamination quarantine.
It is also suggested that they be classified according to the type of damage they have suffered: direct fire damage, damage from smoke deposits, damage from water used to extinguish the fire, and insignificant damage that may cause airborne contamination.

- ✓ In cases where it is not possible to identify the works or objects, it is recommended that they be moved to a safe place for examination by specialists in the field.
- ✓ To remove airborne contaminants, it is advisable to use activated carbon filters.

The objective is to organise the decontamination and quarantine areas so that stabilisation is adequate.

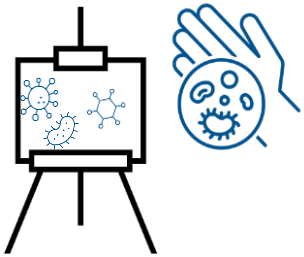
MICROORGANISMS

When the emergency is caused by the presence of microorganisms, it is necessary to quarantine the entire room and affected areas.

✓To prevent serious health risks, it is important that all staff protect themselves by using personal protective equipment (PPE).	✓It is essential to remove spores by vacuuming and cleaning with brushes. Although inactive, these spores could be reactivated under favourable conditions, so their complete elimination is crucial.
✓Vacuum cleaner filters and brushes must be changed frequently to prevent contamination from the spread of spores.	✓Appropriate filters must be used.
✓Once we identify the presence of fungi and bacteria in water-damaged materials, preventing their spread can be complicated. However, preservation at low temperatures or freezing can slow their expansion.	

✓Some collections may be hazardous due to potential pesticide residues they may contain, alongside a broad range of chemicals that were used for their preservation in the past. Collections with skins, feathers, ethnographic textiles, zoological collections with insects and taxidermy, pharmaceutical collections and others preserved in liquids. Although the level of exposure to these materials is low, protective measures must be taken against elements such as mercury or lead.

✓It is essential to put those objects affected by smoke with residues of an acid layer into dry quarantine. It is also essential to URGENTLY notify a specialist with experience in the type of damage present.



✓Surface deposits caused by soot can result in chromatic alterations.

✓To remove soot particles, suction cleaning is recommended. The process is then completed using special chemical rubbers and sponges with products containing diluted alkaline.

✓In the initial stages of cleaning, the surface should be thoroughly vacuumed using a vacuum cleaner equipped with a HEPA filter. To prevent any small parts from being sucked into the vacuum cleaner, it is important to place a tightly woven gauze around the tube hose (although the suction should not be strong under any circumstances). Care should also be taken to ensure that the hose nozzle does not touch or drag on the surface to avoid abrasion or soot stains.

✓It is crucial to note that in some cases, subsequent restoration will be necessary.

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