

POLITECNICO DI TORINO

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Architect as Registrar: when art meets architecture



**POLITECNICO  
DI TORINO**

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This thesis was born from the encounter with the course of Architecture and the passion for art, which has always accompanied me in life. It wants to demonstrate how the figure of the registrar, still little known, can be covered by such a complex and sophisticated figure as the architect. I am strongly convinced that art and architecture move hand in hand and are closely related to each other, that's why I wanted to deepen this research field, totally unexplored especially from an architectural point of view.

Questa tesi nasce dall'incontro con il percorso di Architettura e la passione per l'arte, che mi accompagna da sempre. Essa vuole dimostrare come la figura del registrar, ancora poco conosciuta, possa essere ricoperta da una figura così complessa e sofisticata quale è l'architetto. Essendo fortemente convinta che arte ed architettura si muovano di pari passo e siano strettamente legate fra loro, ho voluto approfondire questo campo di ricerca, totalmente inesplorato soprattutto dal punto di vista architettonico.

# ABSTRACT

In the debate for the definition of the registrar role, a relatively recent figure and little known especially in Italy, we meet various professionals from multiple fields who claim the possibility of holding this role. Among these professionals, the figure of the architect seems to be a valid candidate, as she has the necessary skills not only in the field of history and theory of restoration, as well as art and architecture history, but also in the structural field, conservation of materials, technical physics and, of course, exhibition. Therefore, the thesis aims to demonstrate that the specific skills of the architect can be used in museums and in particular to cover this role.

The elaborate develops starting from the origins and definitions of the registrar, analyzing the tasks and the various necessary skills, and it individuates specifically three macro-areas of reference: database and cataloging management, which could be effectively managed with BIM software; the management of deposits, where the technical skills and the science of materials come into play; the movement of artworks, which requires structural, conservative and set-up skills, as well as knowledge in the cultural heritage field.

The thesis concludes with a survey about the registrar profile that has involved some American and European museums, in which the differences that the role covers in the various countries and institutions are highlighted.

Nel dibattito per la definizione del ruolo di registrar, figura relativamente recente e poco conosciuta specialmente in Italia, si incontrano vari professionisti da molteplici campi che rivendicano la possibilità di ricoprire questo ruolo. Fra questi professionisti, la figura dell'architetto sembra essere un valido candidato, in quanto possiede le competenze necessarie non solo in ambito di storia e teoria del restauro, così come storia dell'arte e dell'architettura, ma anche nel campo strutturale, della conservazione dei materiali, della fisica tecnica e, naturalmente, di esposizione e allestimento. La tesi vuole quindi dimostrare che le specifiche competenze dell'architetto possono essere messe a disposizione in ambito museale ed in particolare per ricoprire questo ruolo.

L'elaborato si sviluppa a partire dalle origini e le definizioni di registrar, analizzandone i compiti e le varie competenze necessarie, e individua nello specifico tre macro-aree di riferimento: la gestione del database e della catalogazione, che potrà essere efficacemente gestito tramite software BIM; la gestione dei depositi, nella quale entrano in gioco le competenze di fisica tecnica e scienze dei materiali; la movimentazione delle opere d'arte, che richiede competenze strutturali, conservative, di allestimento, oltre a conoscenze nell'ambito dei beni culturali.

La tesi conclude con un questionario di analisi sulla figura del registrar che ha coinvolto alcuni musei americani ed europei, nel quale vengono messe in luce le differenze che il ruolo ricopre nei vari paesi e nelle varie istituzioni.

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PART 1  
INTRODUCTION

# INTRODUCTORY NOTE

Museums continue to grow and increase their number. In the UK, for the last half-century, a new museum opened every two weeks. Other countries, like America, Canada, and Australia, increased exponentially their number of museums in the last 50 years, by seven to ten times. This because every town wanted to open own museum.

People go to museums to see exhibitions, whether these are permanent or temporary collection, showing works of an artist, artifacts of civilization, specimens of a country or the progress of technology and science.

The purpose of a museum, anyway, is not only to exhibit and to make known to people what is inside it, but there are many more functions. The mission is carried out through a complex of activities that the museum organization offers: collection, recovery and protection; restoration, conservation and safekeeping; study, knowledge and classification; dissemination, cultural and educational transmission; promotion and development of research; scientific and cultural promotion; animation and entertainment.

We can divide all of these functions in three macro-categories, which are:

- collecting: the acquisition of artworks, specimens and/or artifacts;
- preservation: one of the main purposes of a museum is the preservation of the material culture and the heritage with which it's concerned. Conservation, security and collection management are basic concepts in a museum;
- research: it's related to collect and preserve the objects.

The modernization of the exhibitions and the introduction of multimedia technologies have produced new professional figures. Many different profiles work in a museum, and nowadays we can assist in a progressive division of the roles, becoming more and more complex, while the management and the full responsibility of the museum belong to the director.

The principal fields are<sup>(1)</sup>:

Administration, finance, and logistics, in which we can find:

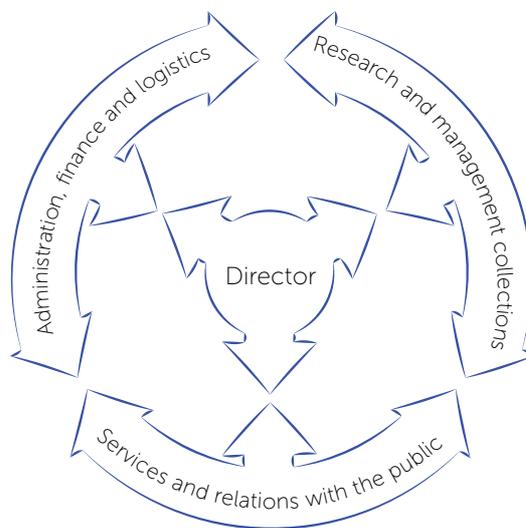
- responsible of the administration and finance;
- responsible of the logistics and safety;
- responsible of the digital services;
- responsible of the marketing, promotion and fund raising;
- responsible of the press office.

Research and management collections, in which there are:

- curator;
- cataloguer;
- registrar;
- restorer/conservator;
- technical assistant assigned to the collections;
- responsible documentation center;
- architect of the exhibition.

Services and relations with the public, with:

- responsible of mediation and educational services;
- responsible of reception and custody;
- responsible of the library;
- responsible of the web site.



To many different profiles correspond different skills and tasks.

One particular figure, the registrar, is relatively a new one - especially in Italy - and it has great importance in the organization of the exhibitions.

In the debate for the definition of the registrar figure, which hasn't yet a specific profile, the architect seems to be an appropriate candidate: the thesis aims to demonstrate that the specific competences of an architect, in the field of conservation, science of materials, structure, building physics, as well as history and theory of restoration, can be used in the museum field and, in particular, fit well in the role of registrar.

<sup>(1)</sup> Ruge A., *Manuale europeo delle Professioni museali*, 2008, pag. 14.

# A COLLECTION OF DEFINITIONS

Many museums can show only 10% or less of their collections in an exhibition. There's a great wealth of materials in museum storage and it's very common to have to move artworks from the storeroom to the exhibition spaces, besides transporting them from a museum to another. This need arises from the evolution of the museum concept: from static to dynamic. In the past, museums weren't used to transport the artworks from a museum to another, but the idea of a static collection persisted. On the other hand, nowadays "the different conception of art and the social role in urban culture played by the museum transform the museum from the static conception of the 19th century «temple of art» to the current vision of a dynamic urban stage".<sup>(1)</sup> In this sentence, it emerges how the museum is not only a "deposit" of artworks but a place where the main purpose is the fruition and the development of art knowledge. Since that an art piece is a universal good, its fruition shouldn't remain limited to a narrow range of people, but it should be accessible to everyone. That's why the transport of artworks is so important, because it allows the pieces to reach easily a wider range of people from different countries. Moving an artwork means moving culture, and culture is something that everybody should aim at. For this reason, museums have new needs and offers to look at, first of all the art pieces movement.

In this way, one of the most delicate profile that works in a museum is represented by the so-called "registrar", the one who is responsible for the movement and the transport of artworks. This role is a relatively new one because its birth and development were around the 1950s in the United States. It can assume different definitions and can have a lot of facets depending on the institution and the context where it belongs.

These are the main definitions available on the web for the registrar's role: "The job of managing, from an organizational point of view, incoming exhibitions and outgoing loans are assigned, in practically all international museums and now also in many Italian institutions, to a well-defined professional figure, equipped with specific professional competencies, universally identified with the term Registrar. This term is "not easily translatable in Italian given the range of its tasks in liaising among the diverse competences of the consignee, the curator, the director, the restorer, and all the professional figures operating outside the museum" (Guidelines on technical and scientific criteria and the standards of

functioning and development of museums).”

by Registrarte, Italian association of artworks’ registrars<sup>(2)</sup>

“From an organizational point of view, the registrar ensures the movement of the artworks, the related documentation and the procedures that regulate it, especially in connection with the loans. In particular, it draws up and organizes the documents relating to the acquisition, the loan, the insurance, the shipping and the safety of the works. The registrar follows the procedure inherent the movement of the artworks outside and inside the museum, is responsible for incoming loan procedures. In the case of exhibitions organized by the museum, it collaborates with the responsible of the safety and the conservation in carrying out its duties ”.

by ICOM, national charter of the museum professions<sup>(3)</sup>

“A museum registrar is responsible for implementing policies and procedures that relate to caring for cultural institutions like archives, libraries, and museums. These policies are found in the museum’s professional standards regarding the objects left in its care. Registrars focus on selections that include acquisitions, loans, exhibitions, deaccessions, storage, packing and shipping, security of objects in transit, insurance policies, and risk management.

As a collection care professional, they work with collection managers, conservators, and curators to balance public access to objects with the conditions needed to maintain preservation. Focusing on documentation, registrars are responsible for developing and maintaining records management systems, with individual files for each object in the collection. Smaller and mid-sized institutions may combine the role of the registrar with that of collections manager, while large institutions often have multiple registrars, each overseeing a different curatorial department”.

by Wikipedia<sup>(4)</sup>

From these definitions, we can synthesize the role of the registrar like the one who acts as an intermediary between the consignee, the curator, the director, the restorer, and other external professionals to the museum, holding the role of “project manager” for what concerns the transport and the movement of the artworks.

Further definitions can be offered by the hiring profiles. For example, in the Museo Egizio of Turin<sup>(4)</sup>, the research for a registrar’s assistant is defined as follows:



#### RECRUITMENT NOTICE

##### Article 1 – Job Profile

This procedure is for the recruitment of 1 staff member in the role of Assistant Registrar, on a permanent contract with the duty of care and management of the collections. The successful candidate will:

- Work closely with curators, registrars and scholars to ensure the proper care of the museum collection while maintaining its accessibility for research and valorisation;
- Conduct research and collect information concerning objects in the collection as required by other departments, scholars, researchers or students and compile condition reports;
- Assist in the planning, preparation and development of inhouse or travelling exhibitions, contributing to the drafting of budget estimates or final balances, and the drafting of technical specifications;
- Assist in the creation of grant applications, scholarly reports and accounts, educational and

informative presentations;

- Assist in operations of handling and transport of objects in the collection, managing relations with transport companies, insurance companies and institutions applying for loans of exhibits; he/she may also act as a courier in case of loans;
- Assist in implementing and managing the database of the collection;
- Assist and collaborate in the back-office operations of the administrative and secretarial work and scholarly management;
- Assist in excavation campaigns abroad.

The successful candidate will report to the Head of Collection and Logistics and will work as a member of the Research & Collection department.

b) Specific requirements:

- A post-graduate degree (MA, MSc) or equivalent is a requisite;
- Preferential but not a requisite: PhD or specialization in Archaeology / Egyptology;
- Work experience in similar fields;
- Knowledge of working methods applied to international art transportation and how this affects the collection;
- Basic knowledge of laws and regulations concerning loans of artworks;
- Experience with database systems;
- Proficiency in spoken and written English; a basic knowledge of a second language is optional;
- Excellent powers of communication (including writing ability) and interpersonal skills;
- Ability to deal with confidential information;
- Ability and willingness to maintain a high level of accuracy, strong attention to detail, ability to prioritize the workflow, ability to manage multiple projects at once;
- Willingness to undertake transfers, if necessary for lengthy periods.

The role of the registrar should not be confused with the one of the collection manager, the curator, and the conservator.

- "Registrars are responsible for risk management and documentation of the collection. They develop and maintain a record system and are often responsible for the storage system. Registrars are academic generalists".
- "Collection managers form the hands-on problem-solving component of the museum staff. They move objects, carry out re-housing and relocation projects and may oversee basic housekeeping, packing and preparatory staff. They often have graduate degrees in museology".
- "Curators are responsible for the intellectual and, in art museums, aesthetic control of the collection. They collect, develop exhibitions, catalog and write. Curators are usually the creative stars of the museum: they are specialists in their academic areas".
- "Conservators do all invasive work on museum collection objects. They oversee the physical care of collections. They are highly trained in chemistry and practical techniques for repair and restoration".<sup>(5)</sup>

<sup>(1)</sup> Foster K.W., "Tempio? Emporio? Teatro? Riflessione su due decenni di museografia americana", *Zodiac*, n.6, marzo-agosto 1991, pp.30-74.

<sup>(2)</sup> <http://www.registrarte.org/p/>

<sup>(2)</sup> ICOM International Council of Museums Italia, *Carta nazionale delle professioni museali*, a cura di Garlandini A., Pesaro, 2008, pag. 19.

<sup>(3)</sup> [https://en.wikipedia.org/wiki/Registrar\\_\(museum\)](https://en.wikipedia.org/wiki/Registrar_(museum))

<sup>(4)</sup> <https://www.museoegizio.it/lavora-con-noi/selezione-del-personale/> published on October 31, 2018.

<sup>(5)</sup> Buck A.R., *MRM5: Museum Registration Methods*, Washington, American Alliance of Museums, 2010, pag. 13.

## BIRTH AND HISTORY OF THE MUSEUM REGISTRAR

The figure of the registrar was born and developed in the United States around the 50s-60s, but it is only in the 70s that we witness the birth of the professional committee, called Registrar's Committee, an organ recognized by the American Associations of Museums (AAM) in 1978.

In the UK, the figure was born in the 70s and in 1979 the UK Registrar's Group was founded, which currently has about 300 members. The group is committed to establish and promote national and international standards in the relevant fields of work.

In recent years, the role of the registrar has also developed in the rest of Europe, particularly in France, Germany, and Spain. In France, the AFROA, "Association Française des régisseurs d'œuvres d'art", has been active since 1997, and it's structured around 3 points: "affirm the professional identity of its members; ensure the promotion of their skills; make known the work in France and abroad".<sup>(1)</sup> Nowadays, there are about 200 members. In Germany, there's the Registrars Deutschland, while the Spanish counterpart is ARMICE.

In Italy, the interest for this figure starts at the beginning of the 21th century, with the foundation of Registrarte. As emerges from the Articles of Association, Registrarte is "a point of reference for all those who operate in the field of museum collection management and the organization of exhibitions and who intend to commit themselves to raise the professional standards of the sector"<sup>(2)</sup>. The association puts together all the people who work in the museums, foundations and public or private companies, in the field of the management, movement of cultural heritage and the organization of exhibitions.

The primary objective of the foundation is to define and promote the registrar figure, through initiatives to encourage the exchange of ideas and experiences and to ensure greater knowledge and awareness of this role. Registrarte collaborates to the definition and the recognition of the professional profile; it organizes courses, seminars, studies and surveys on issues related to the profession; curates and publishes scientific works and sector studies; offers training and support courses for teachers; promotes national and international conferences and conventions; provides advice to public and/or private professionals.<sup>(3)</sup> Nowadays, the registrar is recognized as a profession by the National Charter of Museum Professions, ICOM.

Today, however, there are still few museums that recognize this role, and often the functions entrusted to the registrar are carried out by other operators with non-specific skills.

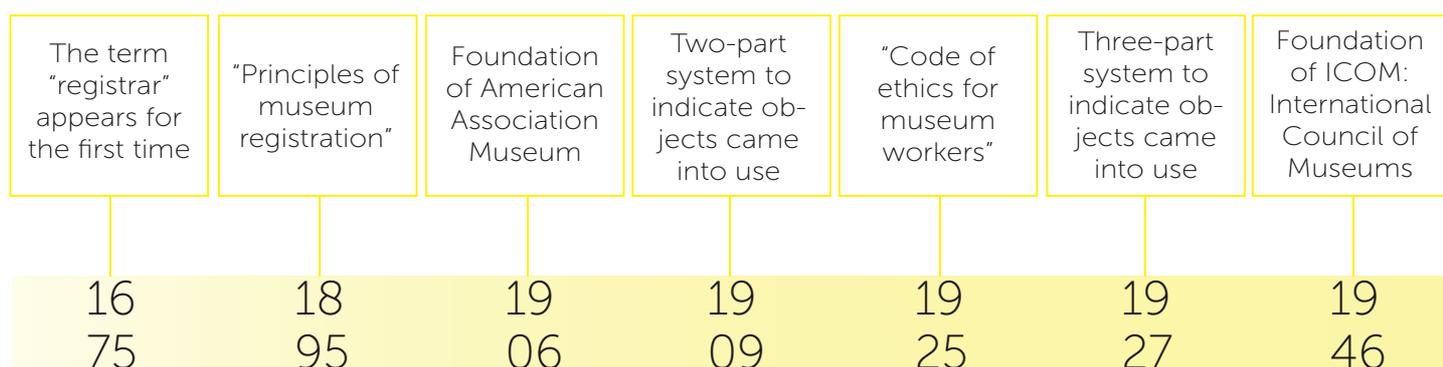
The term “registrar” appears for the first time in 1675 in the city of Bathurst, in faraway Australia, defined as “one whose business is to keep a register, so as an official recorder”.<sup>(4)</sup> Nevertheless, it’s only at the end of the 18th century that it’s related to the museum.

A first tentative to introduce a figure charged to control and manage the museum organization was developed in 1895, when G. Brown Goode, assistant director of the U.S. National Museum building (now Arts and Industries building), wrote “Principles of Museum Administration”. His philosophy about the objects follows these principles:

1. “The value of a collection depends in the highest degree upon the accuracy and fullness of the records of the history of the objects which it contains”;
2. “A museum specimen without a history is practical without value, and had much better be destroyed than preserved”.<sup>(5)</sup>

Many of the first museums were born in the United States, starting with the collection of scientific and natural history specimens, and they have evolved slowly through the late 1800s. The turn of the century brought a high level of interest in collections and business methods that coincided with the founding of the American Association of Museums in 1906.

The registration of art had become a focal point of the museum’s work in the 1900s when it became necessary to have new business and cataloging methods. The system of collection control evolved with the years: at the beginning, it used the simple sequential system employed by libraries in their accession ledgers to number the objects: the first system used only a single number to indicate the object (1-2-3-4...). By 1909, a two-part system came into use, applied for sequential object numbers in each year (6.1, 6.2, 6.3...). By 1927 some museums started



*Timeline of the principal events*

to use a three-part system (8.4.1, 8.4.2, 8.4.3...). Registration became a definite and very important part of the museum's program.

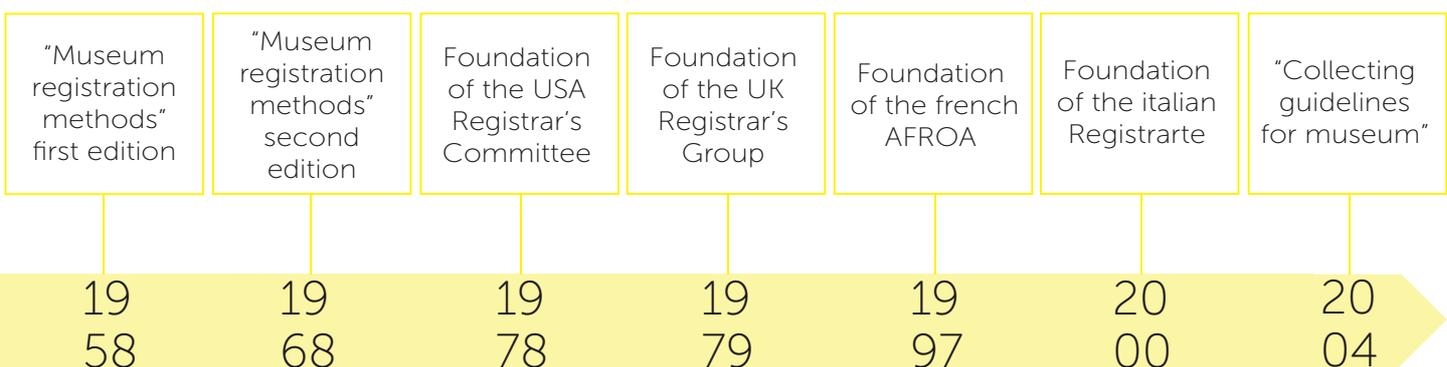
During the first 50 years from its birth, the American Associations of Museums worked hard to establish standards for the care and use of museum collections. AAM's first ethics code was developed in 1925, and take the name of "Code of ethics for museums workers". In this context, was developed the idea that loans were very important to create exhibitions abroad, more than a single museum could do alone. In this way, it became obvious that loans had to be monitored, and museums have to establish procedures together to do that.

The period of the 1950s was a vital period for the development of standards for collections care. In 1946 the ICOM (International Council of Museums) was founded in Paris, as the main international organization representing museums and their workers, to create cooperation between them. The organization works for the preservation and sharing of all the present and future cultural heritage, both material and immaterial, developing universal criteria and standards.

The rapid growth of museum courses and training programs was also developed: in the 1950s there were meetings and sessions in the AAM, to give more recognition to the registrar's role. In 1958 was published the first edition of the book "Museum registration methods", and ten years later was published the second edition. The contribution of AAM was fundamental because it published a lot of material about best practices and standards for the collections: condition reports, insurances and agreements for the loans, emergency planning, and so on.

Furthermore, in 2004, the AAM wrote "Collecting guidelines for museum", a kind of guide useful to develop collections and provide solutions to their possible problems.

In the history of the museum registrar, the AAM played a crucial role, because it was the first association to officially recognize the profile and to take care of its protection.



<sup>(1)</sup> Association Française des régisseurs d'œuvres d'art, <http://www.afroa.fr/>

<sup>(2)</sup> Registrarte, <http://www.registrarte.org/p/>

<sup>(3)</sup> Ibidem.

<sup>(4)</sup> Buck A.R., *MRM5: Museum Registration Methods*, Washington, American Alliance of Museums, 2010, pag. 2.

<sup>(5)</sup> Ibidem.

# THE ITALIAN LEGISLATION

In the Italian legislation, the figure of the registrar appears for the first time in the decree "D.M. 10 May 2001: guidelines on technical and scientific criteria and the standards of functioning and development of museums", published by the Ministry for Cultural Heritage and Activities. In this document, the registrar is described as the person "who creates, documents and organizes all the acts relative to the loan of an artwork".<sup>(1)</sup>

The decree aims to fill, at least partially, the gap that separates the European and extra-European museums from the Italian ones.

In this treaty, the mission of the museum is clarified through eight areas or points:

- I. Legal status
- II. Financial structure
- III. Structures
- IV. Staff
- V. Security
- VI. Collection management
- VII. Public relations and related services
- VIII. Relationship with the territory

These points are divided into functional sub-areas, followed by a premise, a technical standard and, sometimes, by other documents written by different specialists. The VI part, related to the collection management, is particularly complex, integrated with a lot of scientific and technical documents.

In the decree emerge the will to promote actions of development, motivation and sensitivity induction. One example is represented by the opportunity, gradually felt and diffused, to acquire a professional figure that in the international context is indicated with the term registrar. The document doesn't include, at least not yet, this professional figure among the requirements for the IV area, because it doesn't exist a specific corresponding profile already. However, the set of functions in the other areas, especially the one related to the collection management, prefigures the need for its future institution.

## I. Legal status

The Italian museum is a poorly typed institution, both for what concerns the public museum and the private ones because it's not regulated by specific standards.

To adopt regulations means to have a point of reference for the organization and operation of every museum. That's why is so important to have standards, to define purposes and functions, tasks and activities, rights and duties.

In particular, the regulation of a museum has to define:

- the nature;
- the mission and purpose;
- the government and management;
- the financial structure and accounting system;
- the standards for the staff;
- the heritage;
- the general principles for the collection management;
- the general principles for public services;
- the methods to collect data about the activity of the museum;
- the tasks and functions of the museum in the territorial context.

## II. Financial structure

Every museum should have a proper system of economic resources, fit for its dimension and features, to guarantee the respect of the standard for the structure, the staff, the management collection, and all the public relationship.

The management of the financial structure should be transparent and comparable to the other international museum institutions.

The income of a museum is represented by self-financing and external resources, while the expenses are determined by ordinary maintenance, staff, administrative management, collection management, scientific activities, public services and cultural activities, investments, and extraordinary maintenance.

## III. Structures

The museum must guarantee that its structures are adequate to the functions, about the needs of the collections, the staff, and the public. All the requirements must be explicit, detailing the needs concerning exposure, conservation over time, registration, documentation, restoration of the artworks, as well as the public services - education, research and study - and the staff engaged in the maintenance of the museum. The structures should be flexible, to adapt to the new needs, equipped and functional, accessible, controllable and recognizable.

## IV. Staff

Each museum, to fulfill its mission, needs a very different and qualified staff. The choice of the staff is related to:

- the dimension of the museum;
- the features of the collections;
- the responsibility and functions of the museum;
- the need to guarantee continuity and stability to all the services.

In the decree, the following figures are identified: museum director, conservator/curator, responsible of the educational service, responsible of the communication, administrative officer, technical manager, restorer, responsible of the security, public assistant/museum operator, surveillance and vigilance officer, operating staff. Specific requirements and competencies are defined for each one.

This elaboration doesn't include some roles that are present in foreign museums, like the registrar. Sometimes this figure is replaced by other profiles (like the conservator/curator) but there are no doubts that the identification of one specific person would facilitate the exchange of artworks with foreign museums. These are usually to attribute to a single figure the responsibility for all the operations relating to the loans.

## V. Security

In the museum field, there are many problems related to the safeguard of the buildings and their content, but also of the security of its occupants (visitors and employees). The problems could be divided into conservation, protection, restoration, job security, fire safety... including environmental, structural, anti-crime and fire protection aspects. It's necessary to have a security strategy, based on a risk analysis, that includes preventive, protective and organizational measures.

## VI. Collection management

The most important part of a museum is its collection: this is the fulcrum around which the whole organization revolves. Therefore, every museum must guarantee:

- the increment (if explained in the mission);
- the inalienability;
- the conservation, care, and protection of the collections;
- the full accessibility (physical and intellectual).

The collection must be collocated in adequate and safe spaces, with qualified staff to control it and preserve its integrity. The inventory, cataloging, and documentation of the artworks must be ensured, as well as the promotion of knowledge, interpretation, sorting, and the development of research and studies. It must be guaranteed not only the accessibility of the exposed pieces but also of the ones not visible in the exhibition.

In the collection management, the primary needs of conservation and fruition of artworks are strictly related to:

- the creation of a museum structure organized to satisfy and arouse the public demand for culture;
- the design of paths that can contextualize the artifacts in a complex of data and information visible to the public;
- the cataloging that aims to the restitution of a context.

In particular, collection management pursues the following objectives:

### 1. Conservation and restoration

The collection management must be based on suitable policies, to guarantee the prevention of degradation risks that may affect the collections themselves. This because the cultural heritage should be transmitted to future generations.

The museum must be equipped with a prevention plan for the environmental, structural and human factors that can damage the artifacts. The plan must cover all the possible situations where the artworks are temporarily or permanently exhibited to the public, stored in deposits, subjected to restoration actions or moved inside/outside the museum.

For the planning of the restoration interventions and the modalities of the exhibition, storage, and movement, it's fundamental to have two data sheets: one for the conservation, including specific information about the materials, executive procedures and conservation of the artifacts, periodically updated; and one for the technical/environmental issues, with information about environmental conditions and the measures that should be taken to reach the perfect conditions for the conservation. The museum must detect the thermo-hygrometric and humidity condition, the air quality and the lighting condition of the environment. The interventions have to be planned to take into consideration the results from the datasheets.

In the case of movement and transport of artworks, suitable packaging must be adopted, to satisfy all the requirements of dimensional stability, mechanical resistance, impermeability to water/vapor/humidity/pollution, protection from the dust, thermal insulation.

The packaging must allow the introduction of specific probes to control the conditions during the transport. All the particular indications and warnings of the artifact for the movement, the assembly and disassembly must be written. The transport must be in adequate vehicles, with stable anchors and without significant variations of the micro-climate.

#### 2. Increase and inalienability

Forms and methods to control the procedures of increase, inalienability and exposure must be taken. This to guarantee the legitimate origin of the artifacts and the best condition of exhibition and visibility.

#### 3. Registration and documentation

The activities of registration and documentation flow into the cataloging, as a systematic organization of knowledge and administrative status.

When an object enters a museum, it must be registered and documented in a specific register. When a good is cataloged, it's photographed, identified and described through a technical and scientific sheet, with the national and cataloging standards ICCD.

#### 4. Permanent and temporary exhibition, loans

Every museum has to define and check the criteria that govern both the permanent and the temporary exhibitions and the conservation of the artworks in the warehouses, taking in consideration: the availability and security of the spaces; the conservation and fruition of the collections; the respect for the history and the mission of the museum.

The exhibition project should show as much material as possible, presented in a logical order, coordinated with the project of the spaces, and ensure the readability and the valorization of the objects.

The correct loan management, both for the incoming loans and for the outgoing loans, must be guarantee.

#### 5. Research and study policies

The research is a very important issue, for which each museum should establish a relationship with other museums, institutes, universities, foundations,... to reach better results.

### VII. Public relations and related services

Each museum has to offer a different level of service for the public. The access to the exhibition spaces, the consultation of the existing documentation, the possibility to use the cultural and scientific activities, and the information about all the services should be guarantee.

The path of the exhibition has to ensure not only the cognitive elements but also information about the orientation, to increase the experience in the museum.

An important element is then represented by the so-called "virtual museum", that allows collecting information available on the internet.

### VIII. Relationship with the territory

The particular nature of the Italian heritage and the experience developed in some realities may involve the assumption of a specific role of the museum concerning its territory. This can determine some specific consequences of the management and the organization of the museum itself.

<sup>(1)</sup> Decreto Ministeriale 10 maggio 2001, "Atto di indirizzo sui criteri tecnico-scientifici e sugli standard di funzionamento e sviluppo dei musei", pag. 87.

# CONTRACTUAL RECOGNITION

From the contractual point of view, the registrar role was recognized in 2008 by FEDERCULTURA, the Federation for the management of culture, tourism, sport and leisure.

The Federation was born in 1997, nowadays it represents the more important cultural companies in Italy, including public and private subjects related to culture, tourism, leisure. FEDERCULTURA works actively for the cultural promotion and its accessibility to all the citizens, as a sign of national identity and a resource for social growth and economic development of the territories. It supports the enhancement of heritage and cultural activities to help local development; as well as the awareness and legislative interventions for the sector. It encourages the research activity; it promotes projects to enhance the quality, the productivity and the cultural services' organization, with public and private bodies.<sup>(1)</sup>

The dynamism of the cultural heritage goes together with repercussions on the job field. However, this diversification of activities related to the protection, enhancement and management of cultural heritage, wasn't matched by an adequate progression of professions, without a link between training and job. For this reason, FEDERCULTURA created the CCNL, the first collective national labor contract, for all the workers in the cultural field (1999). It's an indispensable tool for an efficient organization of companies and for increasing the services' quality. Its purposes are:<sup>(2)</sup>

- develop the new professional figures;
- enhance work performance in the new business and organizational contexts;
- ensure a better level of cultural, tourist, sportive and environmental services, by increasing the number of activities, their quality, accessibility and safety.

In the document written by CCNL in 2008 about the classification and development of workers, the registrar role belongs to the III Band - D level, where the workers of this category have the following requirements:<sup>(3)</sup>

- they own knowledge and skills acquired through university education and/or work experience;
- they carry out technical and administrative activities of high professional content;
- they operate in complex and diversified organizational units;
- they have the responsibility for the technical, administrative and management

results related to their activity;

- they carry out complex and specific activities;
- they perform supervisory and/or coordination functions of other workers, in complex and different organizational units;
- they are responsible for the quantitative and qualitative results of the activities and resources.

<sup>(1)</sup> <http://www.federculture.it/federculture-2/chi-siamo/> consulted on May 15, 2020.

<sup>(2)</sup> <http://www.federculture.it/contratto-ccnl-federculture/> consulted on May 15, 2020.

<sup>(3)</sup> CCNL Federculture, Verbale di accordo 16 dicembre 2018 "Proposta di classificazione e sviluppo del personale", Roma, 2008.



PART 2  
FOCUSING OF THE FIGURE

# ANALYSIS AND DECLINATION OF THE REGISTRAR'S TASKS

In museums, registrars are often charged with a full scope of collections tasks. Indeed, the profile is more complex, because it integrates a lot of competences and knowledge. In fact, among other things, the registrar is the one that organizes storages, oversees computer projects, manages loans and exhibitions, drafts collection policy and procedures to minimize risk to the collections. It's the person who deals with all the procedures involved in the movement of a work of art.

The tasks assigned to a registrar may vary according to the size of the museum and to its internal organization. The same role can take on two different values: the outgoing/loans registrar and the exhibitions registrar.

The outgoing/loans registrar bears the responsibility for every phase of the artwork's transport, after that the lending museum had given the consent and the regulations have been defined. She deals with the correspondence with the organizers of the exhibition, obtaining the necessary authorizations, taking care of the documentation, insurance, packing and accompanying the piece, and sometimes acts also as a courier. She coordinates the work of all the other figures involved in the operation. Furthermore, the registrar records and archives historical documentation of the loans granted by the museum over time.

Sometimes, in some museums, the outgoing registrar is responsible also for the internal movement of the artworks, the management of deposits and the legal aspects of acquisitions and donations.<sup>(1)</sup>

The same duties for the counterpart are carried out by the exhibitions registrar, who is the registrar for the institution that has requested the loan. Her job begins when the scientific committee - or the curator - of the exhibition supplies the list of the pieces that are going to be exposed. According to the indications provided by the curator/coordinator, the registrar provides for the loans requests, handles the correspondence with the lenders, checks the contracts and lending agreement, orders and distributes to the various interlocutors the information about the works necessary for the exhibition, collaborates in the drafting of the budget and the call for bids, coordinates and oversees all the operations regarding the insurance, the transport, the reception, the supervision and collocation of the pieces that are going to be shown in the exhibition.<sup>(2)</sup>

Despite the double declination, we can basically summarize the tasks of the registrar in three parts:

- inventorying and cataloging;
- management of the deposits;
- movement of the art pieces.

The inventory consists of the collection of all the essential elements for the recognition of the artwork and the traceability with all the technical information connected to it. All the data are contained in the database, which is the main tool for this task.

In the cataloging, all the scientific data related to the piece, like its history, its original context, its artistic relevance is added. The inventory sheet contains also all the scientific information of each object, and it puts in communication the archive with the photographic archive and the management of the library.

The sheet shows the correct inventory and cataloging of the finds, in correspondence with the photos. The purpose, in addition to having the exact knowledge of the consistency of the collection, is to be able to locate without doubts any find and to identify which sheet needs to be created again and which needs only to be completed.

The more correct the inventory, the more efficient the cataloging. In this way, the principal requirements are intuitiveness, synthesis, accessibility, completeness of information, connections, multidisciplinary.

Another fundamental activity connected to the cataloging is the inventory survey, which consists of the verification of the correspondence between the pieces in the database and the reality.

For what concerns the management of the deposits, they can have different requirements and features, according to the needs of the materials. The registrar must ensure the correct placement and conservation of each piece, but also the fruition and the access to it. The traceability and the identification of the artworks must be guaranteed too.

The most important aspect related to the deposits is the air conditioning of the environment. Often, the system is remotely managed and it collects all the environmental data for the machine regulation. The system is implemented with the collection of the internal showcase data, and all the information are managed with alert systems, in case of exceeding of the pre-established thresholds.

The third task regards all the actions for the handling of the artworks. The movement of artworks can be inside the museum when the collection needs a change of the exposed pieces, or external the museum when a piece is moved in another institution, maybe for a temporary exhibition.

This is the most complicated part because it includes a lot of phases.

Briefly summarized, we find, first of all, the feasibility study, in which there's a control of all the passages and the suitability of the venue, followed by the preparation of the necessary tools. The second phase is the peculiarity analysis, where the so-called "live analysis" takes place. It includes photographic documentation, eventually accompanied by preventive diagnostic investigations such as radiography, CT scan, geo-radar, ultrasound, and any preventive conservative interventions. These activities allow to verify the possibility for the piece to travel. After, there's the removal of the object from its original location, drawing up all the paperwork and authorizations. One of the most delicate passages is the packaging, where the find is prepared to be transported. During the transport, the packaging must allow the monitoring of the piece through the insertion of probes. Sometimes, the registrar acts also as a courier and accompanies the artwork. Once arrived

in the new museum, there's the last phase concerning the installment and the adaptation of the object in the new placement.

It's important to underline that during all the phases about the artwork handling all the actions must be registered, with particular reference to the traceability of the object. During the artwork movement, in fact, many documents must be completed: the Condition Report, a document in which all the data about the artwork are inserted before the departure of the piece, after it arrives in the new location, at the end of the exhibition, and when it returns to the original place, can be considered the most important and its compilation is a very tricky task.

According to these tasks, we can define the registrar's principal activities:

- creation of the database for the collection management;
- first photographic campaign for the identification of the pieces;
- access to the collection;
- coordination of the restoration activities;
- warehouse management;
- maintenance of the exhibition spaces;
- movement of the artworks inside the museum;
- loans/external exhibitions management;
- loans/internal exhibitions management.

The figure of the registrar has great importance because she must respond to many legal aspects: in addition to the just mentioned tasks, she's responsible for defining the heritage value, the insurance value and the legal value of the artwork. To stipulate the insurance policy, in fact, it's important to evaluate the correct value of the piece, by considering all the possible features that compete to define it: this is a very delicate activity, and it must be done by a competent registrar.

It's therefore clear that this role has full responsibility for the piece, and this contributes to make her figure so complicated and sophisticated.

Nowadays, in Italy doesn't exist a specific profile for this role, that's why sometimes registrars are people with totally different backgrounds.

A first tentative to identify a profile instead was developed in the USA, where the professional figure is described as follows<sup>(3)</sup>:

"PROFILE

Academic background:

B.A., M.A., or Ph.D. in museum's specialty field and/or museum studies (information sciences and business/legal studies a plus);

Reports to:

Director or head of collections division

Supervises:

Assistants for loans, collections and information management; preparators, packers, handlers and photographers, interns, work-study students, and volunteers, rights and reproduction and, in some cases, library and archives. Coordinates conservation as necessary.

AREAS OF RESPONSIBILITY:

Information management, manual and computerized:

creates/compiles and maintains legal documents, histories of use, physical histories of permanent collections objects and/or specimens; organizes and implements inventory projects; coordinates/assists with computer projects; disseminates information as needed to other departments, researchers, and students; coordinates object identification services; coordinates or is involved with DAMS

project.

Collections management:

monitors legal and ethical implications and care standards of transactions; facilitates care and control of collections on-site; initiates, drafts and implements collection policies; oversees object movement, internal and external; oversees packing and shipping; acts as courier or designates courier; implements security procedures/works closely with security forces; contracts for outside services as needed.

Exhibitions:

borrowed exhibitions (negotiates loan contracts; schedules and supervises packing, shipping, condition reporting, and object movement; prepares grant reports as necessary; produces indemnity applications as necessary); in-house exhibitions (provides information to other departments as needed, coordinates object movement and record-keeping; prepares or helps in preparation of label copy); traveling exhibitions (drafts, reviews contracts; prepares and coordinates documentation, packing, shipping; provides courier service).

Other services and responsibilities:

maintain archives; manages photographic services.

#### ADMINISTRATIVE RESPONSIBILITIES:

Administers department; prepares and implements budgets; storage and other special projects; contracts for services; purchases office and collections management equipment and supplies; prepare rate structures”.

It’s a job that, besides the technical and specific skills, requires also a deep sense of responsibility, ability to deal with unexpected situations, a great spirit of collaboration and service. A registrar should be a compulsive person, intuitive, assertive, diplomat, a clear thinker and able to keep calm.

When, in the academic background, we speak about “museum studies/museum’s field”, we use an ambiguous concept: in fact, with “museum studies” we can mean both the area of the museology and the museography, the two aspects that form the “museum’s field”. These concepts are different from each other. With the term museology we mean the study of museums, their history and role in the society, as well as the activities engage in, including curating, preservation, education, and public services. Museology is a relatively new concept because it was born in 1955, and it deals with the museum institution from a theoretical-historical point of view, focusing on the research for the meanings and essence of a museum. Museography, on the other hand, is an old discipline and is more closely related to the operational-architectural area, aimed at the analytical and descriptive study of a museum.

Hypothetically, we can synthesize the skills of a registrar in the following areas:

AREA OF SKILL	FIELD OF REFERENCE	TO KNOW ABOUT THE MUSEUM
Cultural skills	Museology, art history, restoration	History, mission/goal, role in the society, activities and functions, public services
Technical skills	Museography, architecture	How the museum works from the architectural point of view with all the parts connected to it

Technological skills	Technology, science of materials, technical physics, structure	The micro-climate of the exhibition spaces and of the deposits; the aging of materials and the risk of degradation related to environmental, lighting and human factors; the indoor air quality; the micro and macro environments of the showcases; the monitoring of the environment; basic skills about structural project for the transport of artworks
Economic and juridical skills	Administration and finance	Budget management, bureaucratic and authorization practices, loan contracts and documents, insurance policy

In addition, the knowledge of a second or more language is indispensable.

<sup>(1)</sup> Registrarte, <http://www.registrarte.org/p/>

<sup>(2)</sup> Ibidem.

<sup>(3)</sup> Buck A.R., *MRM5: Museum Registration Methods*, Washington, American Alliance of Museums, 2010, pag. 15-16.

# POSSIBLE TRAINING PROGRAMS

Since that in Italy, but also in the world, doesn't exist a specific course program to become registrar, we can find profiles with different backgrounds. Nowadays, the only existing course in Italy about this profession is represented by a master course of three months, at the IED University of Venice. The course is presented in this way:

## PROFESSION REGISTRAR<sup>(1)</sup>

Advanced training course - IED University of Venice

DURATION

3 MONTHS

FREQUENCY

FULL TIME

LANGUAGE

ITALIAN

FOR WHO

Graduates (I-II level) in:

ARCHITECTURE

RESTORATION AND  
CONSERVATION

ART HISTORY

CULTURAL HERITAGE

## PRESENTATION

The advanced training course in "profession registrar" aims to form professional figures able to guarantee the correct handling and conservation of heritage's artworks.

The objects of the course are:

- the adequate handling and storage of artworks - such as archaeological finds, ancient paintings and all types of artistic expression of contemporary art;
- the coordination of the various aspects of the artistic objects loans in the mu-

seum-exhibition area;

- the planning and supervision of the delivery, preparation, assembly, and dispersion of art objects;
  - the documentation's updating that supports both the external and internal loans.
- The registrar also deals with the mounting of the museum exhibitions and exhibit design.

#### JOB OPPORTUNITIES

Recognized by the ICOM - national charter of the museum professions - the registrar carries out its activity both in the offices of Cultural Institutions and in the exhibition construction sites, strictly in contact with artists, curators, and other workers.

#### METHODOLOGY AND STRUCTURE OF THE COURSE

The work of the registrar is interdependent on the artistic-museum dimension, where it moves and ranges from the request of loan management to the supervision of all the phases regarding the mounting and dismantling of the exhibition. The course is divided into eight modules, concerning different areas of investigation: restoration, conservation, archiving, dating, exhibit design. To these are added elements and notions of insurance, packaging, transport, delivery of artworks, management of collections, organization of data, definition of timing and budget, drafting of condition reports.

#### PLAN OF THE STUDIES

The eight subjects are so structured:

- introduction: introduction to the profession, Italian and foreign situations, differences and relations between registrar and conservator;
- materials history in art: classic and contemporary materials, parameters to date the artworks;
- methodology of artistic techniques (classic and contemporary);
- conservation and restoration elements: stone and fresco, wood and canvas painting, metal, paper and photography, restoration of the contemporary, mixed techniques, diagnostic and conservation;
- security and mounting of an exhibition: notions of architecture, the preparation and the relationship with artists and curators, set-up techniques, museography elements, safety, construction sites, and prevention;
- insurance and organizational aspects: insurance, packaging, analysis of typologies, insulation and air conditioning system, transport and delivery;
- drafting of an exhibition calendar: collecting and organizing of data, archiving, timing and budget, condition report;
- technical English.

This master course is the only one created appositely for registrar's studies. Around the world, similar courses exist, but they are generally oriented to the museum studies. In fact, these programs prepare students for a variety of museum-related occupations, such as collection managers, registrars, museum educators, exhibit developers, curators, administrators.

<sup>(1)</sup> IED University, <https://www.ied.it/venezia/scuola-management/corso-formazione-avanzata/Professione-Registar/CCG26261>

PART 3  
INVENTORYING AND CATALOGING

# THE DATABASE

As we said before, the first task about the registrar's work is the inventorying and cataloging. The main tool to do that is the database. The database is a data archive structured to rationalize the management and updating of information, and that allows the treatment of complex researches.

In a museum, the database is indispensable because it allows:

- archiving of all the artworks;
- organization and quality control of cataloging;
- management of the collection's movement with all the related documents;
- integrated and unitary vision of the goods;
- support in the projects for the realization of thematic exhibitions;
- information about all the people involved in the object/exhibition/loan, in order to find them more easily.

Two types of database exist: those which are standard and available in the market, and those which are customized, created by the museum itself in order to provide for some specific and particular needs or requirements.

For what concerns the database in the market, one of the most common is MuseumPlus.<sup>(1)</sup>

**museumplus**  
*Web-based Museum Management  
Anytime, Anywhere*



MuseumPlus is a solution that provides the necessary tools to fully document any type of object and all related work-flow. It offers web-based collections cataloging while integrating international professional standards for a customizable and scalable solution.

The software is formed by the following modules:

- objects and collection. It's the primary repository for cataloging and registration,

including: core information (title, author, period, dimensions); material and technique; acquisition and origin; location history, provenance, condition history;

- artists and participants. The module stores information about all the people related to the artwork, exhibition or loan;
- address management. It provides a single point of access for all contacts related to the museum and the specific object;
- literature and bibliography. It manages bibliographic entries;
- documents, images, media. It contains all the images and multimedia files related to the artwork;
- conservation. In this module all the conservation activities and treatment reports are stored;
- exhibitions and loans. This module is used for coordinating venues, curators, lenders, borrowers, reserving objects, managing condition reports, organizing images and tracking shipping and loan logistics;
- movement and transport. There is all the information for any piece movement, whether in galleries, storages or in transit for other museums;
- contracts. The module contains all the contracts and agreements about loans, exhibition and collection objects.

Another software very common is the TMS collections (The Museum System collections).<sup>(2)</sup>

## TMS COLLECTIONS

NEXT GENERATION COLLECTIONS MANAGEMENT

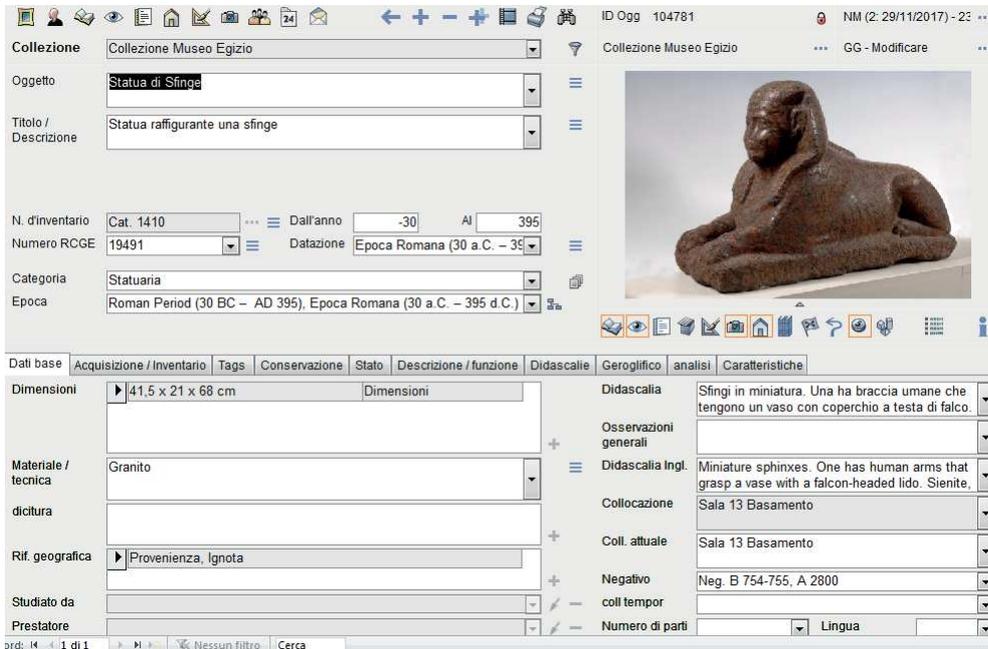


The structure of the TMS collections database is similar to the previous one, containing the following modules:

- objects. It captures information about the pieces in the collection, including core cataloging information, accessioning, de-accessioning, dimension, research notes, provenance, locations and movement, valuation and insurance, rights management;
- bibliography. Bibliographic references linked to the collections information;
- exhibitions. It manages complex workflow to plan the exhibitions;
- loans. The module manages the incoming and outgoing loans, with aspects related to legal and financial processes;
- shipping. It allows to manage and organize objects into crates, to create a conveyance sequence, shipping reports, lists and valuation documents;
- media. There is a wide range of media files related to the piece.
- constituents. It creates records for the people and organizations connected to collections, makers, borrowers, lenders, shipping agents, external conservators;
- sites. The module manages information about the building that contains the collection;
- events. It allows to describe events related to artworks and their acquisition;
- insurance. In this part is possible to track insurance policies, terms, limitations, policy dates.

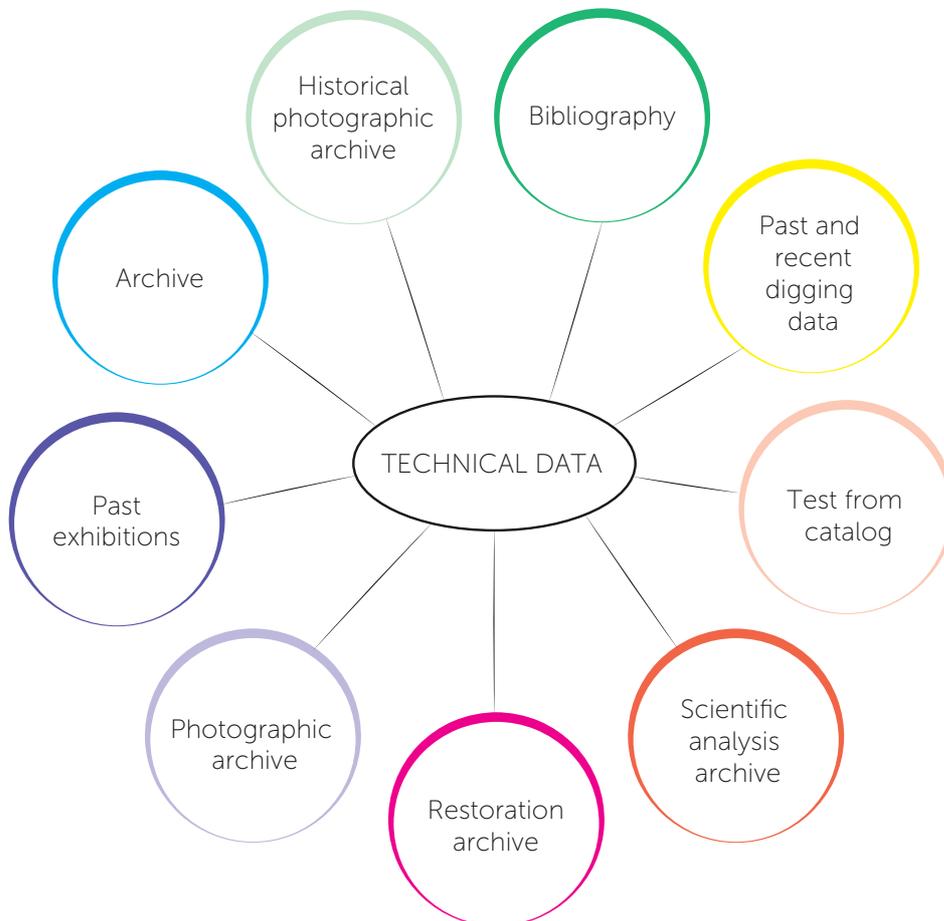
As we can see, more or less all the software available in the market contains the same options and possibilities.

On the other hand, some museums adopt a customizable database system. One example is represented by the Museo Egizio of Turin, whose collection numbers some 40.000 artifacts. Nowadays, the museum has still a standard database available in the market (MuseumPlus, in the picture below), but in 2020/2021 is going to replace the present consultation system by a customized multi-field database.



The actual database of the Museo Egizio of Turin <sup>(3)</sup>

The actual structure of the Museo Egizio database is so defined:



While the project for the future database will have the following structure, with all the fields connected to each other:



The repository will be accessible to everyone in possession of the rights. It will be all-inclusive of all data relating to the collections, from excavation to CT, library and bibliography, photographs, restoration activities, analysis... The database will be adaptable to the new technologies and easy to customize for what concerns the researches and reports.

The future database that the Museo Egizio will undertake to adopt, offers the starting point for a reflection about an important and delicate issue, the one of the public use of cultural heritage. With the term "cultural good", we mean all the historic-artistic-monumental heritage of a nation, to which the natural-landscape one is added.

Cultural heritage in Italy is so much numerous and widespread that often isn't known at all: it doesn't refer only to the immense quantity of the "hidden" works in the deposits, which represent more or less the 80% of the total museum's heritage, but also to all those goods showed in permanent and/or temporary exhibitions, accessible to the public. Nowadays, in fact, we can't limit ourselves to exhibit the artworks, but we must aim at their enhancement, as the final goal. The term enhancement means any action aimed at promoting knowledge of the heritage and ensuring the optimal conditions for correct use and usability by the public. In addition, all the activities that improve the conservation conditions of

the piece are also included.

Strictly related to the enhancement concept, there is the usability, where participation and centrality of the citizens are the main objectives. When we speak about cultural heritage, we don't refer only to its material and economic value, but also and above all to its intrinsic value. We, therefore, understand its ability to transmit cultural enrichment, since it's proof of its era, civilization, society, nation. The good is not important and "famous" only for its aesthetic value which, moreover, is inevitably subjected to a phenomenon of degradation over time, but it's above all for its capacity to conserve: a memory, a community, a historical period. Here then the protection of cultural heritage is not intended only as mere conservation but in the function of public use.

In recent decades there has been a progressive evolution regarding the conception of cultural heritage: from a national to international importance. In fact, the value of a work must be considered as a universal good and must be accessible to everyone. The ancient thought of Quatremère de Quency is therefore taken up, according to which a person couldn't appropriate an artwork because it belonged to humanity and not to the individual person.

The museum institutions, therefore, implement the idea of the restoration, intended as "an intervention aimed at preserving and transmitting the works of historical, artistic and environmental interest to the future, facilitating its reading and without erasing the traces of the passage of time" (Giovanni Carbonara).<sup>(4)</sup>

All the technical-scientific interventions aimed at ensuring the temporal continuity of the material testimonies of the past are then indicated, for dissemination to present and future generations.

For this reason, every museum should engage in spreading knowledge of the heritage: through free access to all material, aesthetic, historical, conservative and photographic information of a work, we move in the right direction for an action aimed at transmission in the future, and total fruition by the public.

The action of the Museo Egizio, therefore, contributes to spreading art (in all its forms) as an "open science", so without any kind of architectural and physical barrier. The barriers that can hinder the use of the artworks aren't only dictated by emergency situations such as the one in which we are now for Covid-19, and for which many museums are equipping themselves, but they are generally represented by the difficulty of finding materials and documents. Unlike scientific texts, where the dissemination and information are almost free and complete, free access to the book, archival, cataloging and storage heritage is very difficult. "Libraries, museums, and archives hold a great amount of valuable public sector information resources, particularly since digitalization projects have multiplied the amount of digital material available to the public. Collections of cultural heritage and the related metadata can form a basis for digital content products and services and have enormous potential for innovative reuse in sectors such as formation and tourism".<sup>(5)</sup> This highlights the importance of open source, thus underlining the universality of cultural heritage.

For the knowledge acquisition on the archaeological, architectural, landscape, historical-artistic and ethno-anthropological heritage, the Iccd (central institution for cataloging and documentation) has developed an articulated system of standards. This in order to adopt tools and rules for homogeneous and national cataloging. The adoption of common practices, in fact, allows information sharing with many public/private subjects that work in the cultural heritage field. The system is composed of method principles, legislations, and regulations, terminology

tools, indications for the accompanying documentation.

The following two examples of Iccd cataloging are available on the web. For each piece is possible to download the full form in order to have all the information. The search of the objects is done by geographical and/or thematic criteria, according to which the objects are divided.

## abbazia-gentilizia poi parrocchia

### Abbazia di S. Matteo

Beni immobili - Beni architettonici e paesaggistici - Codice ICCD 07 00053083

[Visualizza su mappa](#)



#### Chi

Autore: **Montarsoli**

Ambito culturale: **maestranze locali**

Condizione giuridica: **proprietà Ente religioso cattolico**

#### Cosa

Tipologia: **Architettura**

#### Dove

Localizzazione: **Liguria (GE) - Genova**

Indirizzo: **Piazza San Matteo**

#### Quando

Datazione: **XIII XVI - 1278/01/01 1540/12/31**

#### Come

Nessun dato disponibile

## dipinto

Beni mobili - Beni storici e artistici - Codice ICCD 12 00491016

[Visualizza su mappa](#)



#### Chi

Autore: **Modigliani Amedeo**

Condizione giuridica: **proprietà Stato**

#### Cosa

Tipologia: **Opera e oggetto d'Arte**

Soggetto: **ritratto femminile Ritratto di Hanka Zborowska o S...**

#### Dove

Localizzazione: **Lazio (RM) - Roma**

Indirizzo: **Viale delle Belle Arti, 131**

Luogo di conservazione: **Galleria Nazionale d'Arte Moderna**

#### Quando

Datazione: **XX - ca. 1917 ca. 1917**

#### Come

Materia e tecnica: **olio su tela**

*Example of artworks described in the cultural heritage catalog <sup>(6)</sup>*

<sup>(1)</sup> Cfr. MuseumPlus, [https://www.zetcom.com/en/museumplus\\_en/](https://www.zetcom.com/en/museumplus_en/).

<sup>(2)</sup> Cfr. TMScollections, <https://www.gallerysystems.com/products-and-services/tms-suite/tms/>.

<sup>(3)</sup> Picture granted by the Museo Egizio of Turin.

<sup>(4)</sup> Torsello B. P., *Che cos'è il restauro? Nove studiosi a confronto*, Venezia, Marsilio Editori, 2005.

<sup>(5)</sup> [https://www.huffingtonpost.it/marco-scialdone/europa-libero-accesso-al-patrimonio-culturale-digitale\\_b\\_7742420.html](https://www.huffingtonpost.it/marco-scialdone/europa-libero-accesso-al-patrimonio-culturale-digitale_b_7742420.html) consulted on April 08, 2020.

<sup>(6)</sup> [http://www.catalogo.beniculturali.it/sigecSSU\\_FE/Home.action?timestamp=1521647516354](http://www.catalogo.beniculturali.it/sigecSSU_FE/Home.action?timestamp=1521647516354).

## A POSSIBLE FUTURE DATABASE: M-BIM

A possible solution for the museum's future database could be represented by the BIM technology. The Building Information Model (BIM) is a method to optimize the planning, construction, and management of buildings, with the use of a software. Through a 3D model, all the relevant construction data can be collected, combined and connected in a single software. BIM helps the information management of a building throughout its life cycle.

BIM models can also be converted in different formats, to improve the exchange and sharing of information, with the interoperability between other software and operators.

In the museum field, the BIM could be very useful for the management of the collections: in fact, the relation between container and content in a museum is an essential feature for the preventive conservation of the artworks.

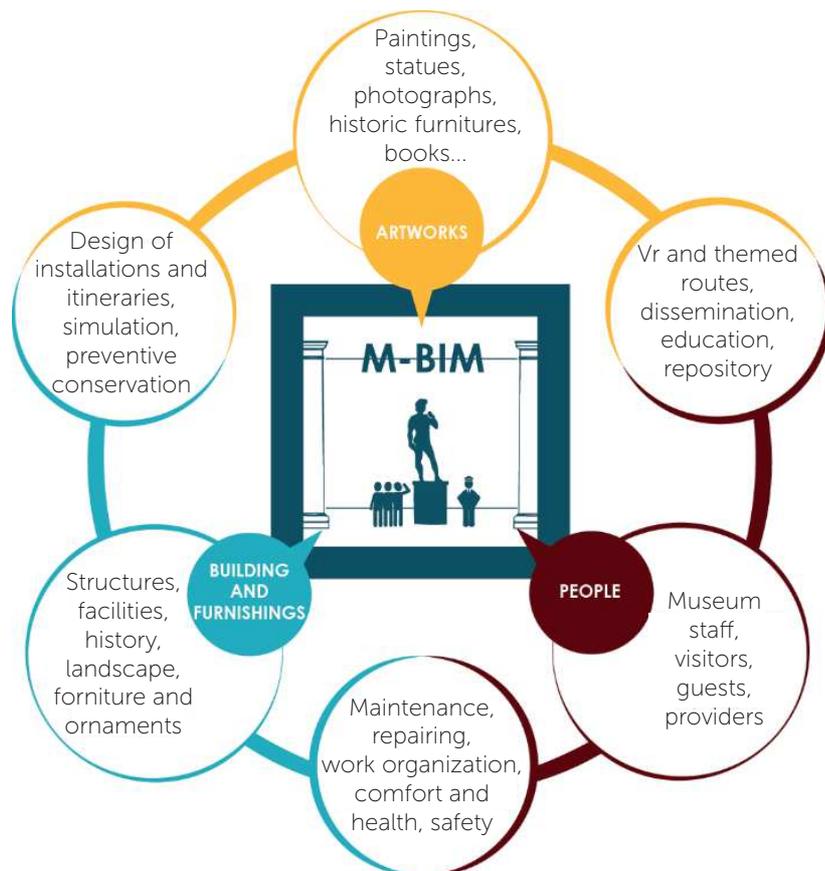
Recent researches have tried to apply the BIM technology to the museum field. This new method is called M-BIM (Museum BIM), and it puts together the museum BIM model with external databases, including the management of information about the building itself and the artworks by 3D objects handling.

The management of a museum is a complex activity, where we can individuate at least three areas: the first one is the scientific side, related to the care and study of collections; the second one is the demand side, that takes in consideration the needs of the users; and the third one is the resources side, including human, economic and built resources. The intersection of these areas determines all the requirements for the management, maintenance, and security of a museum. One of the most important aspects is the interaction between the objects (intended in their physical consistency) and the building that contains them.<sup>(1)</sup>

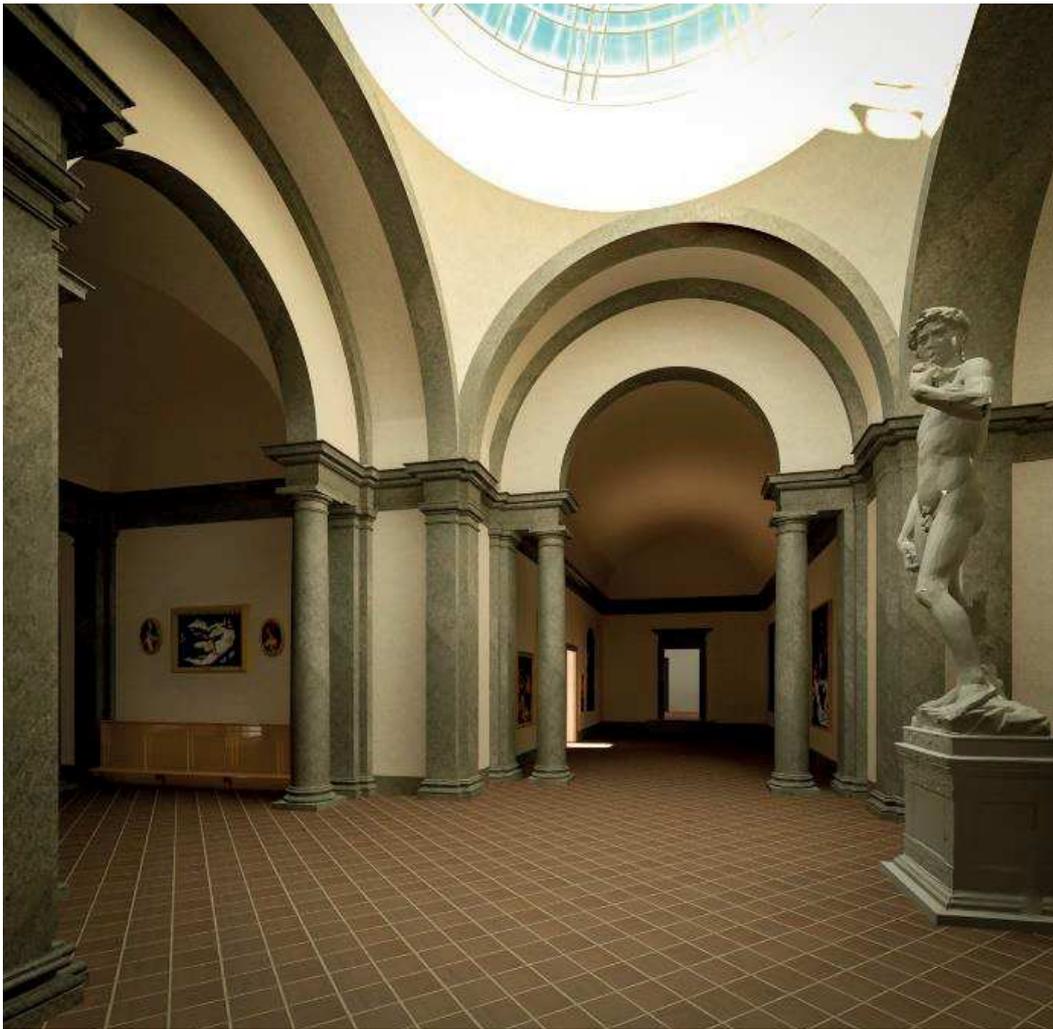
Currently, the systems that manage these two parts are divided from each other: for what concerns the collection, we have the CMS (collections management systems, the database described in the previous chapter), while for the building we have the BIM technologies. The M-BIM aims to include information about the building and the collections, to manage the two things together with a single software. In fact, thanks to the BIM versatility and the possibility to collect information on exhibition and deposits, the microclimate of the museum and environmental condition, microenvironment of the showcases and indications about the single

artwork, as well as visitor flows, we could optimize the museum organization, improving safety, security, management, and economic issue.

A first tentative to combine BIM and classical database was developed for the Galleria dell'Accademia of Florence.<sup>(2)</sup> In this case, the starting point was the realization of a BIM model of the entire building with the help of laser detection. Then, all the sculptures, paintings, objects of the collection were modeled with different approaches and software, then inserted as BIM objects in the model. Since they are BIM objects, for each one it was possible to specify physical data (dimension, material, weight, technique...) and other useful information related to links of external catalogs. In this way, it's possible to have all the information related to the artworks directly connected to the building model and all its specifications. This can help in easier management of the collection: in fact, it's possible to immediately individuate the placement of the object, see its features and needs and check if the environment in which it's placed is correct. It's possible to design installations and simulations to prevent actions of conservation. We can manage the flow of people, optimizing the security not only for the visitors but also for the artworks. In this way, with a single software, we can manage and organize not only the collection but also all the parts regarding the museum building itself (exhibition, deposits and storages, workspaces...).



*A scheme of the use of M-BIM as a link between the macro-areas of the museum system <sup>(3)</sup>*



*M-BIM view of Galleria dell'Accademia of Florence <sup>(4)</sup>*



*Artwork BIM objects workflow, files and file formats <sup>(5)</sup>*

<sup>(1)</sup> Conti A., Corongiu M., Fiorini L., Matta C., Tucci G., Valdambri N. (2019), "M-BIM: a new tool for the Galleria dell'Accademia di Firenze", *Virtual Archaeology Review*, 10(21): 40-55, <https://doi.org/10.4995/var.2019.11943>, pag. 41.

<sup>(2)</sup> Ivi pag. 44.

<sup>(3)</sup> Ivi pag. 41.

<sup>(4)</sup> Ivi pag. 46.

<sup>(5)</sup> Ivi pag. 47.

# PART 4

## MANAGEMENT OF THE DEPOSITS\*

\*NOTE: the following chapters "The museum micro-climate", "The indoor air quality", "The aging of materials" and "Environmental monitoring" take information from a consolidated bibliography, but they are not the subject of study of the thesis.

# THE MUSEUM DEPOSITS

*"Why, for cultural dissemination, do not imagine a process that transforms the less frequented museums into deposits, and transforms the deposits into museums?"<sup>(1)</sup>*

The museums of ancient tradition were used to exhibit everything (as the Wunderkammer, the chamber of wonders). With the modern museography revolution, instead, the works begin to be selected, thinned out and placed only at eye-level of the spectator, to facilitate their viewing.

Since that a museum is an institution that grows constantly, such as libraries and archives, its heritage increases, including new typologies of objects.

A museum nowadays usually shows only from 10% to 20% of its collection to the public. This because often the exhibition space is small compared to the number of objects of the museum, but also because the exposition to the public can represent a danger for the artworks, because of the unpredictable human factor. However, a "good" museum often takes care of running the exhibited works, to show, little by little, more or less all the pieces in the storages. Most of the works, in fact, are kept in the deposits, 60% of which, for the UNESCO, is inadequate in terms of conservation and safety, besides hardly accessible to the public. This increases the idea that a deposit is a negative, dusty, unknown, inaccessible place that "stoles" the artworks from the public fruition.

The storages have great importance in a museum:<sup>(2)</sup>

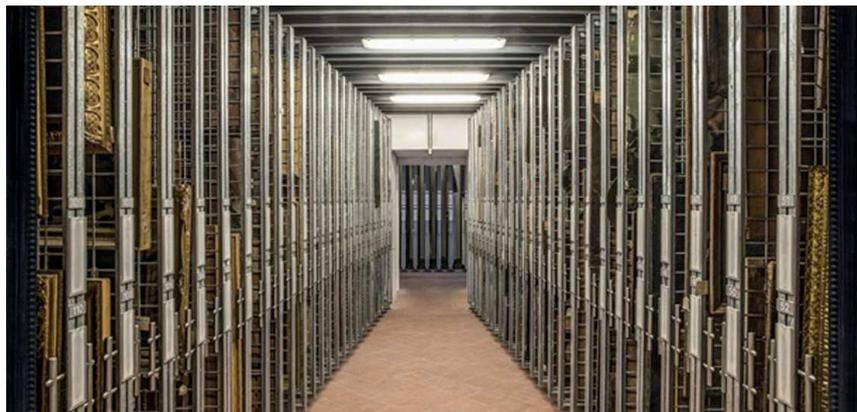
- they store vulnerable objects for which is not possible a long exposition to the public, even if they are important testimonies of the knowledge for our cultural heritage. In this category, all the pieces that are waiting to be studied or submitted to restoration analysis or surveys are included;
- they contain all the artworks that at the moment are not shown in the exhibition spaces, but they could be exposed in future ones, as well as in laboratories or educational programs;
- they are "invisible resources" of the museum itinerary and exhibition spaces open to the public;
- they are spaces for research and study;
- they are places of cultural heritage memory.

We assist to a progressive evolution of the deposits, from a simple place to collect the art pieces in the optimal conditions of security/safety and conservation, accessible only to museum staff, to "reserve space": a complex environment, organized on the concept of conservation together with the consultation of artworks. The design criteria for the deposits should be:<sup>(3)</sup>

- the project of an area of acceptance, articulation and sorting of objects that enter in the museum, as well as a reserved space, accessible by the workers. Every object stored in the deposit must be cataloged in the database, to trace its collocation and its movement, both inside and outside the museum; as well as to trace all the restoration/conservation activities;
- the definition of spaces initial capacity that eventually could be amplified with the increase of artworks acquisition;
- the realization of internal paths to optimize the connection with other areas related to the deposit (laboratories, photographic archive, space for packaging and loading/unloading, parking for the vehicles... so all the spaces related to the loans of pieces);
- the project of artworks containers: open or closed shelves; binders and filing cabinets; rotatable panels and frames on the wall; systems of panels and frames sliding on guides and removable; compactable wardrobes composed by metal shelves with electric or manual opening, they guarantee hermetic closure and very low maintenance; walls with shelves at different height; chests of drawers; bunk vault for the most delicate artifacts;
- the inclusion of a cultural program for students and researchers (presentation, consultation and study of the artworks).

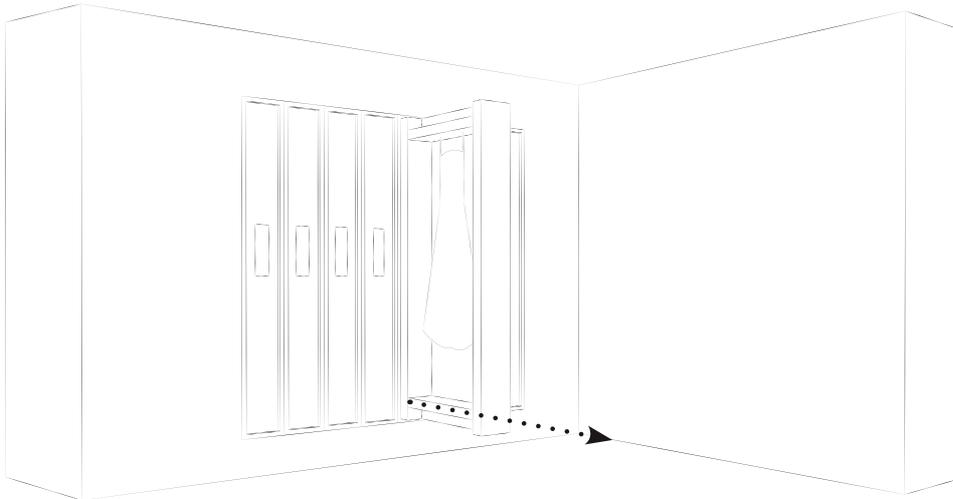
Each museum has to declare in its documents the problems related to the deposits and the forms of their management and organization. In particular, storage must be safe from the natural risks point of view (earthquake, geological instability, floods...) and the human risks (thefts, accidents...). The arrangement of the storages must follow a rational and organic project, with compact and functional furniture, equipped with conservation devices. The maintenance must be regular and periodical.

Since that the artworks are not all the same, every piece can have different needs for its conservation: needs related to the aging of the materials, the relative humidity, the air-conditioning, the light factor, and so on. That's why there are different forms and organizations of the deposits. When possible the centralization of the assets, also through forms of cooperation between the institutions, is assumed. This approach aims to overcome the territorial, proprietary contexts and the disciplinary studies to organize the works according to physical and dimensional problems, materials and conservation needs. The centralized deposits allow having common spaces for study, handling and packaging of artworks, restoration activities, exposition and public fruition.

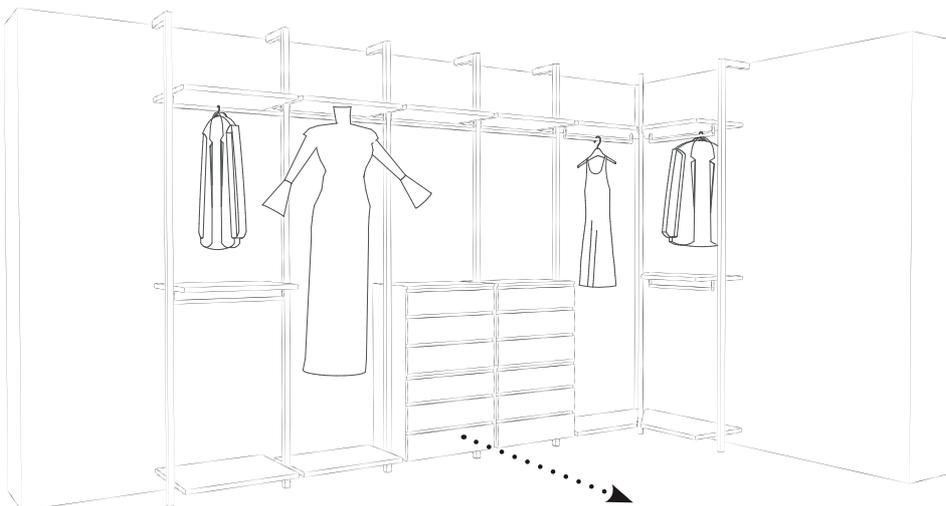


*Example of a deposit<sup>(4)</sup>*

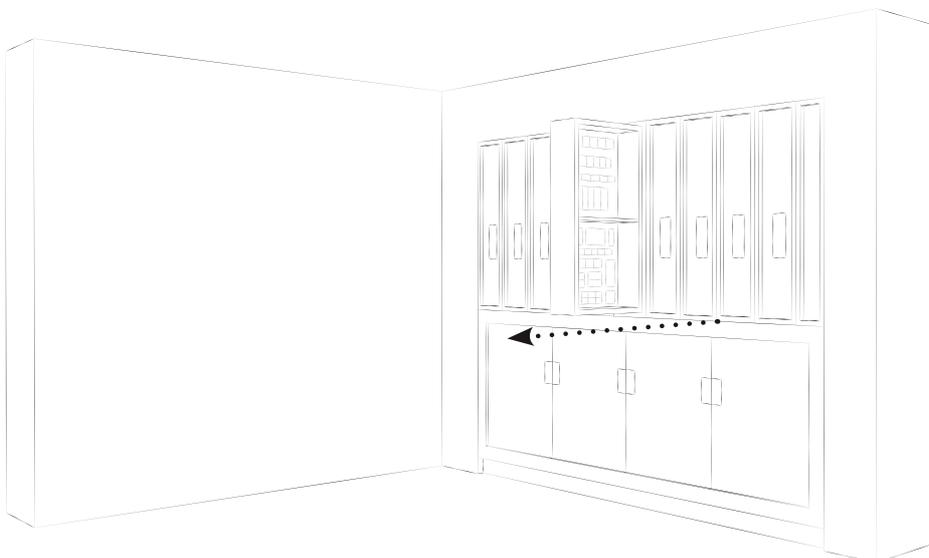
In the deposits, the art pieces can be enclosed in various collection systems, here there are examples of the most common types:



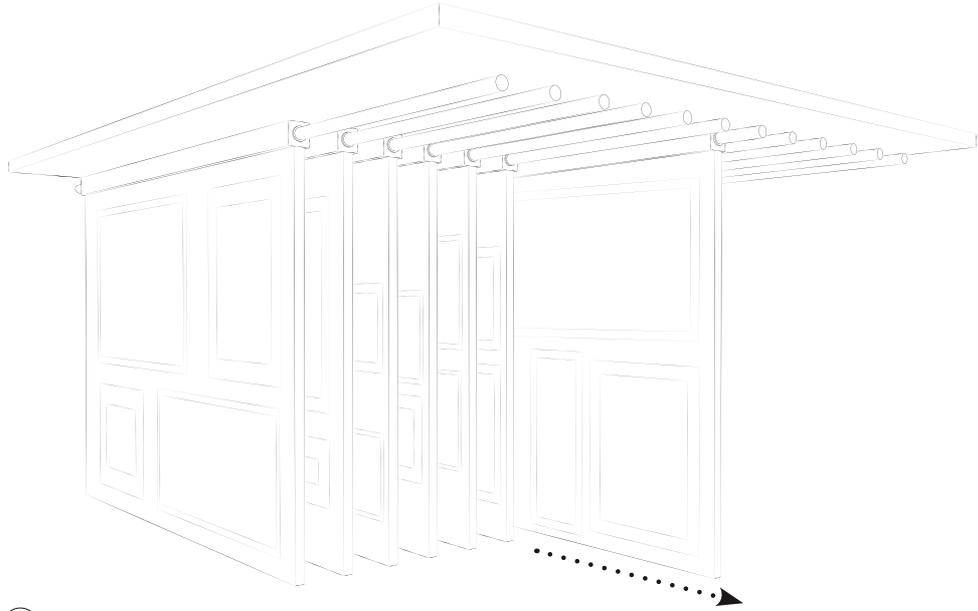
① Extraction system for clothes



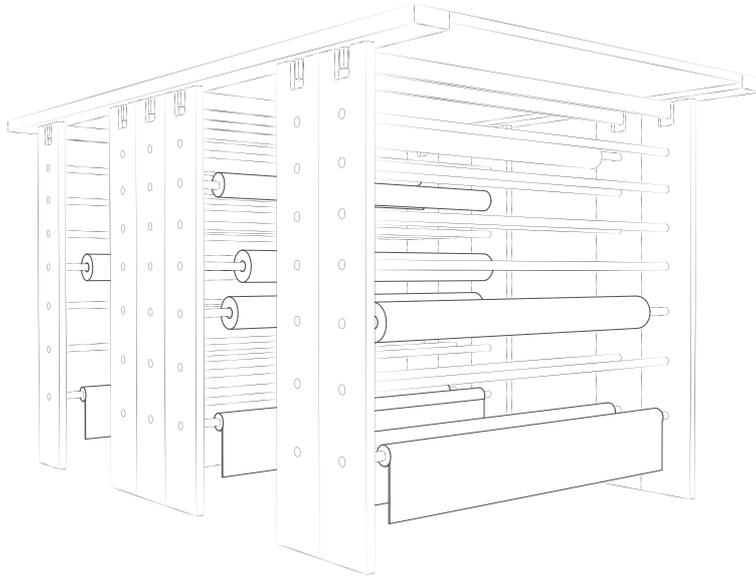
② System with clothes hangers and removable drawers



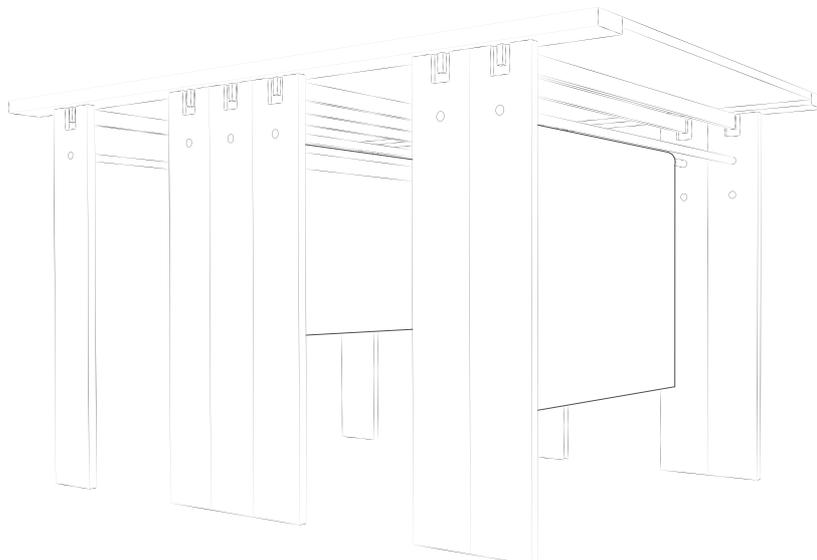
③ Extraction system for small objects (as coins, jewels...)



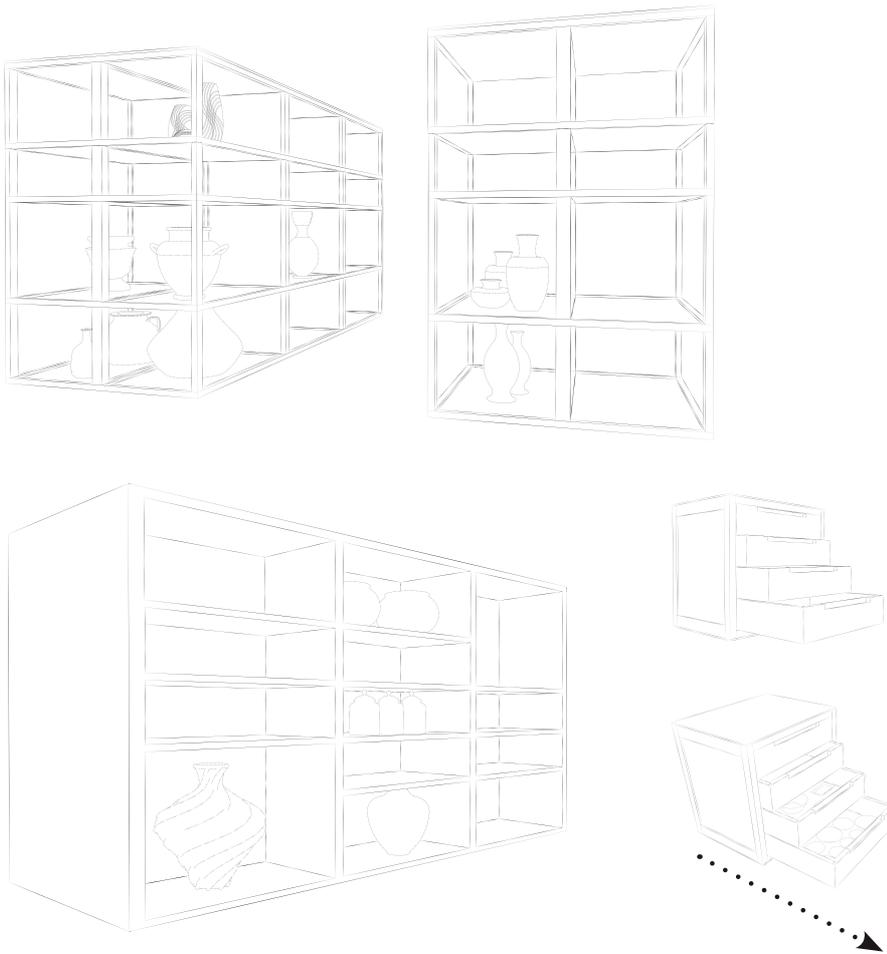
④ Extraction system for paintings



⑤ System for rolled fabrics/rugs/cloths...



⑥ System for hanging fabrics/rugs/cloths...



## ⑦ Cases with compartments and/or removable drawers

In each system, particularly important is the control and monitoring of environmental conditions. Preserving is a difficult activity because it has to deal with a lot of problems and variables, putting together many knowledge and skills. Particularly dangerous are factors as light, dust, relative humidity, temperature, heat, biological attacks. All these factors should - must - be taken into account in the design of the deposits and single containment box. Preserving is better than restoring, not only for the artwork itself that in the restoration operations suffers a very impactful intervention, but also from the economic point of view: restoring is very expensive. On the other hand, good conservation allows a saving also in terms of energy consumptions, with the related reduction of management costs and a lower level of pollution.

A perfect conservation system increases also the loan possibilities from other museums that, before sending the object, carefully analyze the conditions of the preservation system of the host museum.

<sup>(1)</sup> Monti S., "Musei pubblici e depositi. L'editoriale di Stefano Monti", *Artribune*, in <https://www.artribune.com/professioni-e-professionisti/politica-e-pubblica-amministrazione/2018/10/musei-pubblici-depositi-editoriale-stefano-monti/>

<sup>(2)</sup> Cfr. Vaudetti M., Canepa S., Musso S., *Esporre, allestire, vendere: Exhibit e retail design*, Wolters Kluwer Italia, 2014, pag. 14-17.

<sup>(3)</sup> Cfr. ICOM International Council of Museums Italia, *L'essenziale è invisibile agli occhi. Tra cura e ricerca le potenzialità dei depositi museali*, Matera, 2019, pag. 1-2.

<sup>(4)</sup> <https://www.electa.it/mostre/depositi-di-capodimonte/>

# THE MUSEUM MICRO-CLIMATE

The science of conservation is a various and articulated subject that includes a lot of professionals with different backgrounds (chemistry, engineering, geology, architecture, technical physics, science of materials...). Nowadays the artworks' conservation has assumed a great interest in scientific research. This thanks to the emergence of new preventive conservation strategies, whose multi-disciplinary characteristic actively involves the physical-technical sector, especially for what concerns the control of all those parameters that influence the degradation risk of the objects.

Conserving, from the technical point of view, means to create around the art piece the perfect micro-climate conditions. However, this is very difficult because in a museum we deal with objects that require specific condition systems and, often, they are hosted in historical museums that maybe don't have a good one. So, when we speak about conservation, we need to consider not only the collections themselves but also the museum (intended as a building, so from the architectural point of view).

Nowadays, the preventive action for the conservation of the cultural heritage has been implemented thanks to the new technologies, that allow better and easier control of environmental monitoring. All the objects enclosed in cases and showcases, both in the deposits and in the exhibition spaces, interact with the surrounding environment, suffering alterations that are the main cause of degradation risk. For this reason, the constant control of the museum micro-climate constitutes the starting point for the correct management of the collection and of the museum itself. In this way, the role of the registrar is fundamental, because is the one that deals with environmental control.

The micro-climate of a museum is something extremely important because in it all the possible reactions that could compromise the artworks' integrity happen. We can synthesize the deterioration mechanisms in physical mechanisms (dimensional variations), chemical mechanisms (chemical reactions), biological mechanisms (proliferation of microorganisms).

For correct management of the micro-climate, the parameters that must be taken into consideration and periodically controlled are:

- the temperature and heat;
- the relative humidity;
- the ventilation;
- the light;
- the vibrations.

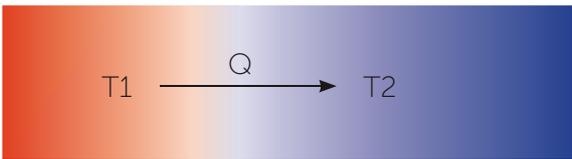
## THE TEMPERATURE AND HEAT

The temperature is one of the most important factors to maintain the durability of the art pieces, and it should remain as stable as possible. Generally, a low temperature isn't harmful to the artworks, while a high temperature can favor the degenerative process.

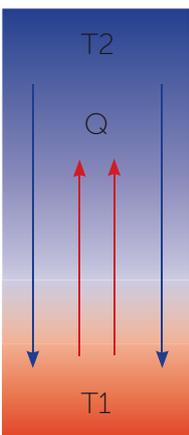
The temperature is responsible for many physical properties of a material, such as the state (solid, liquid, gas), the density, the solubility, the vapor pressure, the electrical conductivity, as well as the speed of chemical reactions. It's an intrinsic property of the system, so it's not related to the matter quantity. The heat, instead, is a form of energy that flows from a body to another, to fill a difference in temperature.

The propagation and transmission of heat can happen inside the body, in the air between different bodies or in the vacuum, in different ways: for conduction, convection and radiation.

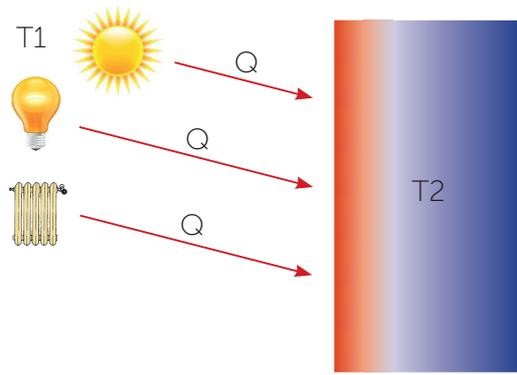
The heat transmission for conduction happens between two bodies in contact with each other, with different temperatures. The energy of the hotter body passes to the colder body, increasing its temperature.



The transmission for convection is characterized by many convective motions that pass between two objects that aren't in contact, but they are divided by a fluid (as water or air). The exchange of heat happens through the hot air circulation that rises.



The radiation happens between bodies with different temperatures that are not in contact. It doesn't require a fluid between the objects, but the propagation of heat can happen also in the vacuum. Each body emits electromagnetic radiation and scatters thermal energy in the surrounding space.



The effects on the heated materials depend on the speed of the heating and cooling, the intensity and quantity of heat transmission, the type of material and surface. The effects can be:<sup>(1)</sup>

- expansion/shrinkage of the structure dimensions or parts of the structure;
- high variation of water content in the warming up material, with the formation of condensation and evaporation that helps the flow of the humidity;
- acceleration of chemical and biological process;
- detachment of surface films, the formation of cracks and loss of material, because of the weakening of the material and structure;
- pressure variation that causes air movement, this can intensify the transfer of pollutants and microorganisms;
- in case of temperature increase: loss of mechanical characteristics of the material, such as fragility, elasticity, breaking load, yield point, fatigue limit. In case of temperature decrease: increase of elasticity, breaking point, yield point, fatigue limit, a decrease of resilience and fracture toughness.

Because of these effects, the internal environment should be well insulated from the external one, and the pieces should be kept far away from heat sources.

To improve the management of the museum temperature is very important to have an excellent heating and cooling system in the building, both for the exhibition spaces and the deposits.

## THE RELATIVE HUMIDITY

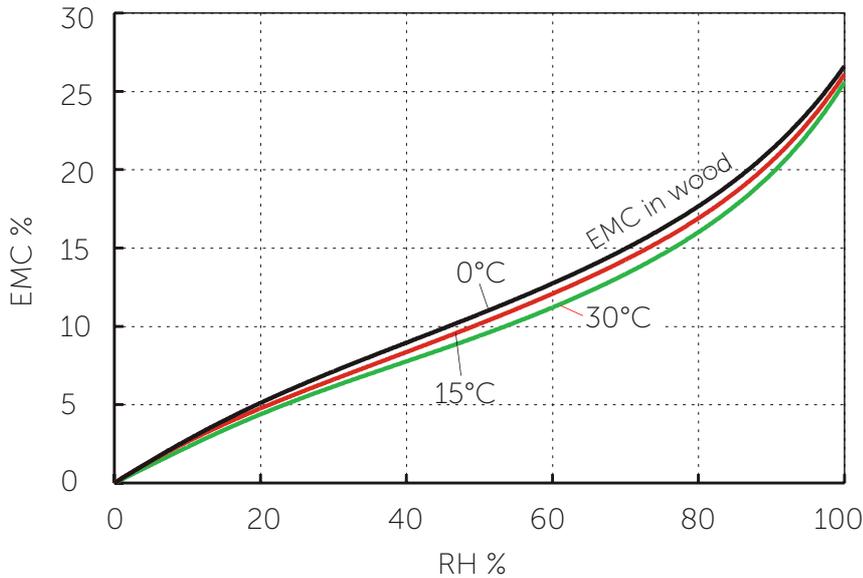
Temperature and humidity are strictly related to each other. The air in a room is never stationary, but it goes at 0,1 m/s: this rapid movement of air (and so of vapor) gives a various distribution of relative humidity in the space. The humidity is water presented in the vapor and/or liquid state: there is vapor in the air which is normally called "relative humidity", but there could be also the presence of water inside the materials or substances. The relative humidity (RH) is the ratio between the partial pressure of water vapor and the vapor pressure saturated at a certain temperature.

Through appropriate sensors that absorb the atmospheric water and modify some properties such as length, weight, electrical resistance and dielectric constant, it's possible to measure the RH value. At the same time, we can use a specific tool to take over the relative humidity, called psychrometer.

One of the most important problems in conservation, is the absorption of humidity in the environment by some kind of materials, as wood.

The wood contains 10% of water on average, but the value can change depending on temperature conditions and environmental humidity. The equilibrium moisture content (EMC) is a parameter that represents the water quantity in the material, related to the air. In the wood, we can see that the EMC value varies from 2 to 20% related to the type and condition of the material, with relative

humidity in the air between 10 and 90%. We can see also that the temperature influences the quantity of water inside the material.



*Scheme of EMC % in wood related to RH % and temperature.<sup>(2)</sup>*

Other materials that can absorb a high quantity of water are cotton, paper, wool, linen, silica gel, plaster.

The humidity influences the dimensional variations and the chemical and biological processes. In particular, when a material absorbs humidity, its form increases and "swells", this can cause cracks and deformations. When the RH exceeds 45% some chemical reactions can happen, such as metals corrosion (metals should have a very low quantity of RH). If the RH exceeds 65% with temperatures higher than 20°C, molds and lichens can develop.

Different materials have different levels of sensitivity to relative humidity variation.

Level of sensitivity to RH variation<sup>(3)</sup>



Every material has different content of humidity. These are the optimal thermo-hygrometric values to preserve the objects in stable climatic condition.<sup>(4)</sup>

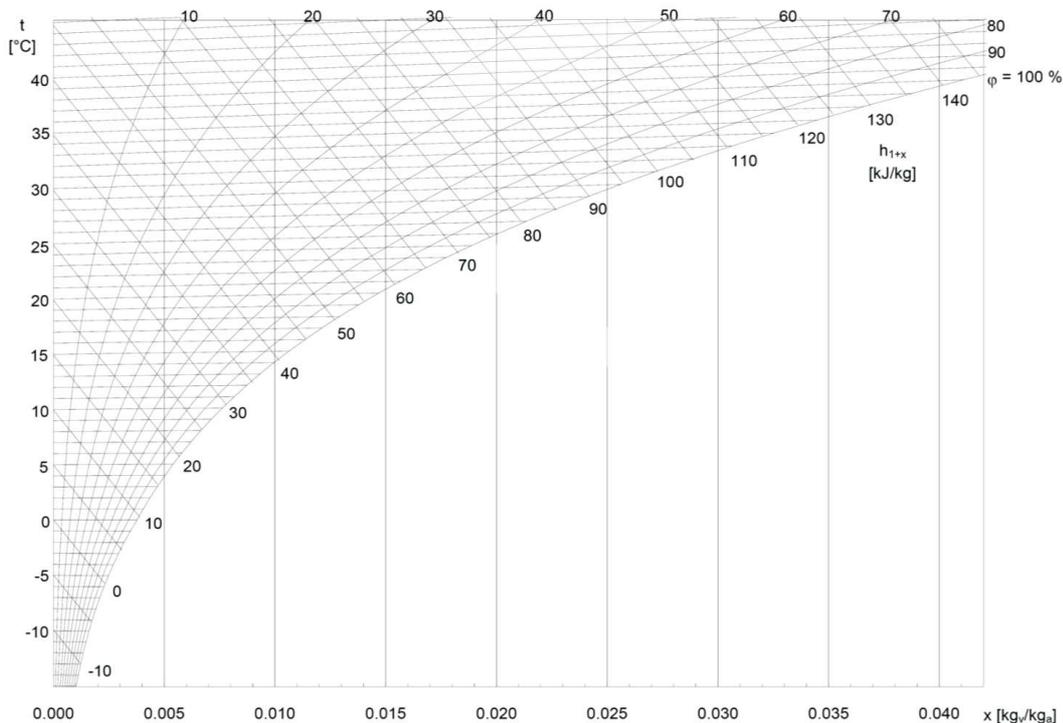
MATERIAL AND ARTEFACTS	RELATIVE HUMIDITY [%]	TEMPERATURE [°C]
Weapons, iron armor	<40	-
Ivory, bone	45-65	19-24
Bronze	<55	-
Paper, papier-mache	50-60	19-24
Anatomical collections	40-60	19-24
Mineragocical collections, stone, marble	45-60	<30
Leather, parchment	50-60	-
Magnetic tapes	40-60	10-21
Botanical collections	40-60	-
Films	30-50	-5 - +15
Photographs (b/w)	20-30	2-20
Entomological boxes	40-60	19-24
Oriental lacquers	50-60	19-24
Wood	40-65	19-24
Painted wood, polychrome sculptures	45-65	19-24
Books, documents	50-60	19-24
Ethnographic materials	40-60	19-24
Organic materials	50-65	19-24
Plastic materials	30-50	-
Metals	<45	-
Inlaid and lacquered furniture	50-60	19-24
Paintings on wall, mosaic	45-60	6-25
Gold	<45	-
Papyrus	35-50	19-24
Drawings, watercolors, crayons, pastels	50-60	19-24
Furs, feathers	45-60	15-21
Paintings on canvas	35-50	19-24
Ceramic, gres, terracotta, porcelain	20-60	-
Silk	50-60	-
Fabrics	40-60	-
Glass	25-60	-

## CONDENSATION

A dangerous problem related to the humidity is the possible formation of condensation on the surface of the objects and the structures. The condensation is the passage from an aeriform state to a liquid state. This phase-change happens at a particular temperature, called "dew temperature".

The presence of liquid water on the substrates exposed to the environment causes the activation of the biological, vegetative and reproductive process, as well as chemical reactions. These trigger transformations of the surfaces and substrates: the processes aren't circumscribed to surfaces but, through water transition by capillarity, can deeply affect the materials. In this way, the water becomes an important vehicle to transfer salts and substances from air to the object.

To check the level of condensation we have the Mollier diagram, which includes the relation between temperature, dew temperature, and relative humidity.



*Mollier diagram*

## EVAPORATION

The opposite phenomenon happens when an object has a higher temperature than the environment. In this case, we have the evaporation of water content from the surface or material. This causes cooling of the surface, caused by the passage from liquid to vapor, and salts migration from the material to the surface with the formation of crystal structures.

The evaporation can easily cause the disintegration and detachment of the surface layer of the structures, because of the crystal structures internal growth that has a volume greater than the one where the salts solutions are contained.

Both the condensation and evaporation are cyclical phenomena, related to natural or artificial cycles (heating and cooling) or directly related to the material itself. Another cause of the condensation is the atmospheric particulate matter, that's why is important to have a periodic cleaning of the museum and collections.

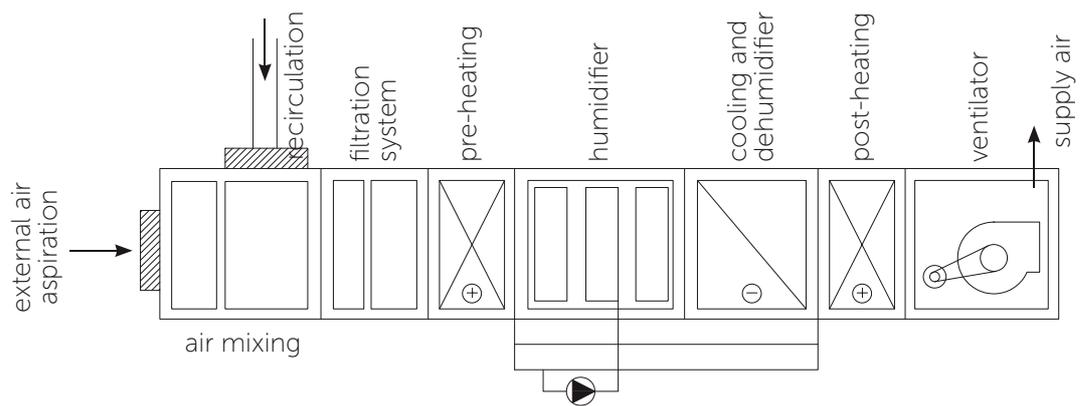
## THE VENTILATION

Another important parameter to consider is the environment ventilation. The ventilation can be natural or mechanical. The first one consists of simply opening and closing the windows and doors, often related to subjective perception. This type of ventilation is not sufficient and suitable in very big spaces, especially with delicate artworks that require constant control of ventilation.

On the other hand, mechanical ventilation is a specific and ad hoc project, designed to give several air changes in time. In this system, the air passes through the UTA (air treatment unit) that provides heat, cool, humidify, dehumidify and filter the air respecting the set values. The facilities should be subjected to periodic controls.

Three different systems for the environment air conditioning exist:

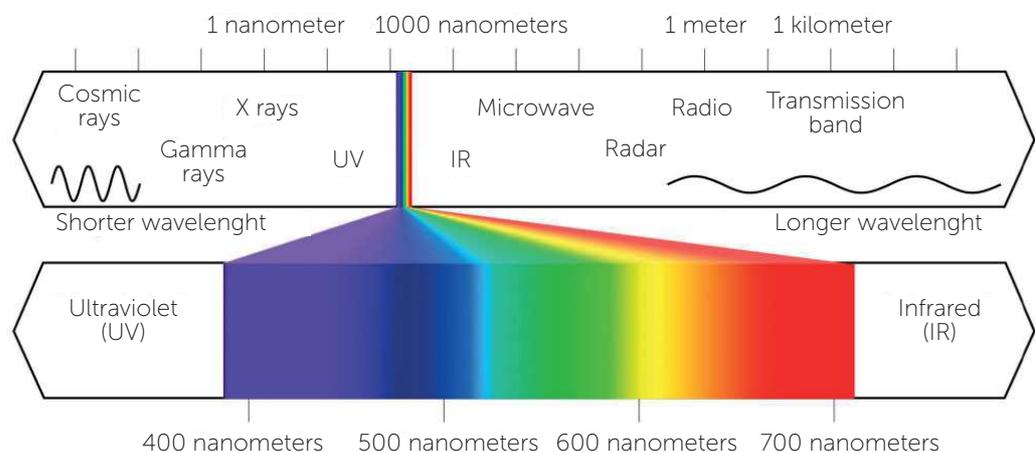
- water system. It allows the temperature control through the introduction (or extraction) of thermal power, the control of air changes through the opening of windows/doors (natural ventilation), the possible humidification with the introduction of vapor in the environment;
- air system. It satisfies all the environmental requirements through the external air introduction subjected to appropriate transformations inside the UTA;
- mixed air-water system.



*UTA operating scheme*

## THE LIGHT

The light is the part of the electromagnetic spectrum that the human eye can see. The wavelength of visible light goes from 400 to 700 nanometers.



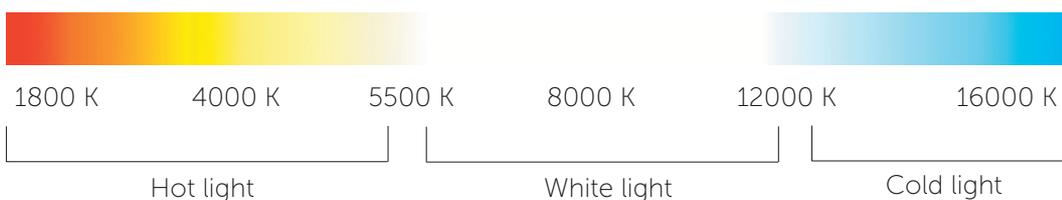
*Light spectrum*

Light can be measured in the following ways:

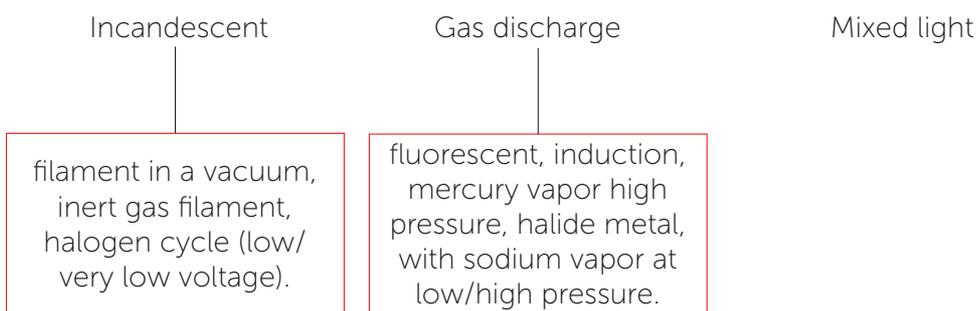
- luminous flux (lumen)[lm] that indicates the quantity of luminous energy (included between 380 and 780 nanometers) emitted, transported or received in one second by a source of light;
- luminous intensity (candle)[cd] that indicates the quantity of luminous flux emitted by a source inside the solid angle in the given direction. A point light source emits radiation at the same intensity and in all the directions, so its luminous flux spreads uniformly;
- illuminance (lux)[lx] that represents the ratio between the luminous flux on a surface and the area of the surface. It indicates the light quantity. Generally, the artworks in a museum shouldn't receive more than 50 lx;
- luminance [ $\text{candel/m}^2 = \text{nit}$ ] is the ratio between the luminous intensity emitted by a surface in a direction and its area. It indicates the light sensation that we perceive from a surface;
- light emittance [ $\text{lumen/m}^2$ ] is the ratio between the luminous flux emitted by a surface and the area of the surface.

Illuminance and luminous intensity are the main values to take into consideration when we design an illumination system for the exhibition spaces/deposits and showcases.

Another important aspect of the light to consider is the "temperature of color" or "tones". Every source of light is characterized by a different color that emits heat.



In the market, many types of lamps exist, and for each object we need to select the optimal one fit for it. These are the three categories for which the light sources are divided:<sup>(5)</sup>



The lighting of a space where artworks are collected should be devoid of the ultraviolet component that causes alteration of colored pigments, as well as the infrared component (or it should have very low emission). Moreover, it should be adjustable for what concerns the light intensity, the light beam, the light source and it should be possible to add screens and/or filters.

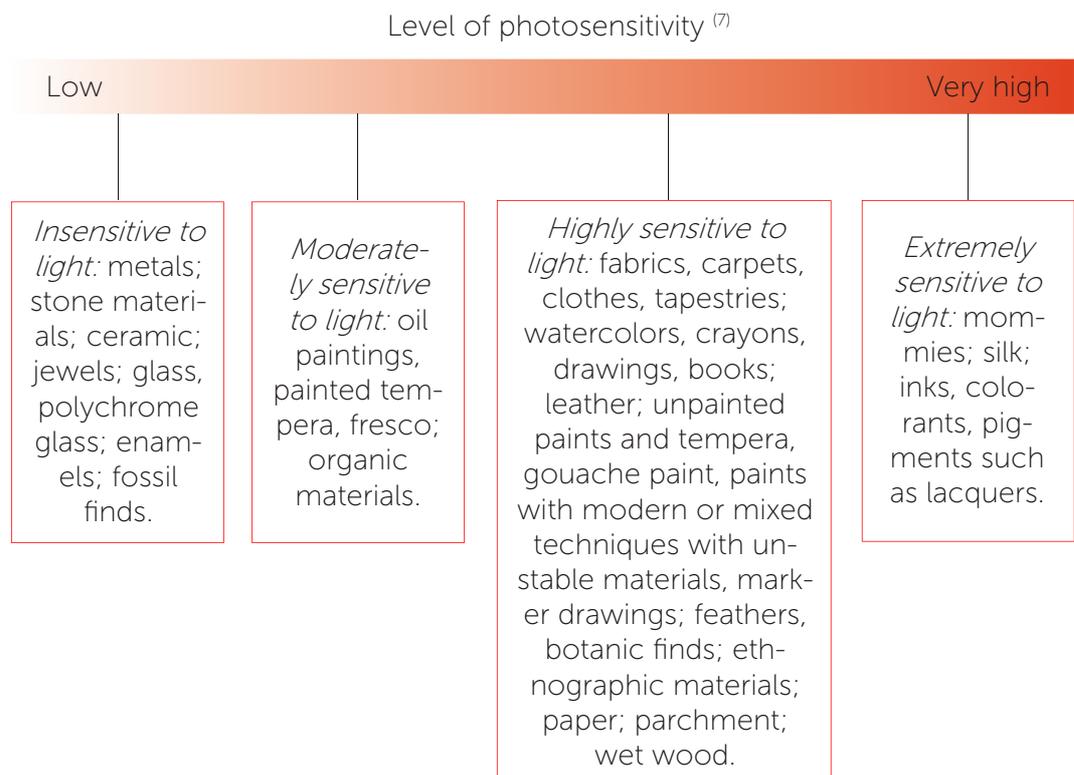
The incandescent and fluorescent lamps are to avoid because they emit a high quantity of heat and they are low energy efficiency, they emit ultraviolet radiation too. On the other hand, the best lamps are the optical fibers, where the light transmitted is free of UV and IR rays, and it hasn't electric radiation (but they are

quite cumbersome); or the LED that is devoid of UV and IR, it has high luminous emission and low energy consumption.

The choice of the light source must be suitable for the objects of the collection, that have different needs and requirements: in this table, some materials are reported.<sup>(6)</sup>

MATERIAL	Emax [lx]	UVmax [ $\mu$ W/lm]
ORGANIC MATERIAL		
Paper, papier-mache, tissue	50	75
Natural fiber materials	50	75
Watercolors, pastels, drawings	50	75
Ethnographic collections	50	75
Tempera	150	75
Leather, parchment	50	75
Papyrus	150-75	
INORGANIC MATERIALS		
Metals	not important	-
OTHER		
Films, photographs	50	75
Photographs (b/w)	150	75

We can see that there are some particular materials which are very sensitive to light. The photosensitivity can be classified in the following way.



If the materials are exposed to inadequate light, degradation phenomena can happen. The degradation caused by light can be of three types:<sup>(8)</sup>

- photochemical effect
  - discoloration or yellowing of pigments;
  - discoloration of textile fibers;
  - paint cracking;
  - detachment of pictorial layers;
  - failure of the support;
  - loss of mechanical strength of textile fibers.
- thermal radiant effect
  - thermal expansion;
  - mechanical tension;
  - chemical degradation;
- biological effect
  - aesthetic consequences (such as the formation of spots on the surface);
  - physical consequences (weakening of the surface);
  - chemical consequences (corrosion of the material).

The book heritage, in particular, is the one that is more exposed to degradation risks caused by the light.<sup>(9)</sup>

BOOK HERITAGE	DEGRADATION PHENOMENA CAUSED BY AN INADEQUATE ILLUMINATION
GRAPHIC DOCUMENTS	
Papyrus	Yellowing and fading, chemical reactions
Parchment	Yellowing and fading, chemical reactions
Paper	Yellowing and fading, chemical reactions
PHOTOGRAPHIC DOCUMENTS AND MICROFILMS	
Photographs (b/w), negatives	Embrittlement, increase of chemical reactions
Photographs, negatives	Embrittlement, increase of chemical reactions
Microfilms	Embrittlement, increase of chemical reactions
MAGNETIC AND OPTICAL DOCUMENTS	
Magnetic tapes (audio and videos), CD ROM	Alteration of the reflective layer

## THE VIBRATION

Another parameter to take into consideration in the museum micro-climate is the vibration. Vibrations can be different for the physical profile, frequency, wavelength, width, speed, acceleration. They are oscillatory motions, compared to the equilibrium situation, caused by an external perturbation that hit the elasticity of the material.

The artworks are submitted to continuous vibrations such as vehicular traffic or seismic activity, whose frequency can damage them.

To measure and control the vibrations nowadays we dispose of two tools:<sup>(10)</sup>

- seismic insulation. This principle is compared to the one of the car suspension: buildings and/or artworks that need insulation are placed on devices - seismic insulators - constituted by layers of rubber and steel which give a high vertical stiffness to support the structure weight, and a low horizontal stiffness to absorb and reduce the accelerations of the earthquake;
- energy dissipation. This allows the removal of energy created by earthquake thanks to special devices - energy sinks - installed in two points of the structure subjected to displacements (i.g. bracing). The energy dissipation can be different depending on the material and type of device.

The vibrations control should be periodical.



*Pictures of the Museo Egizio of Turin (exhibition space and storage) and the Hermitage Museum (storage).<sup>(11)</sup>*

*The correct conservation is important both in the deposits and in the exhibition spaces.*

<sup>(1)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 16.

<sup>(2)</sup> Cfr. Ivi pag. 25-28.

<sup>(3)</sup> Canepa S., Vaudetti M., course of "Architettura degli interni e allestimento", Politecnico di Torino.

<sup>(4)</sup> Ibidem.

<sup>(5)</sup> Corgnati S. P., Becchio C., course of "Fisica tecnica ambientale", Politecnico di Torino.

<sup>(6)</sup> Canepa S., Vaudetti M., corso di "Architettura degli interni e allestimento", Politecnico di Torino.

<sup>(7)</sup> Ibidem.

<sup>(8)</sup> Fellin L., Forcolini G., Palladino P., *Manuale di illuminotecnica*, Milano, Tecniche Nuove, 1999, pag. 692-693.

<sup>(9)</sup> Canepa S., Vaudetti M., course of "Architettura degli interni e allestimento", Politecnico di Torino.

<sup>(10)</sup> Cfr. Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 24.

<sup>(11)</sup> Pictures granted by the Museo Egizio of Turin.

# THE INDOOR AIR QUALITY

A very diffused problem is atmospheric pollution, which is caused mainly by vehicular traffic and industrial sector, especially related to combustion and manufacturing processes. Not only the outdoor spaces suffer from this problem, but also the indoor ones. Clouds of dust, gases, and vapors from the outside enter the building and often the indoor air quality is worst than the outdoor one, with a concentration of pollutants higher than 50 to 100% from the outside. This because the aerosol easily enters a building but it hardly goes out, and it remains attached to the surfaces. The primary pollutants in the air are carbon monoxide (CO), nitrogen monoxide (NO), hydrocarbons (HC), sulfur dioxide (SO<sub>2</sub>), particulates, followed by nitrogen dioxide NO<sub>2</sub> and ozone O<sub>3</sub>.

Like every other structure, museums are also affected by this phenomenon, and this can represent a big risk for all the artworks inside it. In this table, we describe the main damages caused by the pollutants to some types of material.<sup>(1)</sup>

MATERIAL	DAMAGE	MAIN POLLUTANTS
Metals	corrosion, oxidation	sulfur dioxide, hydrogen sulphide, carbonyl sulphide, formic acid, acetic acid, formaldehyde
Paintings and organic coatings	discoloration, fouling	sulfur dioxide, hydrogen sulphide
Paper	embrittlement, discoloration	sulfur dioxide
Photographic materials	staining, sulfurization	sulfur dioxide, hydrogen sulphide
Fabrics	reduced robustness, fouling	sulfur dioxide, nitrogen oxides
Colored fabrics	discoloration, color change	ozone, nitrogen oxides
Leather	weakening, pulverization on the surface	sulfur dioxide
Rubber	elasticity loss, breakage	ozone

Stone, marble, plaster	deterioration, soiling, crumbling	sulfur oxide, nitric acid, nitrogen oxide
Varnishes	blackening	hydrogen sulphide, ozone
Glass	scratching, matting	hydrochloric acid
Fresco	crumbling	sulfuric acid, sulfur oxide
Wood, wooden furniture	embrittlement	ozone
Naturalistic collections	embrittlement	ozone

Among the substances able to deteriorate an artwork, the ones considered more dangerous and aggressive are sulfur compounds, oxides of nitrogen and ozone. An artifact, unlike a biological system, it's not equipped with mechanisms for disposal and elimination of pollutants with which it's in contact. For this reason, there's an accumulation of these substances in a very short time.

The intensity of the chemical attack on the surfaces is proportional to the temperature and relative humidity. The higher the temperature and the humidity, the faster the attack of pollutants. So the indoor air quality is strictly related to the micro-climate.

The indoor air quality (IAQ) represents one of the most important causes of the environmental problem. Contrary to the outdoor pollution, whose value is available at municipal and provincial administrations, the IAQ needs a measurement carried out expressly, and its monitoring requires an oriented program in collaboration with experts.

Values of the maximum concentration of pollutants exist, both for the deposits/exhibition spaces and the archives. For this one, the value is lower than for the deposits, because paper and its derivatives are more delicate.<sup>(2)</sup>

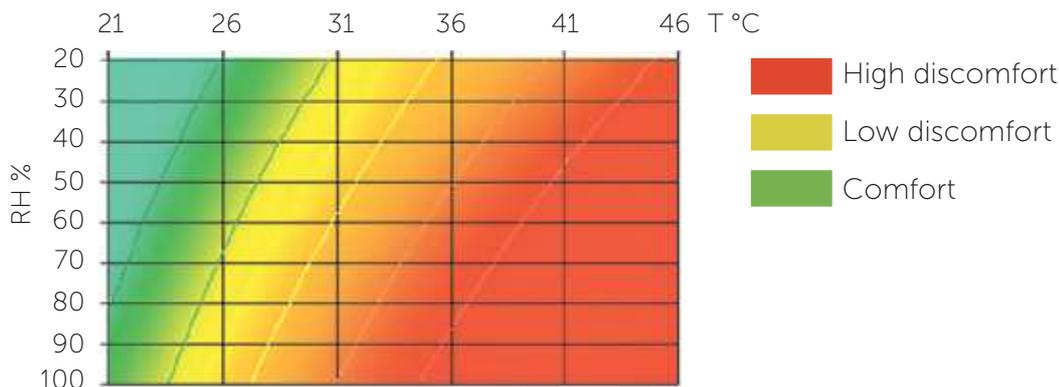
POLLUTANT	ARCHIVES	MUSEUM
Sulfur dioxide	5-10 ppb (vol)	<0,4 ppb(vol)
Nitrogen dioxide	5-10 ppb (vol)	<2,5 ppb(vol)
Ozone	5-10 ppb (vol)	1 ppb(vol)
PM10 (fine powders)		20-30 µg/m <sup>3</sup>

ppb(vol) = partes for billion/volume  
 µg/m<sup>3</sup> = micrograms per cubic meter of air

In case of exceeding these limits, it will be necessary to act procedures aimed at the reduction of air pollutants. Pollutants can be removed from the environments through actions ranging from the control of the outdoor air introduction to filtration systems (UTA). These can filter gaseous and particulate airborne pollutants, outdoor air introduction and recycled indoor air, to decrease the concentration of indoor pollutants. Another way to decrease the pollution involves the use of new materials for filtration, such as fabric impregnated with coal, that acts as passive pollution cleaners, reducing internal concentrations of pollutants, even without air-conditioning system. In this case, it's also possible to use air purification systems called "dejection unities", that are often pre-assembled systems.

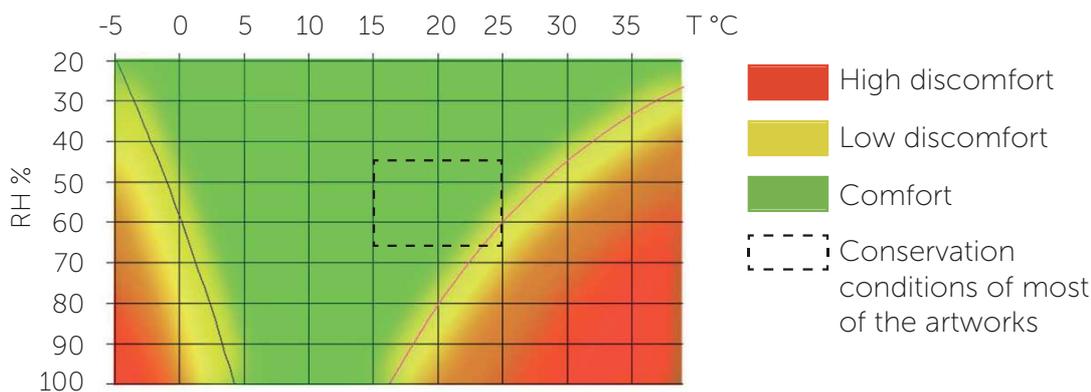
Basically, we can act in three ways to improve the indoor air quality: monitoring of gas and particles inside the museum, control of air exchange between the internal and external environment, frequent removal of dust inside the museum. The air quality contributes to determining the thermo-hygrometric well-being both of people and materials. The well-being of people is treated in many ways and it's an issue of great interest. The IAQ is rapidly becoming a serious health problem worldwide: in fact, the IAQ inside the buildings is important not only for the comfort of the occupants but also for their health.

An effective method to represent the conditions of human comfort is Thom's index or well-being index, that uses the relative humidity and the temperature to monitor the comfort feelings.



Thom's index

Based on the same principle is the Scharlau's index, that uses a great variation of temperatures which allows demonstrating that thermo-hygrometric values recommended for the correct conservation of most of the materials and objects in a museum are similar to the ones for people: 15-25 °C with 45-65% of RH.



Scharlau's index

<sup>(1)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 72.

<sup>(2)</sup> Ivi pag. 73

<sup>(3)</sup> Ivi pag. 85

# THE AGING OF MATERIALS

All the artworks are submitted to degradation caused by the aging of the materials, which is an inevitable and irreversible process. This phenomenon, called the "deterioration process" depends on both internal causes (such as intrinsic instability of material and/or the working process to which it can be subjected) and external causes related to the conservation conditions (micro-climate, indoor air quality). Thanks to a good method of conservation we can slow down the material aging.

In a museum, many types of artifacts exist, composed of many different materials with different needs and requirements. The knowledge of their behavior is a crucial point for the registrar role, because it's responsible for their maintenance. Basically, we can divide the materials into two categories:<sup>(1)</sup>

- inorganic (stone materials, glass, metals);
- organic (paper, wood, fabrics, leather, parchment, paintings, plastic materials, ivory, bones).

The degradation that can hit a material can be of three types: physical, chemical and biological. For what concerns the physical damage, it's directly connected to the structural and thermo-physical characteristics of the building envelope. The physical mechanisms can favor phenomena that cause temperature and relative humidity variations in the environment, representing a big risk for the conservation: they can cause condensation and evaporation, dilations and contractions, transport and release of pollutants, water and salts migration.

The chemical damage is caused mainly by an inadequate value of thermo-hygrometric conditions, which acts as a catalyst to kinetic or photochemical reactions, caused by the presence of pollutants. The higher the temperature, the greater the phenomena; the lower the temperature, the higher the chemical stability of the material (so less reactive).

The biological damage, which is, in any case, influenced and brought back by chemical and physical processes, is represented by mold, insects, pests, fungi, bacteria and so on.

In the table below, we try to summarize the effects of the physical and chemical damage, that are strictly related to the micro-climate and the indoor air quality of the environment. In particular, we take into consideration relative humidity, atmo-

spheric pollution, temperature, light, and vibrations.

Material	Relative humidity	Atmospheric pollution	Temperature	Light	Vibrations
INORGANIC MATERIALS					
Stone		①	①	⑤	①
Glass	⑤	①	①	⑤	① ②
Metal	②	① ②	①	① ⑤	①
ORGANIC MATERIALS					
Paper	③ ④	①	①	① ② ③ ④ ⑤	①
Wood	①	①	①	① ② ④ ⑤	①
Fabrics	① ③ ④	①	①	① ② ③ ④ ⑤	①
Leather	①	①	①	⑤	①
Parchment	①	①	①	① ② ③ ④ ⑤	①
Paintings	③	① ③	①	① ④ ⑤	①
Plastic materials	①	① ③	①	⑤	①
Ivory, bones	①	①	①	⑤	①

#### TYPE OF DAMAGE

##### *Relative humidity*

- ① Swelling with the increase of relative humidity → favoring of microorganisms development. Shrinkage with the decrease of relative humidity → cracks, breaks and/or fragility.
- ② Beginning or acceleration of the corrosion.
- ③ Fading of materials' color.
- ④ Increase of fragility.
- ⑤ Deterioration of material.

##### *Atmospheric pollution*

- ① Loss of material; favoring of microorganisms development; legacy of traces of pollutants on surface; change aesthetic appearance of the objects.
- ② Increase of oxidation.
- ③ Fragility and breaking.

##### *Temperature*

- ① Increase of speed of chemical and physical reactions (as the movement of vapor); expansion of materials; partial dehydration of materials → increase of fragility.

*Light*

- ① Deterioration of material because light acts as a catalyst in oxidation reactions.
- ② Increase of fragility.
- ③ Discoloration, fading and staining.
- ④ Alteration of pigments.
- ⑤ Increase of temperature of the objects.

*Vibrations*

- ① Detachment of instable parts.
- ② Damage or destruction.

The following table, instead, is a synthesis of the main biological damages on some types of materials.<sup>(2)</sup>

MATERIAL	AGGRESSOR	DAMAGE
INORGANIC MATERIALS		
Stone materials	bacteria	black crusts, patinas, exfoliation, spraying
	fungi	patinas, stains, pitting
	lichens	fouling, exfoliation, pitting
	mosses	fouling, surface erosion, fractures, detachment
	seaweed	patinas and films
Metals	bacteria	erosions
	seaweed	patinas
Glass	bacteria	erosions, stains, opacifications
	fungi	erosions, stains, opacifications
	lichens	patinas, erosions
	seaweed	erosions, fouling, pitting, opacifications, iridescence
ORGANIC MATERIALS		
Paper	bacteria	erosions, stains, variations of the mechanical characteristics
	fungi	erosions, stains, variations of the mechanical characteristics, pigmentation

Wood	bacteria	erosions, variations of structural and mechanical characteristics
	fungi	white, brown and soft caries, stains, variations of the mechanical characteristics, pigmentation
Fiber of vegetal origin	bacteria	erosions, stains, discolorations, loss of structural and mechanical characteristics
	fungi	erosions, stains, discolorations, loss of structural and mechanical characteristics
Fiber of animal origin	bacteria	erosions, stains, discolorations, loss of structural and mechanical characteristics
	fungi	stains, erosions, discolorations, loss of structural characteristics
Parchment and leather	bacteria	erosions, stains, loss of structural integrity
	fungi	erosions, loss of structural integrity, stiffness, stains, discoloration
Synthetic materials	bacteria	variations of physical-chemical characteristics
	fungi	variations of physical-chemical characteristics, pigmentation, stains

Between biological damages, there's also the presence of insects, that are dangerous especially for the materials constituted by cellulose, such as paper, parchment, wood. They feed of jelly, starch and glues of various origins. The main cause of the insects' propagation is the micro-climate: with a temperature higher than 20°C and relative humidity over 65%, without light, the perfect environment for the insects is reproduced.

The main damage caused by the insects are superficial and deep erosions, chasms, holes, irregular perforations.<sup>(3)</sup>

<sup>(1)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 36.

<sup>(2)</sup> Ivi pag. 47-48.

<sup>(3)</sup> Ivi pag. 49-50.

# ENVIRONMENTAL MONITORING

The second task of the registrar is the control and monitoring of the deposits. As we said before, the museum micro-climate is influenced by some factors that contribute to the artworks' conservation: temperature, relative humidity, light, ventilation, vibrations, indoor air quality (depending on the pollutants in the air), and biological attacks. These parameters, if not treated correctly, can increase the degradation risk of the artworks. For this reason, it is fundamental to measure the values and variations over time of the various parameters involved, and so to act on the monitoring. It presupposes the adoption of technological systems that allow the acquisition of the parameters to identify the degradation causes.

In the 1980s, the available instruments allowed only direct monitoring: the tools for detecting temperature and humidity were used differentially, moving from a point of sampling to another. The measurements were repeated over time. This method didn't allow a characterization of the environment but only an evaluation of the parameters at the detection moment.

After the development of indirect monitoring systems, it was possible to have acquisition through data-logger, which allows a constant detection with fixed sensors and the remote data transmission without the use of cabling. Thanks to this new technology, it became possible to have a temporal continuity of the detections, and the monitoring has become a diagnostic tool that allows the analysis of environmental parameters' evolution and to make predictions about risky situations. By using the classic sensors with data-loggers it was possible to program the daily number of measurements and store a wide number of data, that subsequently were downloaded and elaborated by a professional.

Nowadays, it is possible to transmit the measurement in a direct way to a station for the control and management of data. This allows also the data transmission in real-time, which consent to verify the correct operation of all the devices and sensors.

The latest technological innovation concerns the wireless sensors, capable to detect the parameters and transmit them in real-time via wireless signal to a station, without the use of data loggers.<sup>(1)</sup>

The purpose of the data analysis is not only to represent the measurements' trend but also to give explanations about their performance, checking some correla-

tions with other different parameters (as the people flow, the activation of heating/cooling system, the cleaning operations of the space...). In this way the data elaboration becomes useful for the actions of artworks conservation, trying to use the values to give information about the conservation state of materials in the museum.

## TEMPERATURE

Temperature measurement can be performed with the use of several types of thermometer based on different operating principles:<sup>(2)</sup>

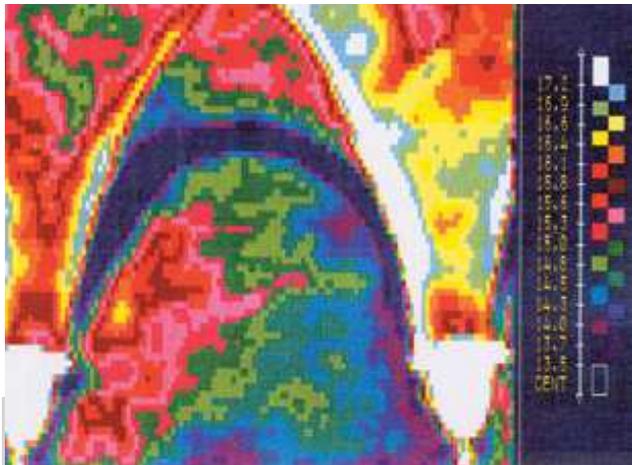
- liquid thermometer (mercury thermometer, alcohol thermometer);
- metal deformations thermometer (bimetallic thermometer);
- electrical resistance thermometer (Pt100);
- thermocouple thermometer (TC).

Each type of thermometer is characterized by precision (range in which the random errors are contained), readiness (rapidity to reach thermal equilibrium), sensitivity, and the method of returning the measurements (analog or digital reading, recording on paper or magnetic memory).

The main problem of these types of thermometers is that the measurement at a certain point can't be considered valid for the entire surface. That's why, recently, a new tool was developed, the infrared thermometer. It allows obtaining a thermal image with many details of the surface, where is possible to highlight also temperature gradients. This tool can be used together with other devices.

For monitoring over long periods without the need to check data, there are small data-loggers that can measure both the temperature and the humidity.

More accurate temperature measurements can be made with Pt100 probes connected to programmable data-loggers.



*Thermographic image: for every color, a temperature is assigned. <sup>(3)</sup>*

## RELATIVE HUMIDITY

Humidity measurement can be performed with the use of different types of hygrometer, such as:<sup>(4)</sup>

- psychrometer;
- bundle of synthetic fibers;
- capacitive hygroscopic sensor.

One of the most common hygrometers is the mechanical psychrometer, a tool that provides accurate measurements of RH%. The measurement is based on the temperature value of two thermometers (dry and wet bulb) with the use of a specific conversion table "temperature-relative humidity". The dry bulb thermometer measures the air temperature, while the wet one, covered with wet fabric, mea-

sure a lower temperature due to the subtraction of heat by water evaporation in the fabric. The higher the humidity in the room, the lower the temperature. The psychrometer can be digital or electronic.

The hygrometer with synthetic fibers (or hair) is quite widely used. It's based on the property of hair to varying in length with the humidity change. The lower the level of relative humidity, the greater the elongations.

The devices can be analogical or electronic, pocket-sized with internal sensors or portable with external measuring probe.

## LIGHT

For what concerns the light, the measurements are about illuminance, luminance and radiance. The tools to measure the light can be portable for impromptu measurements or fixed for continuous measurements.

A very practical and common device is the photo-radiometer, which allows to carry out the three measurements on different angles related to the type of probe connected to it. The measure of illuminance can be developed with the photographic exposure meter, a simple and inexpensive tool. The amount of ultraviolet radiation, which is very dangerous for the artworks, can be controlled with a photometer. For continuous measurements, we can use sensors connected to data-loggers that work in an automatic way.<sup>(5)</sup>



*Pictures taken during the light control <sup>(6)</sup>*

## VENTILATION

Since that inside the buildings the airflow is characterized by air with low speed (cm/s), the use of normal cup anemometers and flag direction sensors is not possible. However, air circulation can be measured with the hot wire anemometer. This tool is equipped with a flow speed sensor of a heated platinum wire which cools proportionally at air's speed.<sup>(7)</sup>

## VIBRATIONS

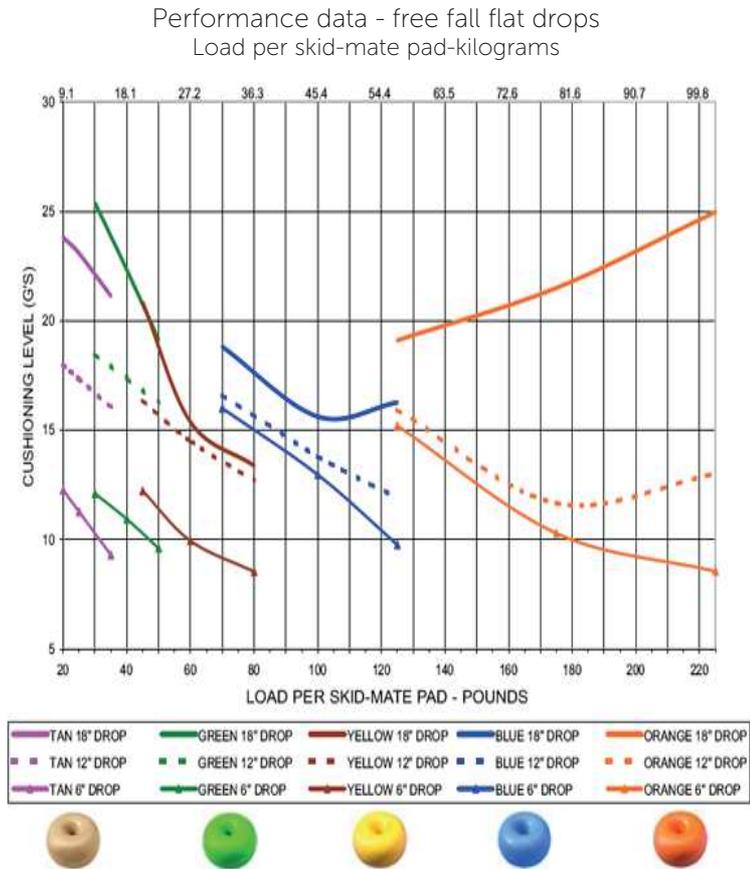
The monitoring of vibrations can be developed with periodic measurements or, when necessary, with continuous measurements. An additional concern to museum professionals considering the loan of their artworks to exhibitions is the stress that objects may suffer from vibration and movement during transportation. In this case, rattling, banging or shaking caused by the movement of trucks can be mitigated by proper packaging, which allows the monitoring during the transport thanks to some tools connected with small data-logger, located on the box, that analyze the current situation.

The vibrations control can be implemented also with the use of a damper, a de-

vice mounted in the structures to reduce the amplitude of mechanical vibrations. This tool is particularly useful to prevent damage, discomfort and structural failure.



Example of a damper



Antishock system <sup>(8)</sup>

## INDOOR AIR QUALITY

The measurement of air pollutants is not simple because it requires specific instrumentation managed by technical staff. Measures can be continuous, for example in the monitoring of cities' pollution, or impromptu according to a pre-established program. The pollutants can be checked in the following ways:<sup>(9)</sup>

- direct measurement with specific gas analyzers. It requires very expensive instrumentation that uses pumps to take samples to analyze;
- indirect measurement through laboratory analysis of a sample. This method requires small pipes with substances able to absorb pollutants that will be analyzed. Often museums have low economic availability, that's why they prefer to use passive samplers, which are cheaper and easier to use. The principle of these tools is the passive diffusion of a gas in an adsorbent tool. They give the results only about average concentrations related to the period, not in real-time. They are suitable for giving a data store of gaseous pollutants, thanks to which we can develop strategies to decrease or eliminate the dangerous substances.

A particular solution, specific to monitor the corrosion of metals, is represented by corrosion classification coupons, in which small copper and silver metal plates are exposed in the rooms and they collect data.

In some temporary exhibitions with many people, it could be also useful to check the level of carbon dioxide, carried out through a special sensor connected to a control unit that manages the measurements. Another important issue is the monitoring of suspended powders.

## BIOLOGICAL ATTACKS

Last but not least thing to control in a museum is the risk of a biological attack, especially by bacteria and fungi (these are always present in the air and with the right conditions they can develop and colonize a wide range of materials). The periodic check allows implementing procedures for the prevention of fungal attacks, especially on sensitive material such as wood, paper... This measure is carried out by sampling and analyzing the samples in a microbiological laboratory. The sampling is performed with a special aspirator that releases the dust on plates with culture medium. Then, the microorganisms are taken to the incubator, where they grow and will be counted and identified under the microscope.<sup>(10)</sup>

For what concerns the attack of the insects, recently in the archives there are entomological traps to monitor the eventual fauna and realize intervention methodologies. The insects are analyzed from the morphological point of view, to find the harmful species to the materials.

<sup>(1)</sup> Sileo M., Terenzio Gizzi F., Masini N., *Salvaguardia, Conservazione e Sicurezza del Patrimonio Culturale. Nuove metodologie e tecnologie operative*, Zaccara Lagonegro, 2015, pag. 37-40.

<sup>(2)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 96-98.

<sup>(3)</sup> Ivi pag. 97.

<sup>(4)</sup> Ivi pag. 93-95.

<sup>(5)</sup> Ivi pag. 99.

<sup>(6)</sup> Pictures from Vaudetti M., Canepa S., course of "Architettura degli interni e allestimento", Politecnico di Torino.

<sup>(7)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 98-99.

<sup>(8)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(9)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 79-80.

<sup>(10)</sup> Ivi pag. 101.

# THE MICRO-ENVIRONMENT

We talked about the macro environment, underlining how important is its monitoring to prevent degradation risks. In particular, the control of the deposits is essential because many objects generally are not monitored constantly. Fundamentally, the storages must have stable climatic conditions, without pollutants and the presence of microorganisms. Since each material can require different needs, there should be various types of deposits, with different macro-environment. When a new artwork arrives, it's necessary to know its original environmental conditions, to avoid stress to the material due to the rapid change of temperature and relative humidity to which it can be subjected.

In addition to the micro-climate, another important issue is the one related to the micro-environment, so the climate provided in an enclosed environment within an exhibition gallery (such as showcase, vitrine, container...) that is different from the climate around it in the rest of the gallery.



*Examples of showcases <sup>(2)</sup>*

Two types of micro-climates are possible:<sup>(2)</sup>

- passive. It simply uses materials to control the enclosed environment. A passive microclimate can be simply a framed, matted print with a dust-proof protective paper, or a painting with a background board. They aren't buffered by any modulating materials, but only use materials to contain the climate within. This can vary for example with the introduction of silica gel panels within the frame behind the support board;
- active. It introduces mechanical means to regulate the microclimate. An active microclimate case uses air-handling equipment to condition the climate inside the display case. The system can be placed in a hidden space within or under an individual showcase, or in an adjacent room where it serves more cases. Most cases require some tools to monitor the interior climate, through special sensors, probes or hygro-thermographic equipment.

The building materials for the containers must be free from chemical substances and their possible release. In the same way, we can control the climate inside the museum, we can manage the micro-environment inside the cases.

- Temperature and humidity. The first thing to determine is the position of the showcase: if it's in the room's center, the air will provide to give the first level of control, implemented by the fact that the container is closed. On the other hand, if the showcase is against the walls, the overheating because of the sun and the cooling due to the walls' temperature need to be checked. This situation can cause phenomena such as condensation and mold formation. That's why it's better to separate the wall and the showcase or to put an insulation material between them.

The bigger the showcase, the more similar the temperature and the relative humidity inside the case with the external one. If the showcase is small, the control needs to be implemented by closing tightly the showcase with inert silicone to seal the cracks. To keep the temperature and the relative humidity stable, absorbent materials (such as silica gel, active carbon or cotton) that can absorb the humidity and release it when it decreases are used: these substances are called drying agents. Water can be present in three ways: steam water of air, water vapor adsorbed by the materials inside the case, or water vapor on the internal walls of the case. The drying agent acts on both the different water presence, to fulfill its buffer function.

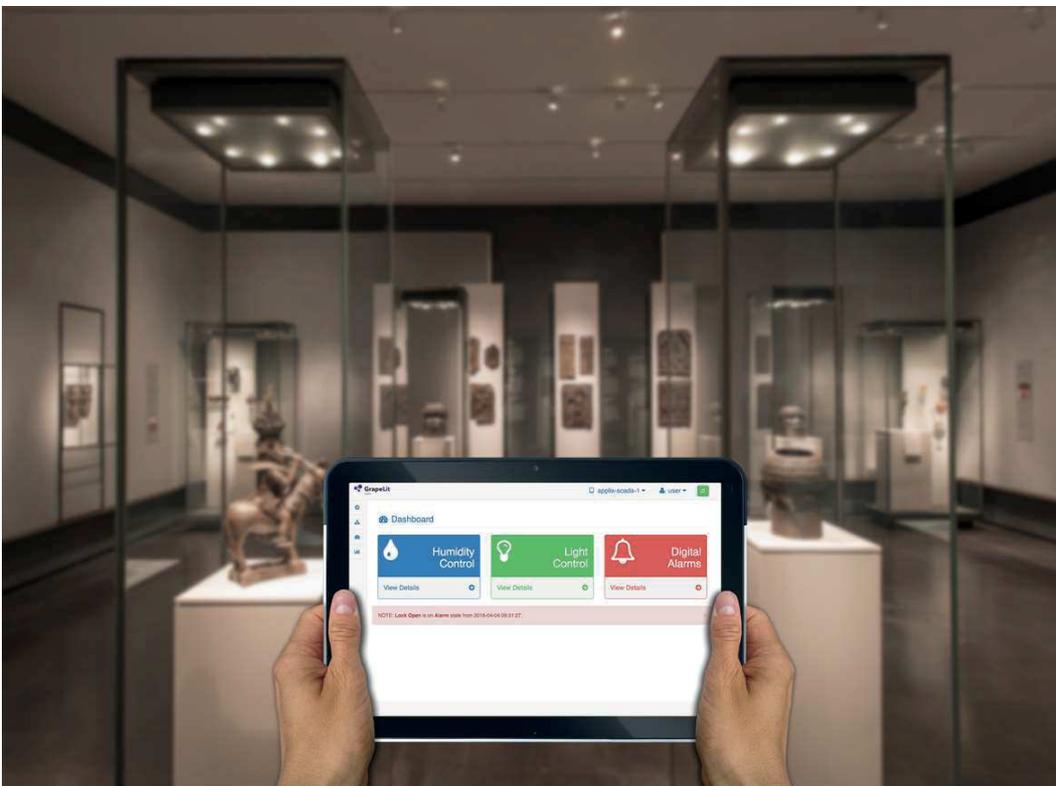


*Examples of showcases* <sup>(3)</sup>

- Light. The light control is very important both for the illuminance and the UV rays. It's better to keep the lamps outside the showcases, to avoid heating and RH variations. When the light sources are put inside the box it's necessary to have a specific project, to decrease the degradation risk.
- Pollutants. The monitoring of pollutants and indoor air quality can be developed with the use of substances that purify the air, by building the container with low pollutants emissions materials, and by minimizing the air introduction in the case.
- Microorganisms. The microorganisms' introduction in the showcases is easier to control compared to the macro-environment, because if the box is well closed it's quite hard that the microorganisms can enter. The mold can be monitored together with the RH control.

The containers can have a different level of air sealing: the showcases usually are equipped with openings dust-proof doors; the display cases can be inspected only with specific staff; climabox are containers built to protect a particular artwork and they are equipped with passive systems to regulate internal relative humidity. Showcases, display cases and climabox can eventually have some active regulation systems to control humidity and overpressure, that allow maintaining pollutants outside of the case.

To better control the climate inside the container, some special showcases called "smart showcase" have been developed by the Goppion group. These are equipped with various integrated sensors that provide to museum staff the data related to the artworks' conservation, such as humidity, temperature, vibration, amount of light... They can also interact with visitors, for example giving direct information on mobile devices.



*Example of smart showcase that provides information to the museum staff returned via tablet <sup>(4)</sup>*

The suitable materials for the construction of containers can be acrylic adhesives, ceramic and glass, water-based paints, aluminum, bronze, steel, nylon and polyester, acid-free paper, plastic, polyethylene, polypropylene, polycarbonate, plastic laminates, non-colored fabrics, neutral sealants, some types of wood.<sup>(5)</sup>



*Examples of containers in the deposit<sup>(6)</sup>*

The role of the registrar in the management of the deposits and exhibition spaces, in terms of micro-climatic control, is related to the ascertainment of the respect of the pre-established values. Sometimes she doesn't take directly the measurements, but she's responsible for their control. The professionals give the results to the registrar and, by looking at the Condition Report, she makes sure that the values are compatible.

<sup>(1)</sup> Pictures taken in the MAO museum: Museo Arti Orientali, on November 2019.

<sup>(2)</sup> Lord B., Lord G.D., *The manual of museum exhibitions*, Altamira Pr, 2001, pag. 121-122.

<sup>(3)</sup> Pictures taken in the MAO museum: Museo Arti Orientali, on November 2019.

<sup>(4)</sup> Pictures from Vaudetti M., Canepa S., course of "Architettura degli interni e allestimento", Politecnico di Torino.

<sup>(5)</sup> Carlini L., Cuoghi Costantini C., De Nuntis P., Guaraldi C., Mandrioli P., Massetti Bitelli L., Monco A., Salvi A., Silvestri I., *Oggetti nel tempo. Principi e tecniche di conservazione preventiva*, Bologna, Clueb, 2007, pag. 142-143.

<sup>(6)</sup> Pictures granted by the Museo Egizio of Turin.



PART 5  
MOVEMENT OF THE ARTWORKS

# INTRODUCTION TO THE LOANS

The third task of the registrar is the handling of artworks.

Temporary exhibitions, especially those that include loans, must be part of a multi-year program and carefully designed, in advance, by the scientific and organizational part. The rotation of the objects in storages is also important, to extend the accessibility to the collections. Each museum should guarantee proper loan management:

- outgoing loans, by recording the external movements of objects, the verification of their conditions, the stipulation of loan conditions, the courier service when necessary, the guarantee of safety during the packaging and the transport;
- incoming loans, by ensuring the right conditions of safety and conservation during the exhibition, with an adequate insurance policy.<sup>(1)</sup>

The guidelines that regulate the artwork loans between different international institutions are established in the document "General principles on the administration of loans and exchange of works of art between institutions", written in July 1995 in London and revised in November 2002. The chart, defined also as "Principles of London" declares the rights and duties of the lender as follows:<sup>(2)</sup>

- the request of the loan should be done in time, at least one year before the exhibition;
- the loan conditions and modalities must be written;
- these conditions can be modified only by a certain date. If they are not respected the artwork can be retired;
- it could be the request of a courier for the artwork.

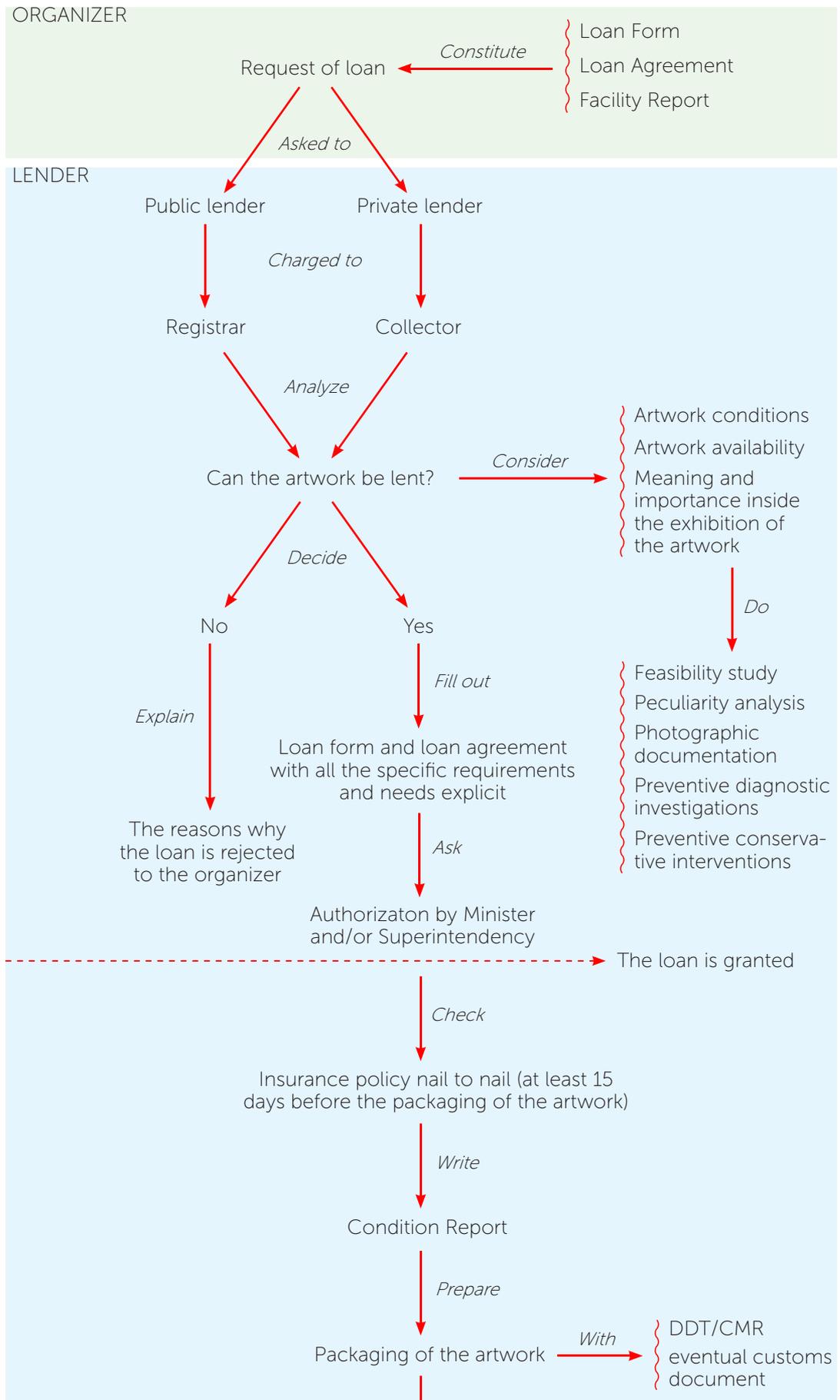
In the meanwhile, the lender should:

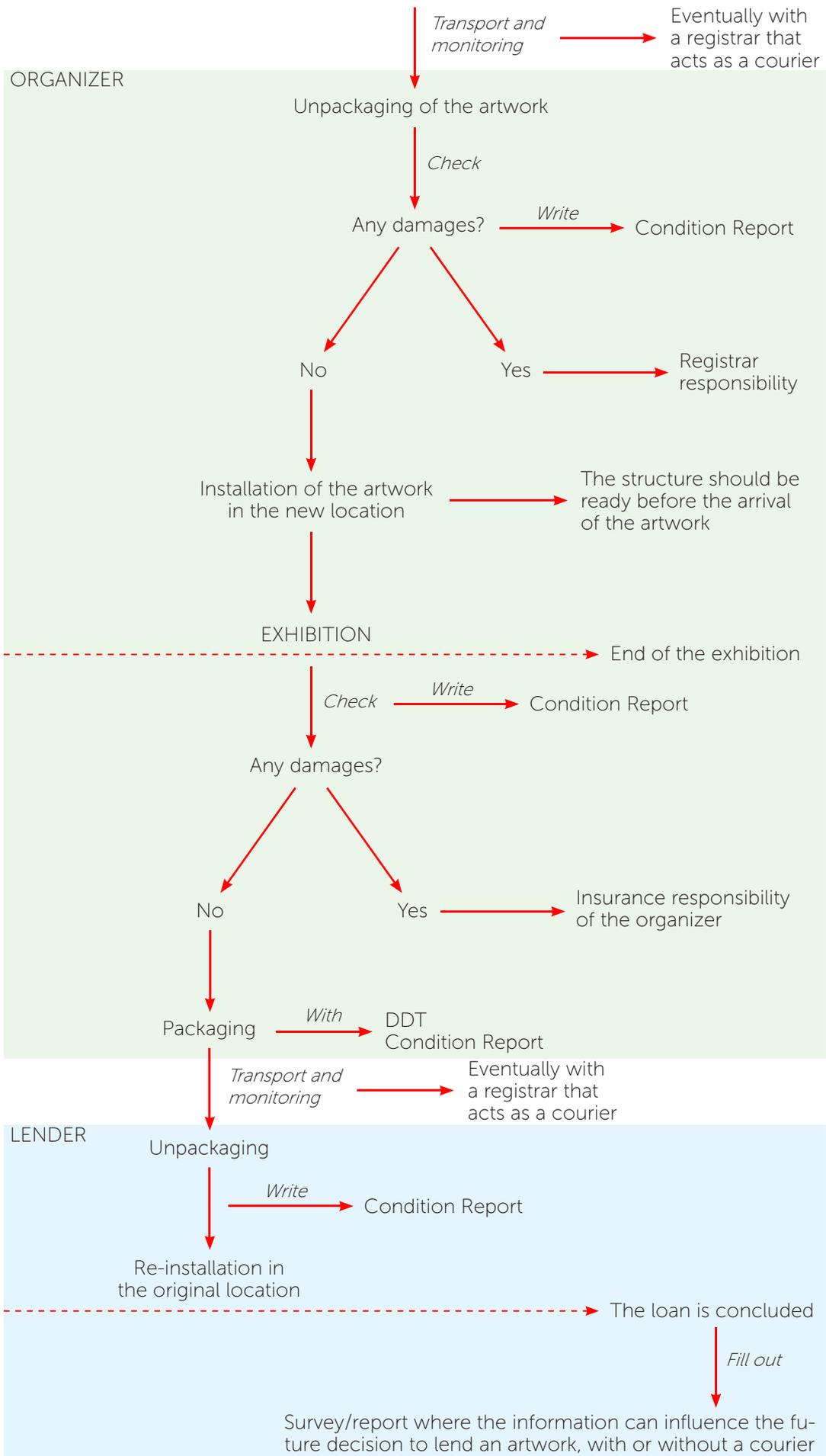
- do not impose unreasonable conditions or excessive burdens and try to keep the cost containment;
- give in time all the information and indications about the artwork to the host museum.

The organizer, at the same time, should:

- guarantee adequate conditions in term of conservation and security during the the movement and the exhibition;
- write an adequate insurance policy;
- bear the costs associated with the loan.

The movement of an artwork is a complicated activity because it requires a lot of phases and documents. In this scheme, there's a synthesis of all the passages.





As we can see in the scheme, the first step for an artwork loan is the “request of loan”. This is a document where the host museum asks a specific object to the lending museum. It should contain:<sup>(3)</sup>

- title and period of the future exhibition;
  - place and location of the exhibition;
  - the curators and the scientific committee;
  - the organizing institution;
  - a text in which the importance of the piece for the future exhibition is explained.
- Attached to the request there is also the scientific and architectural project of the exhibition, the Loan Form and Loan Agreement to fill out, and the host museum’s Facility Report.

The Loan form is a module where the main data of the artwork and lender are requested, such as:

- personal data of the lender;
- author, title, technique, weight, measures of the artwork, number of the object in the database;
- insurance value and eventual insurance preferences;
- instructions for the transport, packaging, installation and movement, sometimes together with the need of a courier;
- the need for an eventual restoration activity before the movement;
- credit line to use in the cataloging and the exhibition.

The Loan Agreement is the contract between the lender and the organizer and is signed by both the parts. It tells:<sup>(4)</sup>

- transport, courier, insurance and installation cost;
- loan term;
- choice of the insurance company;
- choice of the transport company;
- conditions for the artwork exhibition;
- reproduction rights;
- exhibition rights;
- actions in case of restoration;
- jurisdiction.

The Facility Report is a technical document in which all the measurements of security and conservation of the exhibition space and museum are written. The main information is:<sup>(5)</sup>

- the building description and activities that it hosts;
- the access and discharge procedures for the loans (i.g. limitations in term of time, dimensions, vehicles...);
- night and day surveillance method and description of the anti-intrusion system;
- data about the museum micro-climate;
- the fire system description;
- the PSEM (the plan of security and emergency of the museum). Nowadays very few Italian museums have one.

The loan request usually is approved by the director together with the registrar and the curators. The decision is taken by verifying the artwork conditions and availability, as well as the meaning of the piece inside the exhibition and its importance: if the subject of the exhibition is too limited or commercial to justify the movement of the requested good, or the scientific project is confused, as well as not able to demonstrate the need to include *that* particular piece in the exhibition, or the value of the lent artwork is not relevant, the object can be “not

lent". The guidelines establish that "the main reasons to lend must be always the necessity for the research, the scientific nature of the project, the cultural opportunity of the initiative" and that "the artwork loan must be subjected to verification of the coherence and the cultural quality of the manifestation for which the loan is requested, by justifying the temporary renunciation of the artwork itself in the name of the cultural progress".<sup>(6)</sup>

In the positive case, the registrar will fill out the loan form or send the customized loan agreement to the organizer.

The requested artwork for the exhibition can belong both to public subjects (such as museums) and private subjects (collectors, gallery owners, corporate art collection, private institutions...).

The loan can be considered granted only after the authorization by the Minister and/or the Superintendency.<sup>(7)</sup> At this point, is possible to go on with the procedures related to the loan itself, starting from the Condition Report.

<sup>(1)</sup> Decreto Ministeriale 10 maggio 2001, "Atto di indirizzo sui criteri tecnico-scientifici e sugli standard di funzionamento e sviluppo dei musei".

<sup>(2)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 5.

<sup>(3)</sup> Benvenuti G., Catullo C., Dipasquale R., Mensi L., Pacifici L., Panzironi F., Resti C., *IN-&OUT. Guida pratica al prestito di opere d'arte*, Rome, Apice, 2018, pag. 7.

<sup>(4)</sup> Ivi pag. 15.

<sup>(5)</sup> Ivi pag. 8.

<sup>(6)</sup> Decreto Ministeriale 29 gennaio 2008, "Linee guida per il rilascio delle autorizzazioni al prestito delle opere d'arte".

<sup>(7)</sup> The control of the artworks' circulation is governed by the Cultural Code (Legislative Decree 42/2004 and subsequent amendments), which establishes which documents are necessary for both the permanent and temporary exit of the artworks, in national or international territory. For what concerns the loans, the Code introduces the obligation to obtain a "temporary movement certificate" from the Export Office of the Superintendency, which is responsible for checking and issuing the relative authorizations. The decision for the loan authorization lies with the General Directorate of Archeology, Fine Arts and Landscape, which, at least 20 days before the exhibition, must acquire all the documentation about the loan. The works subjected to the authorization are all the art pieces whose author is dead at least 70 years ago, and their value is over 13.500 €. In the opposite case, only a self-certification is necessary.

# STATE OF CONSERVATION AND CONDITION REPORT

The Condition Report is one of the most important documents in the artwork loans because it could avoid eventual disputes in case of damage of the piece during an exhibition. It can be considered the starting point for insurance in case of artwork degradation. Thanks to it, it's possible to verify when and where eventual damage takes place, and establish if the responsibility is of the lender or organizer.

The Condition Report is defined as the document that describes the conservation state of an object which is going to be lent to another institution, by writing all the significant interventions and data related to the object to ensure correct monitoring during the exhibition. Two types of form exist: the restoration form, related to the restoration activity, and the conservative form, similar to the "medical records" of an artwork.

The functions of the Condition Report are:

- verify the conservative state of the artwork during all its movements, to identify the moment in which - eventually - damage takes place;
- be a point of reference for insurance in case of an accident;
- guarantee the responsibility assessment in case of damage, to protect workers.

The document must be executed:

- before the artwork leaves the original location for the exhibition in another museum;
- when the artwork arrives in the new venue;
- at the end of the exhibition, before the packaging;
- at the arrival of the artwork in the original location.

Even if the artwork remains for a long period in the same position it's better to periodically update the CR. Every kind of variation must be communicated in time. The signature of this document determines the formal passage of the artwork responsibility from the lender to the organizer and vice-versa.

The CR should be written by professionals such as restorers, curators, registrars, with adequate skills about materials and the *modus operandi* of the author. The document registers the conservative state of the piece, with the degradation map, and eventual updating of it. It must be signed by its compiler, as well as the artwork owner, or eventually by the organizer.

The data inside the CR can be subjective, depending on the institution, but there are some data can't miss, such as:

- inventory number;
- name of the artwork;
- author;
- dimensions;
- material and technique;
- type of transport;
- type of packaging;
- type of damage on the piece, its protections and its packaging;
- degradation map;
- photographic documentation.

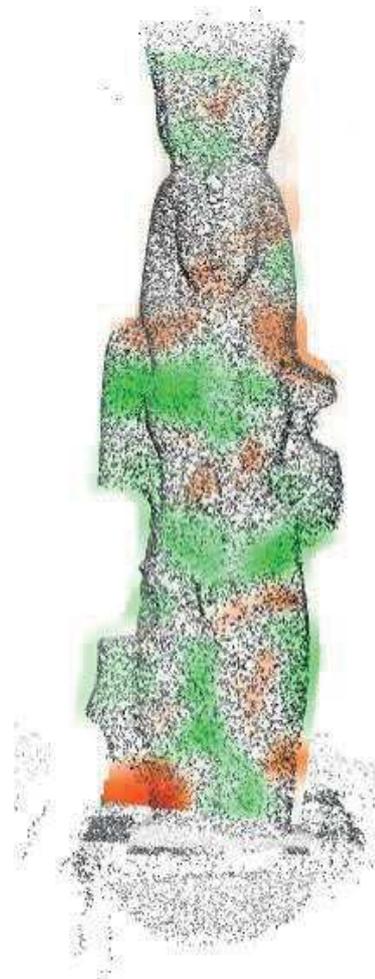
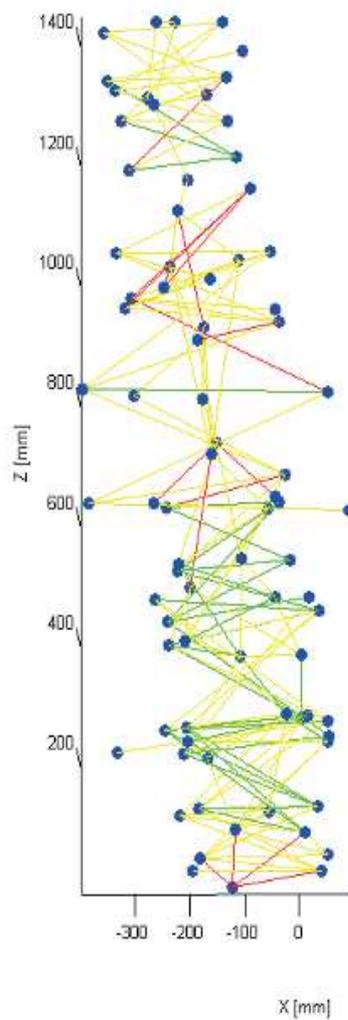
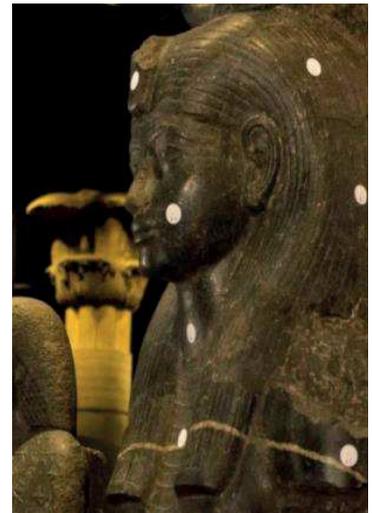
The CR should have clear and simple terminology, comprehensible descriptions, essential graphic and versatility.

To fill out this document, there are various actions to do before:

- visual examination;
- photo shooting that assesses the effective state of the piece: the artwork is examined from every angle, with incident and grazing light, and eventually with the UV light;
- analysis such as CT scan, georadar, ultrasound, radiography;
- eventual restoration actions;
- eventual diagnostic.

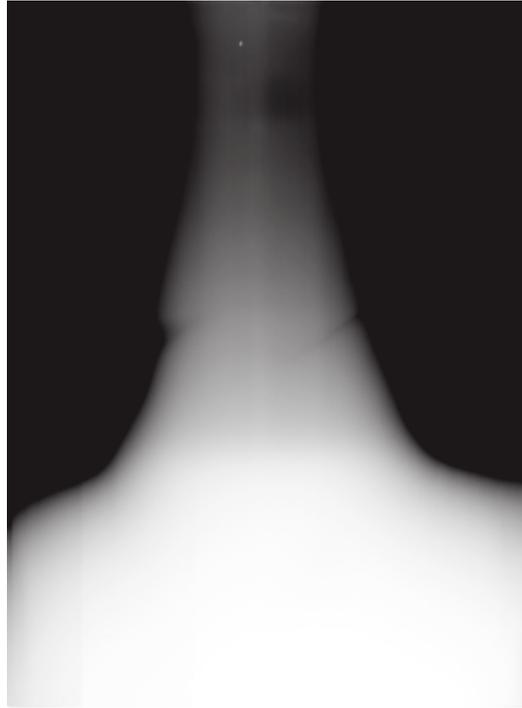


*Photo shooting <sup>(1)</sup>*



*Ultrasound analysis <sup>(2)</sup>*

*Analyzes of this type allow to investigate and understand the internal structure of the statue, giving information, for example, on the presence or absence of metal pins. With this information, it's possible to determine how the specimen is going to be packed and handled.*



*Radiography* <sup>(3)</sup>

If the artwork is addressed or it comes from abroad, the CR is written in English, with specific and simple terminology. There's also a specific vocabulary that ensures homogeneity between the institutions for the redaction of CR: "Controlled vocabulary for the material and technical items of the catalog cards", by Lattanzi and Colalucci, in 1992.

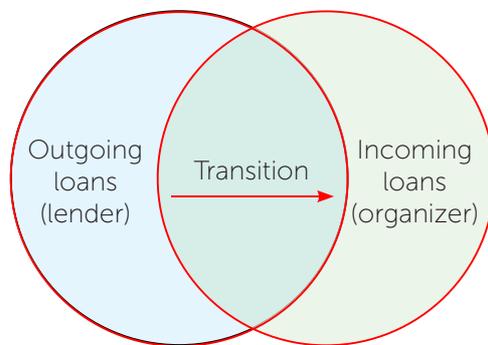
<sup>(1)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(2)</sup> Ibidem.

<sup>(3)</sup> Ibidem.

# INCOMING LOANS

We said that the registrar can assume two different values depending on incoming or outgoing loans. In the first case, the loan procedures are developed by the exhibitions registrar, who is the one that receives the artwork from another museum for the temporary exhibitions, and so she acts as the organizer. In the second case, we deal with the outgoing/loans registrar, who is in charge of getting the piece to the applicant museum.



*Scheme of the loans*

The incoming loans are constituted by the artworks that enter a museum from another institution for a temporary exhibition. The organizer can ask a specific piece from any private or public body that, by accepting the loan, undertakes to deliver the object within the set times.

From the organizational point of view, the management of the incoming loans is more complicated compared to the outgoing loans, because it requires a higher number of operations in a short time. The task of the exhibitions registrar is to take care of the loan procedures, insurance, packaging, and shipping of all the artworks, to register the arrival and departure of the pieces, and to control them during the exhibitions.

The procedures for the incoming loans are:<sup>(1)</sup>

- definition of artworks and collections that are going to be exposed;
- loan request;
- stipulation of the loan conditions;
- choice of the set-up company;
- choice of the insurance company and the policy;

- choice of the packaging, shipping and transport company;
- responsibility for delivery, unpacking, control, installation.

#### DEFINITION OF ARTWORKS AND COLLECTIONS

The list with the artworks that are going to be exposed should be established at least one year before the exhibition opening, because there could be contingencies of any type: some loans couldn't be allowed, and so it could be necessary to ask for another piece; some objects could require a restoration intervention; it could be necessary to incur unexpected expenses. Furthermore, a good organization allows improving the management of costs with a budget definition, transport and packaging services, and also information about the collection for a good exhibition. The artworks' list should be correlated with images and contain all the useful data, such as the cataloging number of the object, especially if it's preserved in the deposit.

#### LOAN REQUEST

The loan request, should be sent informally about two years before the exhibition, while the formal request at least one year before the exhibition. The loan request is composed of the Loan Form, the Loan Agreement and the Facility Report, as we said in the previous chapter. It contains a scientific description of the exhibition project, the period of the exhibition, the list of the artworks, the name of the curators and the scientific committee, the responsible for the pieces, the insurance policy, the institution and its juridical status.

#### STIPULATION OF THE LOAN CONDITIONS

When the loan request is completed, the lender fills out the Loan Form and/or the Loan Agreement, where more information about the artwork itself and the loan modality is given, such as insurance, installation of the object, transport, packaging, modalities of conservation...

The exhibition budget is opportunely updated.

#### CHOICE OF THE SET-UP COMPANY

All the technical data is given to the set-up company, to guarantee a correct installation of the artworks. In the documentation, there should be also information about the micro-climate and micro-environment for the correct conservation, and to allow a good project of the showcases. Some important things to check are the materials, techniques, dimensions, weight, frame/holders, type of coupling, security screws, type of showcase, specific requirements...

#### CHOICE OF THE INSURANCE COMPANY AND THE POLICY

The insurance costs are incurred by the organizer, but the specifications are written by the lender, because she has all the data about the value and the particular requirements of the piece. The policy and the insurance contract should be sent to the lender at least 10-15 days before the packaging.

#### CHOICE OF THE PACKAGING, SHIPPING AND TRANSPORT COMPANY

The choice of the company usually is preceded by a tender between the societies with experience in this sector. Since that the task is particularly delicate, the winner is chosen not only for the affordability but also for the service quality. The specifications should contain all the details about the description of packaging, shipping, customs procedures, license by the Export Office, assembly and disassembly, collection and storage of empty crates. It's possible to grant also the logistics management of the accompaniment, by defining how many couriers, the total amount of days and nights, type of trip and vehicle, type of accommodation,

travel allowance.

For each object, the following information is given: name and contacts of the registrar, description of the piece with technical data, size and dimensions, weight, insurance value, packaging and shipping requirements.

#### RESPONSIBILITY FOR DELIVERY, UNPACKAGING, CONTROL, INSTALLATION

With the architectural plan of the exhibition, the organizer writes the loans register, a document where every object is related to pictures, data about the lender, date of the artwork arrival, the number attributed in the exhibition, a copy of the Loan Form/Loan Agreement and Condition Report. All the movements must be registered.

When the cases with the artworks arrive, they should be placed in adequate space with similar characteristics to the ones of the exhibition. When it's time, the objects are unpackaged, the data in the datalogger is recovered, and the pieces are placed in their location for the exhibition. A conclusive report of the micro-climatic conditions is sent to the lender, together with the declaration of micro-climatic conformity of the space.

The installation of the artworks happens with the presence of the courier and only when the exhibition space is completely ready. In the opposite case, the pieces are kept in an adequate deposit.

At the exhibition opening, the organizer sends the catalogs and other editorial products to the lender. During the exhibition, some periodic controls can be done. The total balance of the exhibition will be closed only when the artworks will return to the original museum.



*Pictures during the installation of artwork <sup>(2)</sup>*

In this timeline, we reassume all the phases related to the incoming loans.<sup>(3)</sup>

-365 days	<p>PRELIMINARY PHASE AND SENDING OF LOAN REQUEST</p> <ul style="list-style-type: none"> <li>- Acquisition and informatization of the artworks' list and related lenders;</li> <li>- Budget elaboration with the highlight of problematic or expensive loans;</li> <li>- Sending of the official loan request.</li> </ul>
-270 days	<p>PREPARATION PHASE</p> <ul style="list-style-type: none"> <li>- Information finding (dimensions, insurance value, technical data, particular requirements), Loan Agreement negotiation;</li> <li>- Database updating;</li> <li>- Photo shooting.</li> </ul>
-180 days	<ul style="list-style-type: none"> <li>- Information to the architect about the exhibition;</li> <li>- Sending of the artworks' list to the scientific-technical committee;</li> <li>- Budget improvement for the exhibition.</li> </ul>
-150 days	<p>OPERATING PHASE</p> <ul style="list-style-type: none"> <li>- Choice of the set-up company;</li> <li>- Choice of the transport company;</li> <li>- Choice of the insurance company.</li> </ul>
-120 days	<ul style="list-style-type: none"> <li>- Information to the lenders about the choice of the companies with relative procedures.</li> </ul>
-90 days	<ul style="list-style-type: none"> <li>- Program elaboration for the arrival and installation of the artworks with the courier and the architect, control of the air-conditioning system.</li> </ul>
-30/15 days	<ul style="list-style-type: none"> <li>- Temporary request for the artworks importation;</li> <li>- Request for all the eventual permits;</li> <li>- Work-plan elaboration (restorers, architects);</li> <li>- Improvement of the arrival and installation program;</li> <li>- Documentation for the incoming artworks;</li> <li>- Possible preparation of stocks.</li> </ul>
-10 days	<ul style="list-style-type: none"> <li>- Coordination briefing with all the workers.</li> </ul>
0	EXHIBITION OPENING
+ few days	<p>INTERVAL</p> <ul style="list-style-type: none"> <li>- Organization and coordination for security and environmental monitoring;</li> <li>- Sending of catalogs and press review to the lenders;</li> <li>- Sending of weekly thermo-hygrograph records;</li> <li>- Elaboration of the exhibition opening balance.</li> </ul>
- 30 days to the exhibition closing	<ul style="list-style-type: none"> <li>- Organization and planning of the exhibition closing.</li> </ul>
after the artworks' departure	<p>FINAL PHASE</p> <ul style="list-style-type: none"> <li>- Final balance;</li> <li>- Document filing.</li> </ul>

<sup>(1)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 14-21.

<sup>(2)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(3)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 22.

# OUTGOING LOANS

For what concerns the outgoing loans, the responsibility belongs to the outgoing/loans registrar, who deals with the register of the artworks movement and the procedures related to every single loan. A museum can register:<sup>(1)</sup>

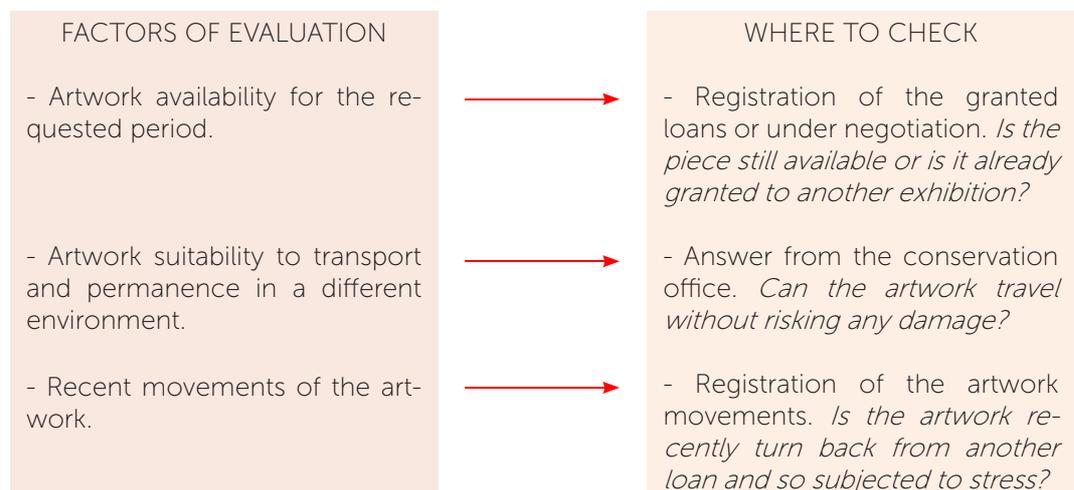
- the current loans, the pieces that have already left the institution;
- the granted loans, the pieces that are going to leave the museum;
- the loans under negotiation, the pieces that could leave the museum;
- the rejected loans, by specifying the reasons;
- the concluded loans.

The phases for the outgoing loans are:<sup>(2)</sup>

- the decision-making process;
- the definition of the loan conditions;
- the artworks' preparation for the departure;
- the organization for the accompaniment.

## THE DECISION-MAKING PROCESS

This phase is constituted by the consent (or the dissent) for the loan request, followed by the Ministerial authorization and the license for the temporary exportation (in case of loans to foreign countries). The decision of accepting a loan or not is developed by considering many factors:<sup>(3)</sup>



- Effects of the artwork's absence on the exhibition, especially if the object is part of the collection exposed.	→	- Registration of the granted loans in that period. <i>Is it a crucial piece for the actual exhibition? How many pieces are already granted for other exhibitions?</i>
- Scientific depth and value of the exhibition in the host museum.	→	- Exhibition project of the host museum. <i>Is the artwork related to the exhibition? What is its value inside it?</i>
- Suitability of the museum to host the artwork, in terms of micro-climate, security and staff qualification.	→	- Facility Report of the museum. <i>Does the museum have all the correct requirements to host the artwork?</i>
- Reliability of the organizer.	→	- Registration of the concluded loans with that institution and companions' feedback, specific information given by the organizer. <i>Is the organizer reliable? What is the feedback about that museum?</i>
- Reciprocity.	→	- Registration of the received or rejected loans from that museum. <i>Does the museum usually borrow or lend artworks with other institutions?</i>
- Compliance with the loan policy of the museum.	→	- Documents that defines the loan policy of that museum. <i>Is the loan policy suitable?</i>

Generally, the motivations to lend an artwork are "to contribute to an important exhibition or to an educative project that involves a new type of public; to know deeply an artwork or to have the opportunity for a restoration; to gather objects separated by time; to show artworks usually stored in the deposits and so difficult to use; to meet new cultures; to lend artworks to other institutions".<sup>(4)</sup> Of course, another important reason to lend is to be sure that the transport will not jeopardize the artwork's integrity.

### THE DEFINITION OF THE LOAN CONDITIONS

The lender should dispose of a contract in which all the loan conditions are explained, applicable to all the pieces of the collection, and eventually integrated with the specific needs of some particular objects.

In the contract, there's a reference to:

- the choice and the use of specialized companies for the packaging and the transport;
- the stipulation of an insurance policy nail to nail for all the possible risks, chosen by the lender;
- the modalities of transport and exhibition of the artwork;
- the possibility to have a courier;
- the obligation to have the exhibition space ready at the artwork arrival;
- the prohibition to act on the piece without authorization;
- the prohibition to take pictures or make a video of the artwork without autho-

rization;

- the regulation of photographic material.

The specific needs that can be added are:

- insurance clauses;
- exhibition modalities;
- micro-climatic values and data;
- details about the courier accommodation and travel allowance: generally, for national loans, the transfer is one night and two days, for international loans (UE) two nights and three days, for international loans (extra-UE) three nights and four days;
- eventual refund for the loan preparation;
- the number of requested catalogs (usually two).

#### THE ARTWORK PREPARATION FOR THE DEPARTURE

The piece that is going to leave the original location is followed by some documents written by qualified professionals: the Condition Report and the Delivery Report of the object (one for the organizer and one to send to the lender). The loan is registered with indications about its temporary location and the date of its return.

#### THE ORGANIZATION FOR THE ACCOMPANIMENT

It's possible to follow the artworks during the transport in case of elevated fragility of the piece, high value, difficulty in its handling and installation, or even because of a low level of trust in the host museum. Generally, the courier is identified with the figure of the registrar. In case of loans from the same city, it could be possible to consent a cumulative accompaniment.



*Picture during the shipping of an artwork <sup>(5)</sup>*

<sup>(1)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 6.

<sup>(2)</sup> *Ivi* pag. 7-9.

<sup>(3)</sup> *Ibidem*.

<sup>(4)</sup> Decreto Ministeriale 29 gennaio 2008, "Linee guida per il rilascio delle autorizzazioni al prestito delle opere d'arte".

<sup>(5)</sup> Picture granted by the Museo Egizio of Turin.

## THE PACKAGING

With the packaging, we enter the practical phase of the artworks' movement. This phase starts with the removal of the artwork from the original location, made by professionals or with some specific mechanical equipment, sometimes realized appositely only for the movement of one single piece.





*Pictures during the removal of artwork from its collocation <sup>(1)</sup>*

The handling represents the riskiest activity for an art piece, and it should carefully be planned. The considerations for the type of packing are related to the dimensions and weight of the object, the materials and technique, the micro-climatic conditions, the type of vehicle where the piece is going to travel, the final destination, the problems related to the movement, as well as the budget and the economic issue. The packing is chosen by the lender and is often correlated with some instructions and a graphic scheme about how to open it (this because the artwork could be opened by a different person at its arrival in the host museum). The packing is the first form of protection from mechanical stress, vibrations and external factors, that's why the project should be developed by a professional. The packing operation happens in the same environment in which the piece is conserved. The crate and materials are placed in the same environment for at least one day, to acclimatize them.

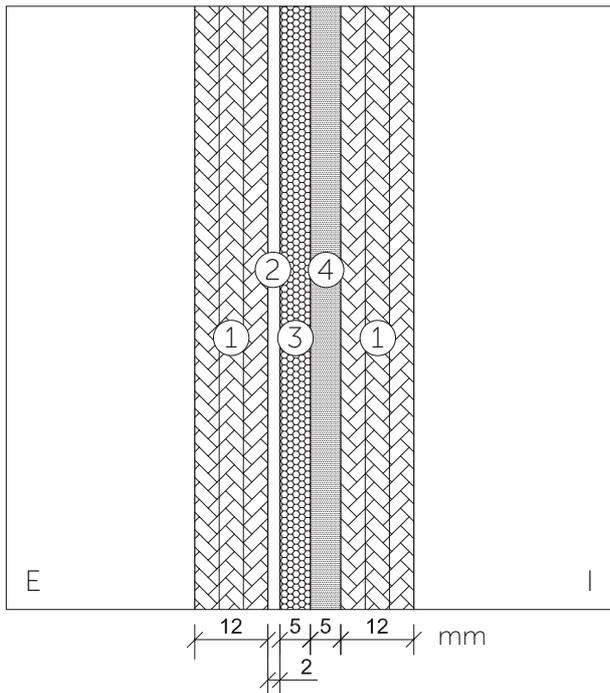


*Pictures during the packaging of artwork <sup>(2) (3)</sup>*

Every object put in the packing is surrounded by a mass of another material that acts as thermo-hygrometric flywheel inside the crate, materials such as paper and cardboard fill the empty spaces around the piece.

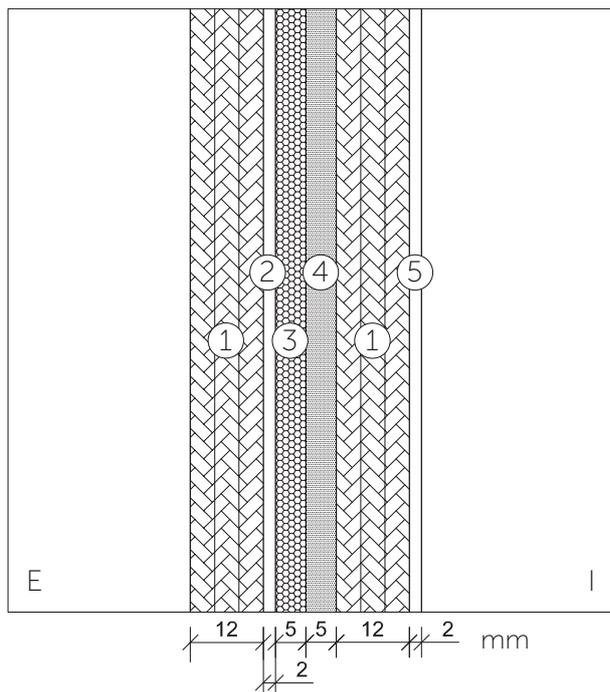
There are three types of packing:<sup>(4)</sup>

- soft packing: they give minimum protection and they are used for simple and short movement. They protect from dust and humidity and can be constituted by paper, non-woven fabric, Tyvek, tissue paper, PE polyethylene film, glassine paper, Melinex/Dartek. Together with these types of material is often matched a Pluriball layer with an Ethafoam PE layer, and three layers of cardboard both on front and back.



- ① Three layers cardboard
- ② Paper/non-woven fabric/Tyvek/tissue paper/PE polyethylene film/glassine paper/Melinex/Dartek.
- ③ Pluriball
- ④ Ethafoam PE

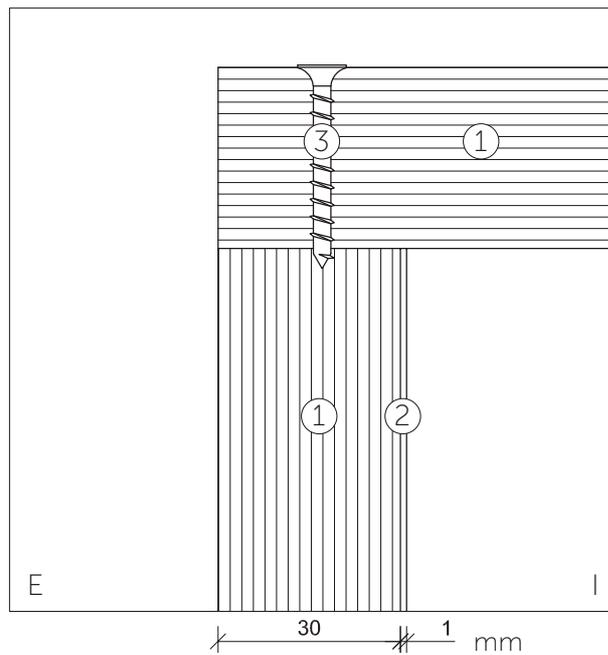
- semi-rigid packing: they consist of a cardboard or plywood layer in addition to the soft packing.



- ① Three layers cardboard
- ② Paper/non-woven fabric/Tyvek/tissue paper/PE polyethylene film/glassine paper/Melinex/Dartek.
- ③ Pluriball
- ④ Ethafoam PE
- ⑤ Plywood/cardboard

- rigid packing: the crates are built with multilayer poplar plywood, with a thickness of 3 cm, glued and nailed. The use of hygroscopic and insulation materials, with low thermal conductivity coefficient, helps to maintain stable conditions of temperature and relative humidity and to limit the vibrations caused by external movement. The external layers are smoothed with milled edges, the surfaces are waterproofed by water-based painting. They are equipped with handles, to facilitate the handling. The cover is closed through screws.

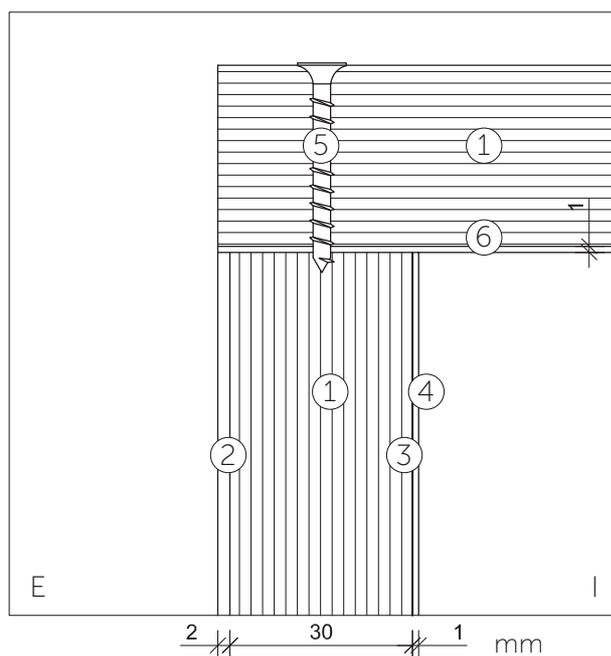
Inside, the crates are lined with a polythene aluminum layer, that ensures the first protection against the external factors, and it's free from pollutants or chemical substances.



- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② Polythene aluminum
- ③ Screw

We can divide the rigid packing into many types:

Ⓐ Standard crate

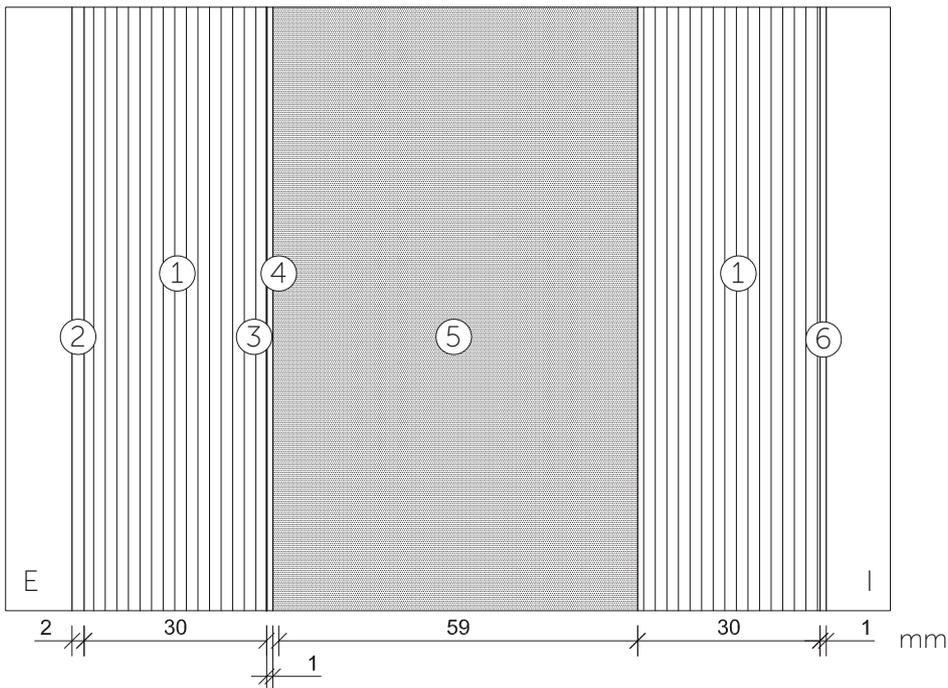


- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② External reinforcement
- ③ Internal film barrier
- ④ Polyethylene
- ⑤ Screw
- ⑥ Neoprene sheath

This type is suitable for manuscripts, prints, drawings and engravings. The crates are realized with a poplar multi-layer, with handles, and internally covered by a layer of low-density polyethylene, with different thickness depending on the artwork weight, with an external reinforcement of quadrature and corner reinforcements. The neoprene sheath contributes to air and dust tightness, while the internal film barrier helps in the thermal insulation.

The crates can be also equipped with transverse supports in plywood or Skid-mates feet, to facilitate the movement of big artworks.

Ⓑ Double crate

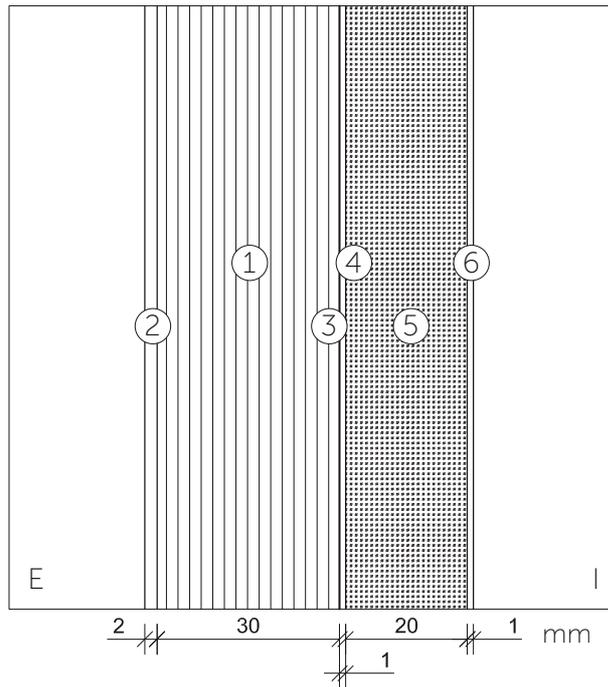


- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② External reinforcement
- ③ Internal film barrier
- ④ Polyethylene
- ⑤ Ethafoam
- ⑥ Polythene aluminum

This crate is used for the artworks characterized by delicate situations.

The double crate is formed by an internal crate, called inner, constituted by the A-type, and an external crate, called outer, formed by the basic rigid case. Between the two crates, there's a layer of Ethafoam, whose thickness can range between 40 and 80 mm, that absorbs the vibrations and mechanical stress.

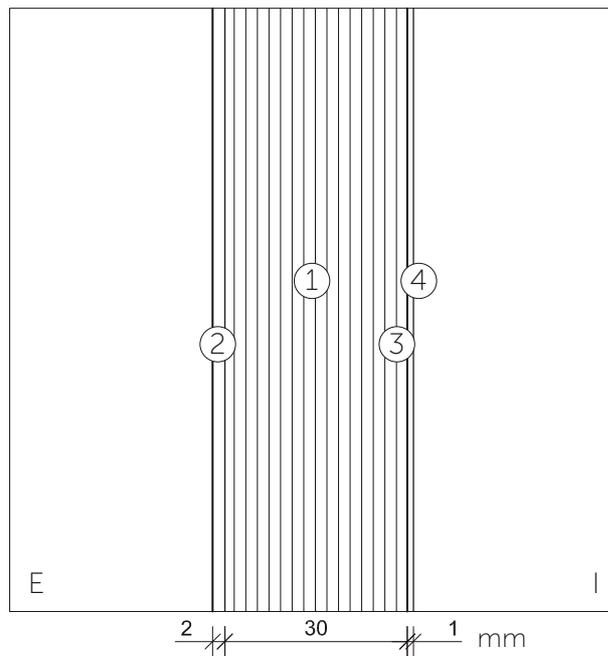
© Air-conditioned crate



- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② External reinforcement
- ③ Internal film barrier
- ④ Polyethylene
- ⑤ Expanded polystyrene
- ⑥ Dynamic stabilizer sheet/roll

It's quite common to use this type of crate for paintings on wood and artworks sensitive to the micro-climatic change. The crate consists of the A-type with the introduction of an expanded polystyrene layer, that helps to keep stable the climatic conditions. Besides, there's also a layer of dynamic stabilizer sheet/roll for the constant maintenance of relative humidity.

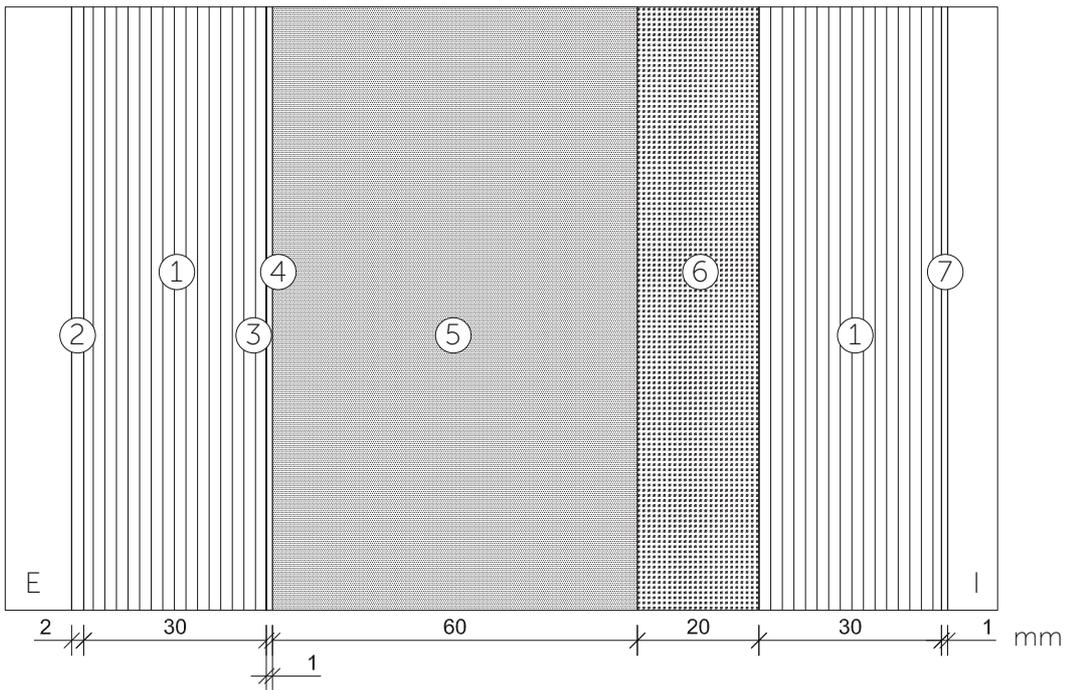
© Fireproof crate



- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② External reinforcement treated with an intumescent product
- ③ Internal film barrier
- ④ Polyethylene

The only difference with the A-type is that the fireproof case is externally treated with an intumescent product to offer a fire reaction class equal to 1.

⑤ Double air-conditioned crate

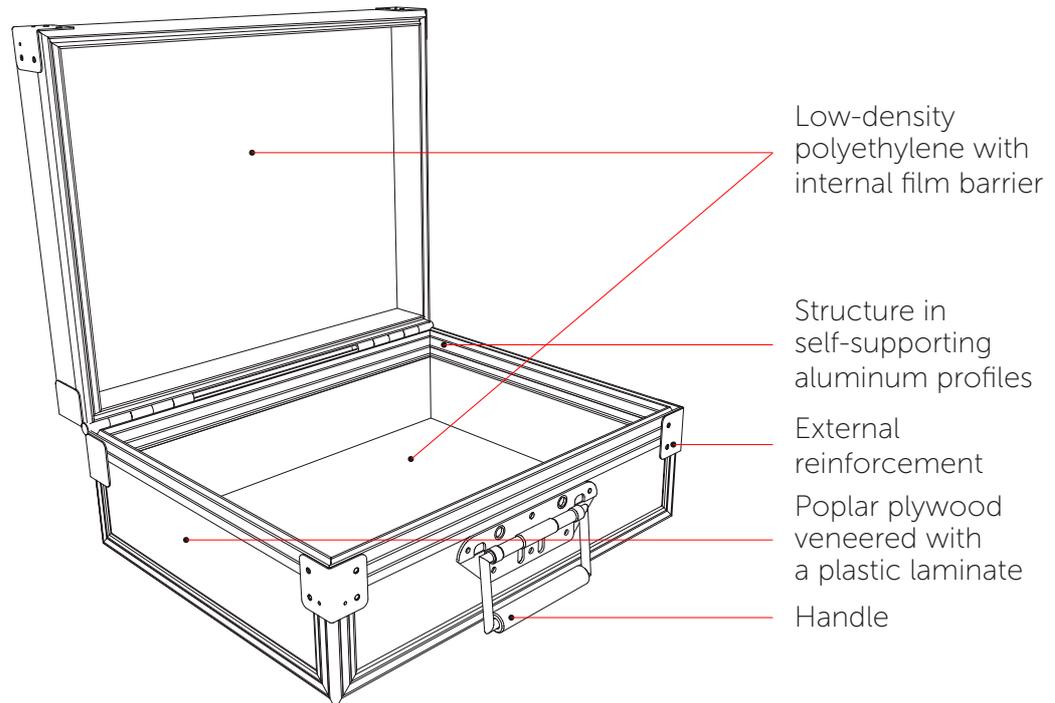


- ① Poplar plywood with surfaces waterproofed by water-based painting
- ② External reinforcement
- ③ Internal film barrier
- ④ Polyethylene
- ⑤ Ethafoam
- ⑥ Expanded polystyrene
- ⑦ Polythene aluminum

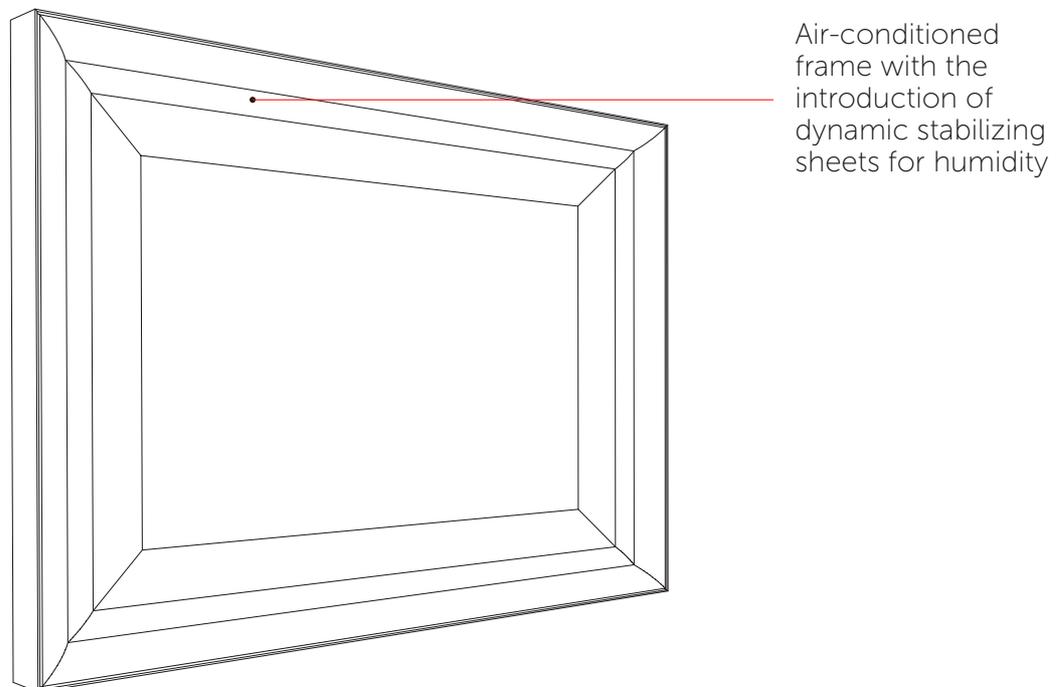
Another type of packing suitable for very delicate and sensitive to the micro-climatic change artworks is the double air-conditioned crate. As the double crate, this type is formed by an inner and an outer, with a gap in between filled with Ethafoam and expanded polystyrene. The Ethafoam helps to limit the vibrations and mechanical stress, while the polystyrene acts as a thermal barrier.

Other types of rigid packing exist:

① Flight case

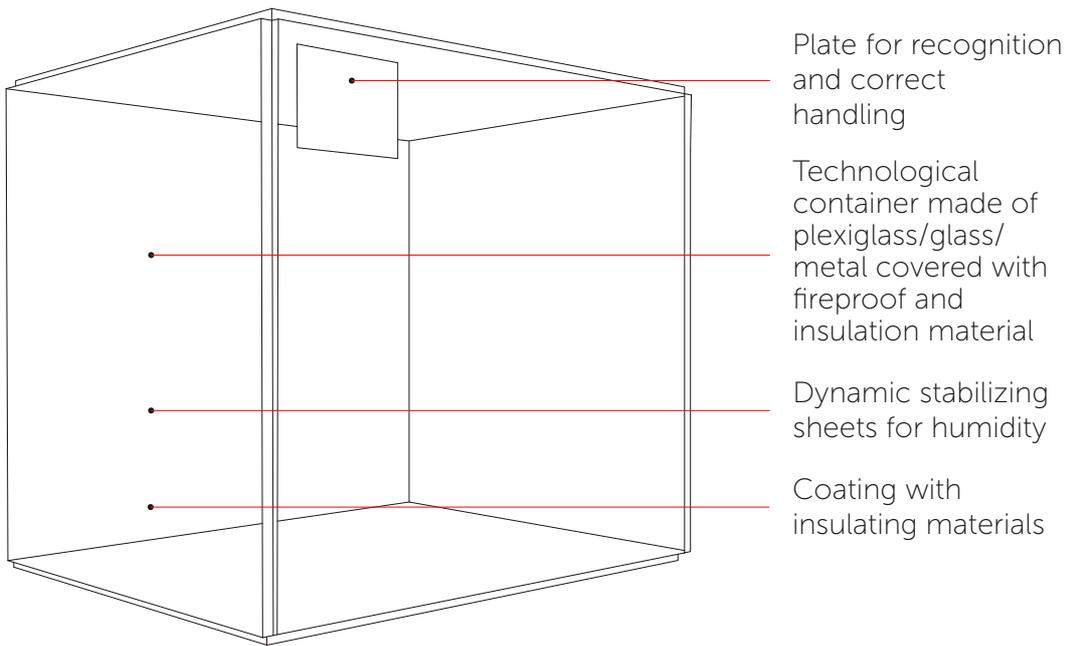


② Climaframe



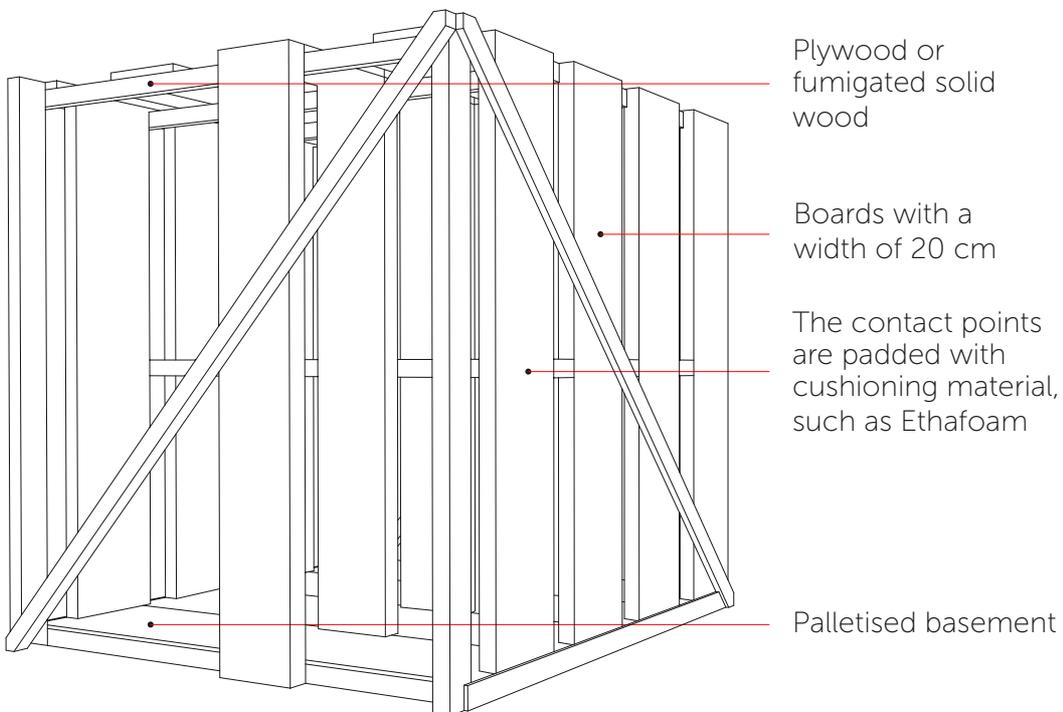
The Climaframe can be realized with the use of the existing frame or with the construction of a new frame to put on the original one.

③ Climabox

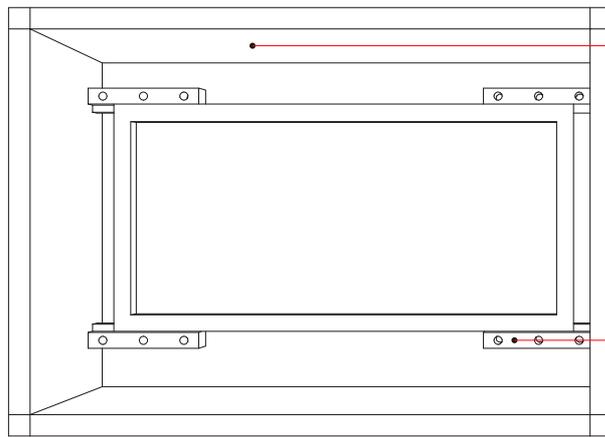


The Climabox allows maintaining the micro-climate where the artwork is usually conserved.

④ Cage

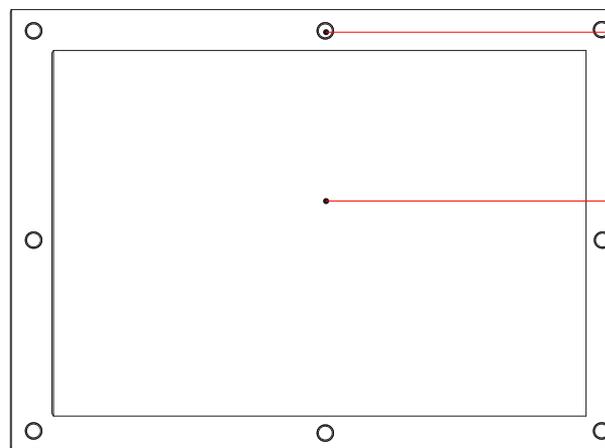


⑤ Travel Frame



Poplar plywood  
th. min. 2 cm

Metal plates that  
keep the artwork  
suspended, without  
contact with the  
case



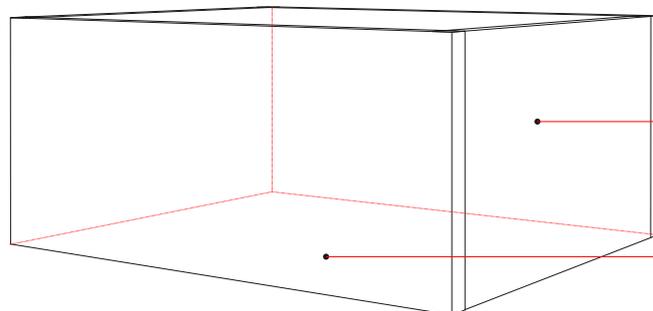
Bronzed  
self-tapping screw

Cardboard cover

⑥ Safe Box



Cardboard cover



Plywood

Cardboard base

The Safe Box is the cheapest and simplest of the rigid packing. It's used only for short transports.

The type of packing is chosen by the lender taking into consideration the physical characteristics of the artwork, by studying and designing solutions that often can be more complicated than a classic case, especially for big and delicate pieces. Anyway, we can summarize common packings used for some kind of artworks:<sup>(5)</sup>

Paintings on wood	→	For small paintings (70x90 cm): Climaframe in crystal or polycarbonate. For big paintings: Climabox with control of temperature and humidity.
Paintings on canvas	→	For small paintings and short transport: soft packing. For big paintings: Climabox with the artwork wrapped in tissue paper and padding on the back.
Sculptures and three-dimensional objects	→	Sculptures in marble, metal or terracotta of small dimensions: standard crate. Sculptures in marble, metal or terracotta of big dimensions: double crate. The object will be fixed with spacers or wooden septa with padding. In the most delicate parts of the piece there will be padding. The sculptures will be wrapped in tissue paper.
Works on paper (drawings, prints, photographs, engravings)	→	Two ways of packing: - packed work carried by hand by the operator, while the frame could be travel separately; - the artwork can be packed together with the frame, with shatterproof glass and put into a Climaframe. In any case, the artwork will be placed in a cardboard passe-partout with a thickness of 13,5 mm.

<sup>(1)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(2)</sup> [http://www.sciutto.it/portfolios/imballare\\_ok/](http://www.sciutto.it/portfolios/imballare_ok/).

<sup>(3)</sup> <http://www.simonipacking.com/>.

<sup>(4)</sup> Benvenuti G., Catullo C., Dipasquale R., Mensi L., Pacifici L., Panzironi F., Resti C., *IN-&OUT. Guida pratica al prestito di opere d'arte*, Rome, Apice, 2018, pag. 40.

<sup>(5)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 42-44.

# THE TRANSPORT

The transport company is chosen by the organizer, depending on the number of venues and workers in the territory, the available resources, the equipment and the type of vehicles, dislocation of the deposits and, above all, the experience in the fine art sector. The transport company must adopt all the necessary measures to guarantee the security and the conservation of the artwork, as far as possible. Each movement must be registered.

The DDT (documento di trasporto) is the main document related to transport in the national context, and it contains all the details about movement, such as vehicle characteristics; the name of the lender and organizer; quantity, dimension and weight of the piece inside the vehicle. For international transport, this document is replaced by the CMR (Convention des Marchandises par Route). If the artwork exits outside the European Community, there are also some customs formalities to carry out before any movements.

It's important to have an insurance policy All Risks, in this way the eventual damage can be indemnified by the insurance company and not by the transport company.

The main way to transport artworks is by land or by air.

## BY LAND

The transport by road is used especially in the national territory or in short tracks, or when the artwork dimensions don't allow another way of transport.

The vehicles must respect the parameters and requirements for the artworks' movement, such as:<sup>(1)</sup>

- two drivers;
- suitable vehicles for the art pieces' transport;
- cockpit separated from the rest of the van, with thermal walls treated with the anti-fumes product, anti-vibration anchor bar system, and the skidproof floor with antibacterial treatment;
- air-conditioned and humidified vehicles to keep a stable micro-climate, generally with a temperature of 20°C ( $\pm 2$ ) and 50% ( $\pm 5$ ) of relative humidity (especially when the transport passes through countries with different external environments, such as Italy and Sweden);
- suitable internal anchor points for the packing;

- anti-theft devices;
- surveillance systems h24 and GPS related to the remote center of surveillance;
- anti-robbery system;
- air suspension to reduce the vibrations;
- hydraulic tail lift equipped with hydraulic stabilizers that allow the lowering and lifting of the piece, avoiding lateral heeling or stresses during the loading/unloading phase;
- devices that allow the control and the management of the micro-environment (temperature and humidity);
- safety sealable closures.



*Vehicles for transport by land <sup>(2)</sup>*

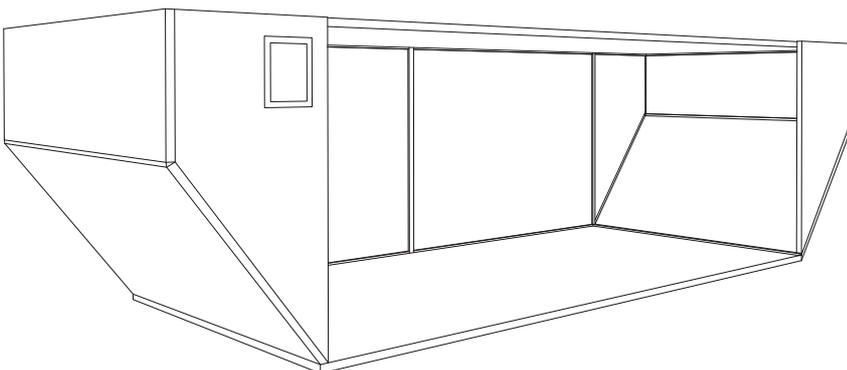
## BY AIR

The solution to travel by air is better than by land because is cheaper and faster. The flight should be without intermediate stops.

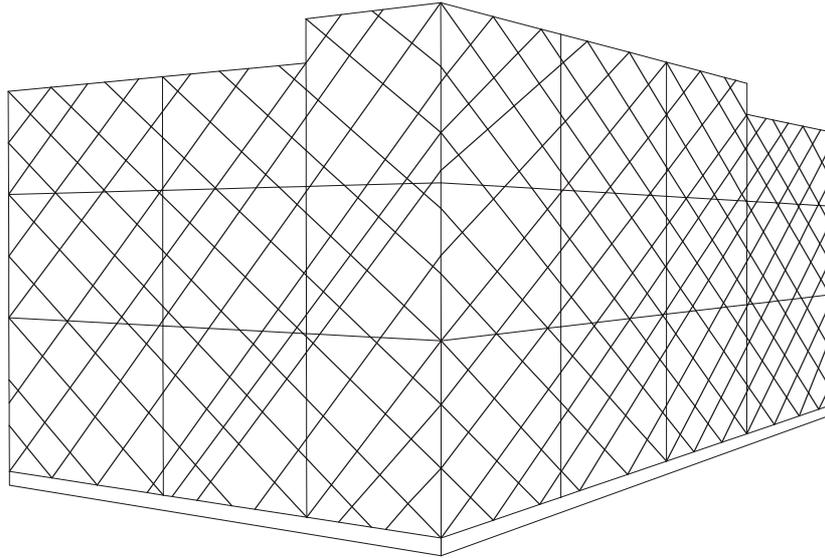
The shipping can be of two types:<sup>(3)</sup>

- Freight: the artwork shipping happens in the hold of the passengers or cargo plane and, usually, it has a temperature of 10°C. For the correct position and stability of the piece, the plane should have containers or pallets. Often, the plane allows transporting only objects with a height of 80-114 cm.

The freight is probably the safest way to transport artworks for what concerns the thefts.



*Example of a container for plane*



*Example of a pallet for plane*

It's important to monitor both the palletizing and boarding in the airport (when possible), by checking that the case hasn't extra weights above it, that isn't in contact with dangerous substances or materials, as well as it's handled correctly. A good thing is to cover the pallet with a waterproof plastic sheet and/or to equip the container with straps to secure the artwork. It's useful to annotate the container/pallet number, and to have a copy of the airway-bill, in case of unexpected events.

At the end of the flight, the courier is accompanied to the drop-off point. If the staff requires to open the case, it's appropriate to do it in a suitable room with professionals and adequate equipment.

- Hand-carry: the artwork travels together with the courier in the plane cabin. In this case, the object dimensions are equal to the dimensions of cabin baggage. The baggage is placed under the seat or in an extra-seat next to the passenger, depending on its dimensions. The hand-luggage can be constituted by flight-cases, avoiding in this way the construction of wooden cases. The courier, in this case, is escorted by the plane's staff.

When an artwork has a very high value, it can be accompanied also by the Police.





*Pictures during the transport by air <sup>(7)</sup>*

## THE COURIER

The lender can evaluate the need to accompany the artwork during the transport, by considering its fragility or the difficulty in its handling, as well as its high value or the level of trust in the organizing museum, or the type of travel. If the artwork needs a courier, it can be accompanied by the registrar or another professional. All the costs related to the courier are provided by the organizer, that's why is necessary to include the request inside the loan conditions, by establishing all the details.

Her task is to supervise the various phases of the loan, by ensuring the conservation and the correct filling of all the documentation related to the movement. The courier must be present at the moment of the unpacking, and all the eventual interventions on the piece must be authorized by her. She's responsible for the artwork control from the packaging to the installation in the organizer museum. In particular, the tasks of the courier are:<sup>(4)</sup>

- assist the artwork packaging and unpacking in the museum, by signing the Condition Report;
- control the vehicle suitability and cleanliness;
- verify the packing conditions, both at the arrival and departure;
- verify the suitability of the exhibition space (security, micro-climate...);
- verify that the exhibition space is ready for the artwork installation;
- ensure the security and stability of the piece during the installation (in the negative case, the courier can deny the installation).

To the courier is required the maximum discretion, especially when the artwork travels as a hand-carry: indications about the piece and exhibition are not recommended on the packing.

The documentation of the courier is:<sup>(6)</sup>

- Condition Report;
- record of delivery (signed by the organizer at the piece arrival);
- copy of the Loan Agreement/Loan Form;

- copy of the proforma invoice in case of extra-UE loans;
- copy of the export license and/or DDT;
- copy of the airway bill (in case of loan by air);
- packing list (if there is more than one object);
- program of the travel.



*Picture during the unpacking of artwork <sup>(5)</sup>*

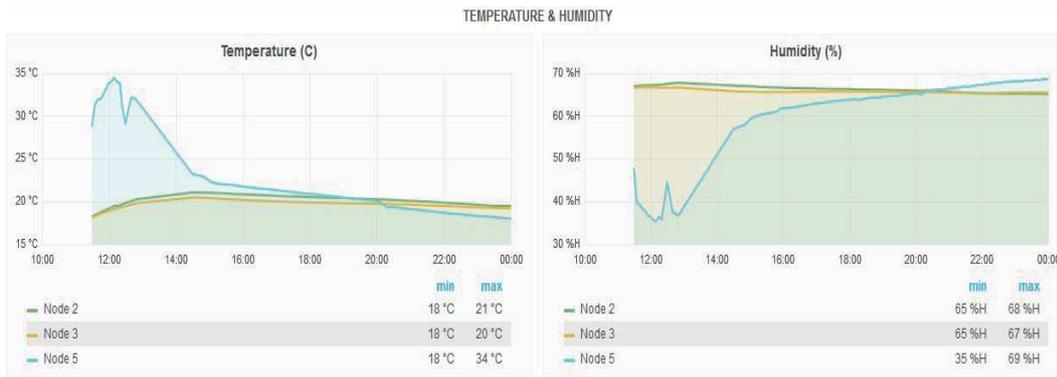
#### THE MONITORING

During the transport is a good practice to control and monitor the artwork: vibrations, temperature, relative humidity, exposition to the light... If the packing is well done, usually there are no problems during the movement, but is important, anyway, to check the conditions inside the vehicle.

The monitoring is possible only during the transport by land, where the vans are equipped with special devices that allow controlling (and eventually changing) the micro-climate from the cockpit. It's a good thing to provide the packing with these types of devices (i.g. datalogger), too.



*Devices on the packing for the artwork monitoring <sup>(8)</sup>*



Monitoring of the temperature and relative humidity during the transport <sup>(9)</sup>

<sup>(1)</sup> Benvenuti G., Catullo C., Dipasquale R., Mensi L., Pacifici L., Panzironi F., Resti C., *IN-&OUT. Guida pratica al prestito di opere d'arte*, Rome, Apice, 2018, pag. 44.

<sup>(2)</sup> <http://lauriweb.it/>.

<sup>(3)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 45-46.

<sup>(4)</sup> Benvenuti G., Catullo C., Dipasquale R., Mensi L., Pacifici L., Panzironi F., Resti C., *IN-&OUT. Guida pratica al prestito di opere d'arte*, Rome, Apice, 2018, pag. 24.

<sup>(5)</sup> Ibidem.

<sup>(6)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 51-54.

<sup>(7)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(8)</sup> Ibidem.

<sup>(9)</sup> Ibidem.

# THE INSTALLATION OF THE ARTWORK

*"Today art is defined based on an identity between creation and selection. This means that the creative act has become the selection act".<sup>(1)</sup>*

The artworks maintain a strong relationship with the exhibition space: the art is not identified only with the single piece, but with a complex system of objects, subjects, space, time, meanings, relations... The exhibition is not only a container, but it's a project, an environment where the visitor is invited to consider also the space itself as a content and an artwork.

Installation and environment are strictly connected, that's why is important to evaluate the scientific depth of the exhibition and the importance of the artwork itself inside it. The exhibition is no longer only an exposition of pieces, but an attempt to write the history, ideas, artistic movements, symbols and utopias.<sup>(2)</sup> The exhibition should build, through the artworks' selection and their installation in the space, a global vision and a critical interpretation of the history and social context.

The phase of installation is delicate not only for the technical and practical part, but also for the meaning of the exhibition. The decision of an artwork location instead of another is crucial. The exhibition moment becomes an indispensable source not only for the cataloging, documentation and possible reiteration, but also for its identity: without this phase, the artwork doesn't exist.



*Exhibition space<sup>(2)</sup>*

About the practical point of view, as we said in the previous chapter, when the artwork enters the new building, the acclimatization phase takes place. The case, still closed, remains for minimum 24h in a space with characteristics similar to those of the exhibition space, to mitigate the difference of temperature and relative humidity between the external and internal environment. At the adequate moment, that can be recognized with the aid of a Bluetooth device, the artwork will be unpacked and placed in its collocation for the exhibition, by recovering the datalogger information.

The declaration of climatic conformity of the museum spaces proves the eligibility of the values for the correct artwork conservation.

The starting points for the installation of an object are:

- the knowledge of the piece: information about its conservation, handling, installation and disassemble, reaction to vibrations/movements...;
- the knowledge of the exhibition space: access, workspace, organization of the space, architectural characteristics, micro-climate, people flow...;
- equipment and materials: the building site for the artworks' installation is equal to the architectural building site, so there are various standards to respect. The structure should be able to hold a weight three times higher than the one of the object.

Another important aspect is the respect of deadlines, which should be expected in the design phase of the exhibition.



*Picture during the installation of artwork <sup>(2)</sup>*

Generally, some rules should be respected in the artworks' installation:

- for what concerns the paintings, they must be detached from the wall of 3-5 cm with an air-gap;
- the light should be measured at least one time on the lent object;
- the pieces shouldn't be near to the air vents;
- the artwork should be protected from the natural light.

During the exhibition, it's recommended to monitor the temperature and relative

humidity, according to the declaration of climatic conformity.



*Installation of paintings: they are not attached to the wall <sup>(4)</sup>*

<sup>(1)</sup> Piatti A. (2015) "Le pratiche espositive e le opere complesse: alcuni casi nei musei italiani", *Ricerche di S/Confine*, vol. VI, n. 1, <http://www.riceredisconfine.info/>.

<sup>(2)</sup> Poinot J.M., "Large exhibitions. A sketch of a typology", *Thinking about exhibitions*, ed. Greenberg R., Ferguson B.W., Nairne S., 1996, pp. 37-66.

<sup>(3)</sup> Pictures granted by the Museo Egizio of Turin.

<sup>(4)</sup> Pictures from Vaudetti M., Canepa S., course of "Architettura degli interni e allestimento", Politecnico di Torino.



# PART 6 DOCUMENTATION

# FACILITY REPORT

We have seen that there are many documents requested for an artwork loan. Besides of the Condition Report, that is fundamental during all the phase of the loan, other papers are important: Facility Report, Loan Agreement and Loan Form, Ministerial authorization, insurance documents. To these is added the DDT (documento di trasporto)/CMR (Convention des Marchandises par Route). In this part of the thesis, we focus on a deeper knowledge of these documents.

As we said in the previous chapter, the Facility Report is a technical document that describes the characteristics of the exhibition space, both from the security, safety and environmental point of view, including architectural and micro-climatic description. There are some standard models, such as the UKRG (UK Registrar Group) or the American Standard Facility Report, but each institution can adopt and create a personal one.

The Facility Report can be adapted, where necessary, to various kinds of cultural heritage (museums, monumental sites, historical buildings, churches...) and is also useful for collecting information for the standards related to museum accreditation program developed by regional administrations.

It provides an overview, aimed at outlining the situation of the museum, and collecting information as a starting point for quality evaluation of facilities, security and collection management in museums and cultural heritage. It's divided into sections dealing with different aspects: facilities, layout, installations, exhibitions, conservation of the collections, management, safety and security, maintenance.<sup>(1)</sup>

This paper must be included in the request of a loan, from the organizer to the lender to allow him to verify if the museum could be suitable for the artwork loan. The document contains:<sup>(2)</sup>

- identification and juridical status of the host museum;
- exact location of the museum;
- data about any billing (P.IVA, invoice header);
- opening hours to the public of the exhibition space;
- name and data about the referents (director, registrars, curators...);
- description of the museum mission and its collections, with particular reference to the latest activity;
- information about the host venue.

In particular, for what concerns this latest point, the Facility Report furnishes the following information:

- General data of the exhibition space:
  - history and construction period of the museum, reporting all the restoration/remaking activities;
  - construction features (building typology, materials used in the exhibition spaces...);
  - intended use of the building (museum, archive, library, deposits, offices, other services);
  - other activities in the museum.
- Description of the exhibition spaces:
  - architectural plan;
  - dimensions;
  - accesses with doors' dimensions;
  - lighting (natural and artificial lighting, light sources' typology and characteristics, exposition to the light...);
  - micro-climatic control (type of air-conditioning systems, natural/mechanical ventilation...);
  - fire protection system (safety of installations and materials, smoke and gas detection, fire alarm system with acoustic notification, extinguishing methods, protection systems against atmospheric discharges...);
  - overcrowding management (people flow, maximum overcrowding for the slabs and the emergency exits, lighting and safety signs...).
- Description of the deposits (with the same points of the exhibition spaces).
- Description of the installations and security procedures:
  - intrusion detection system (technologies and devices used);
  - anti-burglar security (technologies and devices used);
  - artworks' protection (showcases, devices, alarms, architectural barriers...);
  - security service (museum custodians, surveillance cameras...);
  - closed-circuit television control system (if present);
  - emergency plans and safety procedures;
  - name of the workers which to refer;
- Description of the procedures for the artworks' delivery and collection:
  - limited accesses to the insiders in the artwork mounting and dismounting;
  - artworks' control during their installation and exposition;
  - registration of internal movements and relocation of the artworks;
  - closing and securing the location when the staff is not present;
  - regulation for the storage accesses;
  - name of the responsible for the artworks' exit from the building.
- Description of the procedures for the handling, unpackaging and mounting of the pieces:
  - identification of the proper area;
  - identification of the staff and methodologies;
  - technical staff and restorers for the control of the artwork conditions, as well as its handling and mounting, with identification of the responsables;
  - equipment available for the objects' movement.

It's important to accompany the Facility Report with architectural plans and schemes.

The data about security must be treated with confidentiality and discretion: inside the museum, only a few people are allowed to transmit these sensitive data.

Once that the Facility Report arrives at the lender, it's possible that she refuses to grant the loan, or that she requires to inspect the venue.

This document can be useful also to collect information for a shared and par-

anticipated analysis of the risks connected to conservation and for starting a decision process aimed at improving the quality of the museums' structures and their services. Furthermore, it's used to highlight any problem issues towards which to direct the resources, as well as to underline the actions' priority as support in decision making.

This report will allow to highlight the needs related to preventive conservation and the safeguarding of collections and, above all, to define correct management of the procedures based on the organizational structure of museums and on the awareness to regulate, standardize, improve and renew existing structures and their service.<sup>(3)</sup>

<sup>(1)</sup> Filippi M., Rota M., *Confidential Facility Report: a tool for quality evaluation and decision making in museums*, in Angelo Ferrari (a cura di), "Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin", Proceedings 4th International Congress, vol.I, Cairo, 2009, pag. 391-395.

<sup>(2)</sup> *Guida per l'organizzazione di mostre d'arte*, a cura del Ministero per i Beni e le Attività Culturali - dipartimento per i Beni Culturali e Paesaggistici, 2000, pag. 15-17.

<sup>(3)</sup> Filippi M., Rota M., *Confidential Facility Report: a tool for quality evaluation and decision making in museums*, in Angelo Ferrari (a cura di), "Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin", Proceedings 4th International Congress, vol.I, Cairo, 2009, pag. 391-395.

# LOAN AGREEMENT AND LOAN FORM

When a loan is granted, the registrar has to fill the Loan Form, that represents a simplified contractual form, or to forward the Loan Agreement to the organizer, that shows the information related to the artwork and the prescriptions connected to the loan consent. The latter is a real contract between the organizer and the lender.

In the Loan Agreement, the following aspects are established:<sup>(1)</sup>

- loan duration;
- insurance modalities and choice of insurance company: sometimes, the organizer can assume all the responsibilities in case of damage or loss of artwork material: this is called *absolute liability*. The responsibility for the insurance cost belongs to the organizer;
- indications for the transport and choice of the transport company;
- indications for the adequate packaging;
- modalities of artwork conservation related to its needs and materials (eventual need of restoration activity);
- details of the installation in the new location: the structures must be completed before the arrival of the object;
- transport, courier, insurance and installation cost;
- legal and bureaucratic aspects;
- use of pictures: the right of reproduction of artwork pictures in the exhibition catalog for educational and promotional purposes is defined. The department of museum exhibitions gives a list where all the available photos are listed, with the allowed uses. For the reproduction of the picture, the lender will give the credit line to the organizer and the copyright related to the photo;
- right of exposure to the piece. This right belongs to the artist or who has bought it, and the law for the copyright is valid until 70 years after its death: in this case, the heirs could have the power to authorize the artwork loan. However, if the exchange happens between public institutions and for a limited period, without commercial purposes, it doesn't require the authorization;
- right of reproduction. It's related to the permission to reproduce the original artwork, which belongs to the artist or who has bought it. With the term reproduction we mean for example the pictures of the piece, the digital copy available online, the printed copy, the cinematography... This right has value until 70 years

after the author's death.

The Loan Form can also count as a contract, in absence of the Loan Agreement, if signed by both the lender and the organizer. It contains all the data related to an artwork (author, title, technique, weight, dimensions, catalog number, insurance value, instructions and modalities for its handling, conservation state...) and its lender (identification of the responsible for the loan with her contacts).

<sup>(4)</sup> Benvenuti G., Catullo C., Dipasquale R., Mensi L., Pacifici L., Panzironi F., Resti C., *IN-&OUT. Guida pratica al prestito di opere d'arte*, Rome, Apice, 2018, pag. 7-8.

# MINISTERIAL AUTHORIZATION AND TRANSPORT DOCUMENTATION

The loans' authorization is regulated by the D.Lgs. 42/2004, updated on June 19, 2019. The Ministry of Cultural Heritage and Activities and Tourism - General Directorate of Archeology, Fine Arts and Landscape - to simplify and rationalize the procedures, has delegated to the Superintendencies Archeology Fine Arts and Landscape the authorization to the loans in the national territory and without particular critical issues. The Superintendencies are responsible for the verification of the received data and have to inform the Ministry.

The artworks that require the authorization are:<sup>(1)</sup>

- all the artworks whose birth dates back more than 70 years and their author is dead, with a value over 13.500€;
- artworks belong to the Nation;
- mobile pieces that have a great cultural, historical, archeological, artistic, ethno-anthropological interest, which belong to public institutes or juridical people, or other private subjects;
- the archives and documents that belong to the Nation, other public institutes or private subjects, with great historical value.

The criteria to release the authorization are to guarantee the artwork conservation and the public fruition.

For the objects that don't require the ministerial authorization, it's necessary only the self-certification, given to the Exportation Office.

For what concerns the foreign loans, when an artwork leaves the Nation, apart from the authorization of the Ministry, it's necessary to ask also the Temporary Circulation Certificate (Certificato di Circolazione Temporanea) from the Exportation Office. In case of an extra-UE exhibition, it's needed also the Exportation License (Licenza di Esportazione). The loan is allowed only for a maximum of 18 months.

For the loans coming from abroad, when the objects arrive from the European Community we speak of shipment and it's necessary the Certificate of Shipment (Certificato di Avvenuta Spedizione - CAS) from the Exportation Office. In case of loans from outside the European Community, we speak of importation and it's required the Certificate of Import (Certificato Avvenuta Importazione - CAI).

The authorization request should be done at least six months before the exhibi-

tion, including:<sup>(2)</sup>

- scientific-technical project of the exhibition;
- standard Facility Report of the venue;
- artworks' list;
- list of the artwork loans;
- Loan Form;
- name of the responsables for the artwork loans.

Within 60 days from the opening day of the exhibition the organizer must send to the Ministry:<sup>(3)</sup>

- juridical state of the piece;
- declaration of the cultural interest in case of a private lender;
- return guarantee at the end of the event;
- in case of a foreign loan, note by the homologous Ministry of the host Nation that certifies the jurisdictional immunity enjoyed by the Italian state;
- artworks' list with photographs;
- Condition Report;
- identification of the handling, packaging, transport, installation and insurance company.

Within 20 days from the opening day of the exhibition the organizer must send to the Ministry:<sup>(4)</sup>

- eventual change/integration of the artworks' list;
- insurance certificate of the policy "all risks" or state guarantee;
- report certifying the fulfillment of the prescriptions given in the CR;
- report certifying the positive conclusion of the conservative intervention required for the granting of the loan (if needed);
- name of all the people involved in the loan;
- name of the referents of the Export Offices and customs agencies in case of international loans;
- chrono-program and plan of the artwork' withdrawals with indications of managers, dates and times.

Together with the authorization for the artworks' export/import, the transport documentation represents another important issue. It's constituted by the DDT (documento di trasporto) in the national territory, and it's substituted by the CMR (Convention des Marchandises par Route) in case of foreign loans.

The contract of transport involves the lender, the organizer and the carrier.

This document contains:<sup>(5)</sup>

- place and date of the issue;
- sender data;
- carrier data;
- organizer data;
- destination address specifications;
- quantity and weight of the transported pieces;
- specifications about who must bear the transport costs;
- indications about the dangerousness of the goods;
- any mandatory points at the customs level.

Furthermore, usually, there are also data about the vehicle, such as the registration of the vehicle used for the artworks' transport.

It establishes also the carrier's liability. The transport company is responsible in case of loss of all or part of the piece, damage during the movement, or delay in the artwork delivery. In case of loss, damage or delay that derives from a specific

defect in the piece, from unavoidable circumstances, or defective packaging, the carrier can be released from its liability.

The CMR was signed in 1956 in Geneva to regulate aspects of international road transport. The agreement concerns also the intermodal transport by train, plane and ship if these are carried out without interruptions. The Convention came into force in 1961, and it was signed by 55 countries, most of them European.

<sup>(1)</sup> Decreto Ministeriale 19 giugno 2019, 76/2019, according to the article 48 of Decreto Legislativo 42/2004.

<sup>(2)</sup> Ibidem.

<sup>(3)</sup> Ibidem.

<sup>(4)</sup> Ibidem.

<sup>(5)</sup> <https://www.logisticaefficiente.it/wiki-logistica/network-e-trasporti/cmr.html>

# INSURANCE DOCUMENTATION

The insurance documentation is certainly a fundamental thing in a loan. The risk of degradation/damage during artwork handling is never equal to zero, even if we pay a lot of attention.

The best insurance policy is the formula "All risks - nail to nail cover on an agreed value basis - no exclusions", that ensure a full protection of the artworks against all the possible risks they are related:

- the transport;
- packaging and unpackaging;
- installation and dismounting;
- permanence during the exhibition.

Some All Risks formula could have some exclusions for the insurance coverage: these are to avoid.

An insurance policy, in fact, must cover all the possible risks related to:<sup>(1)</sup>

- war during transits as per IWC (Institute War Clauses), terrorism and stay risk;
- strikes, riots and vandalism;
- catastrophic events;
- climate changes consequence of water-system and/or air conditioning and/or temperature devices accidental breakdown;
- light exposure;
- packing defect.
- sleight of hand and theft committed by employees/staff, malicious act and gross negligence of the employees;
- pair & set clause;

Furhtermore, the policy shouldn't have deductible applied, and have a depreciation of 100% and a waive rights of recourse against carriers and packers or other bailees.

The insurance coverage starts with the artwork removing from its original location and ends with its relocation.

The contract is constituted by the general and particular conditions of the policy together with the insurance certificate, which contains the name of the insurance company, the policyholder, the name of the lender, the place for the delivery, the period for the insurance coverage, the period of the exhibition and information about the venue, the title of the exhibition, the artworks' list and their value.

When the insurance company assesses whether to take on the burden, it considers the relationship with the applicant: before the stipulation, in fact, the insurer, first of all, requires complete documentation from the customer.<sup>(2)</sup> The objects are divided according to risk categories.

In case of a sinister, the compensation given by the insurance company could be of two types: full value (it covers the totality of the assured things and it's done for their entire value), first absolute risk (the insurance covers a sum lower than the total value of the objects, corresponding to the maximum damage that the policyholder believes she can suffer in case of a sinister).

In case of destruction or total loss of the piece, the insurance company will give an amount equal to the value in the policy: accepted estimate (the commercial value attributed to the object) or the declared value (value indicated by the lender, with reference to the commercial value). With commercial value, we mean the real value of the artwork in the market or the possible one, in case of a sinister.<sup>(3)</sup>

The insurance policy can be temporary, annual or multiannual.

<sup>(1)</sup> Data given by the Museo Egizio of Turin.

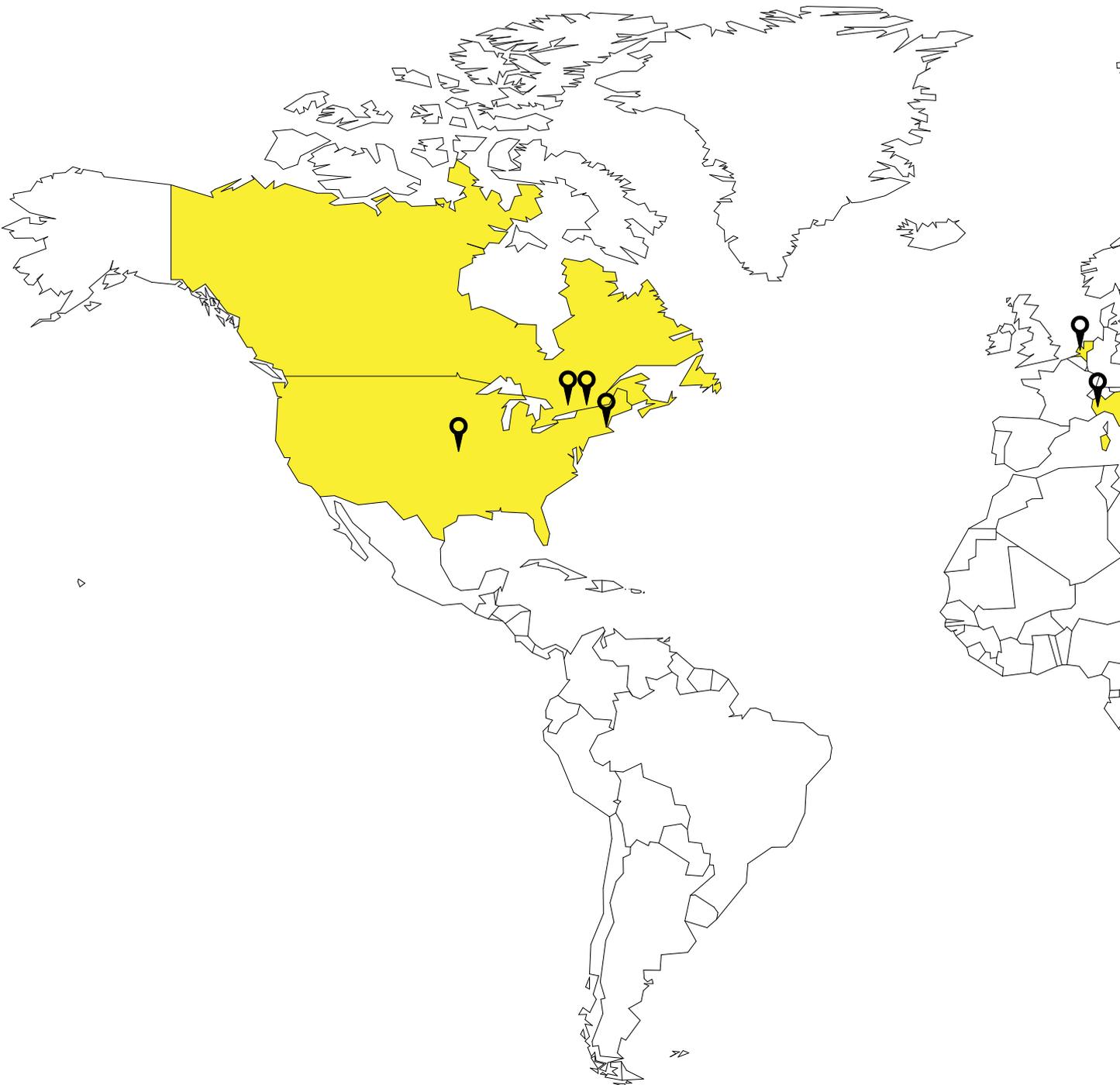
<sup>(2)</sup> <https://abcrisparmio.it/guide/assicurazioni/assicurare-opere-arte>.

<sup>(3)</sup> <http://www.cestart.it/wp-content/uploads/2013/08/COPERTURE-ASSICURATIVE-PER-LARTE.pdf>.



# PART 7 SURVEY

# SURVEY ABOUT THE ACTIVITY OF THE REGISTRAR





To better understand the role of the registrar and the difference that this role has around the world, a survey has been sent to some museum registrars, in collaboration with the Museo Egizio of Turin. This to collect information about how the figure works abroad, what are her main tasks compared to the Italian ones, what is the entity of the museum for which she works (it's a museum that has an active role in the loans?), and so on.

In the previous map it has been indicated the countries from which the answers obtained arrive: because of the emergency situation of Covid-19, many museums were closed and so it was quite difficult to find out the answers. The registrars that have answered are from:

- Museo Egizio, Turin (Italy);
- Amos Rex, Helsinki (Finland);
- Rijksmuseum van Oudheden, Leiden (The Netherlands);
- Egyptian Museum, Cairo (Egypt);
- Pointe-à-Callière, Cité d'archéologie et d'histoire de Montréal, Montreal (Canada);
- The Nelson-Atkins Museum of Art, Kansas City (Missouri - United States);
- Museum of Fine Arts, Boston (Massachusetts - United States);
- CINÉ+ - Musée canadien de l'histoire, Gatineau (Canada).

The answers collected in the survey are the following:

## SURVEY ABOUT THE ROLE OF MUSEUM REGISTRAR

1. Name of the museum:



Museo Egizio



Amos Rex



Rijksmuseum van Oudheden



Egyptian Museum



Pointe-à-Callière, Cité d'archéologie et d'histoire de Montréal



The Nelson-Atkins Museum of Art



Museum of Fine Arts



CINÉ+ - Musée canadien de l'histoire

2. What kind of formation do you have to work as a museum registrar?



Degree in Languages + museum experience.



Bachelor in Architecture + museum experience.



Bachelor (*she doesn't express in which field*).



Degree in Archeology + training project for the American Research Center.

-  Degree in Museology Technique + bachelor with 3 certificates: art history, archives and cultural animation + 10 years of museum experience.
-  Bachelor *(she doesn't express in which field)*.
-  Bachelor *(she doesn't express in which field)*.
-  Bachelor in Anthropology and a Diploma in Cultural Heritage Conservation and Management.

#### Database

3. Does the museum have a database available in the market or customized?

-  Available in the market (MuseumPlus) with the project to have a customized database in the future.
-  Available in the market: Muusa, finnish program.
-  Available in the market: TMS collections.
-  Available in the market: KE Emu
-  Available in the market: File Maker Pro.
-  Available in the market: TMS collections.
-  Available in the market: TMS collections.
-  Available in the market: KE Emu.

4. How do you manage the traceability and the handling of the pieces?

-  The movements are registered on PC in real-time.
-  The movements are registered manually on the database.
-  The movements are registered by a Collection Registrar who is in charge of TMS and keeping it up-to-date.
-  - *(she doesn't answer)*.
-  With a location field in the database.
-  Paper forms (art movement form) given to registration by the preparator or the conservator who moves the work.
-  Location moves, in the objects module in the database.
-  We use the database to keep track of all movements.

5. How many artworks does the database contain?



40.000.



About 8.000.



230.718 (at March 4, 2020).



More than 168.000.



Over 10.000.



Over 60.000 (there are records for loans as well as accessioned works in the collection).



Approx 450.000 accessioned objects, plus accessories, frames, mounts, crates, etc. Also borrowed objects for temporary exhibitions, etc.



Currently 2.138.473 catalogue records, this includes a portion of our archaeology collection, objects and archival documents.

6. Is the database used only by the registrar or also by other figures?



No, also by curators, communication office, library users. Part of the database is online.



No, also by others, some have only the right to read the database, not to edit.



No, also by loans registrar, collection registrar, collection managers, conservators, curators, project-leaders. In total, about 20 people but only a few can make changes to TMS. Most people have small rights to make adjustments.



Yes, registrar only. Recently some of the curators have taken a training program to improve their collection responsibility but, anyway, the access is available only in the registrar's office.



No, it's shared with the head of the media library and the conservation technicians.



No, also the curators, conservators and preparators can see and edit, but only certain fields, while the registrar has complete access to the data.



No, by the whole museum, although not everyone can see every part of the database.



No, the database is used by multiple departments: conservation, collections, registrars, curators, project managers.

### Loans

7. Is the museum where you work mainly deals with incoming or outgoing loans?



Both incoming and outgoing.



Mainly incoming.



Both incoming and outgoing.



Both incoming and outgoing.



Mainly incoming.



Both incoming and outgoing.



Both incoming and outgoing.



Both incoming and outgoing.

### Incoming loans

8. How many incoming loans are made in one year?



One big exhibition with a variable number of pieces, a maximum of 100 pieces.



3-4 exhibitions per year, 1-90 separate loan contracts, 300-800 individual works.



About 590 incoming objects from 48 institutions (2019).



About 10 exhibitions per year (*she doesn't say the number of pieces*).



Over 500 pieces.



100-600. Some loans are long-term loans to the museum that are renewed bi-annually.



510 (2018-2019).



About 47 per year, on average.

9. Do you personally follow the condition report of the pieces?



Yes, one or more registrars write the condition report of the incoming pieces.



No, the condition report is followed by the conservator.



No, the project-lenders deal with it.



No, the curators, with the supervisor of the conservator, do it.



Yes, together with the curator.



Yes.



No, I only do outgoing loans.



No, there's a conservation technician that looks at and reports all incoming objects.

10. Do you personally follow the bureaucratic part?



Yes, always.



Yes.



No, the project-leaders deal with it.



- *(she doesn't answer)*



Yes, together with the curator.



Yes.



No, I only do outgoing loans.



Partially, I handle incoming loan requests by creating hardcopy files as well as digital files in our database. I let the appropriate people know that a loan is coming in. The loan is requested by a curator, they do all the negotiating. Once the loan is confirmed, the request comes to me, I open the file and prepare the paperwork and arrange the transportation. I also provide insurance certificates for the lender.

### *Outgoing loans*

11. Do you manage also the outgoing loans?



Yes.



Yes.



Yes, I follow only the outgoing loans.



Yes.



Yes.



Yes.



Yes, I follow only the outgoing loans.



Yes.

12. How many outgoing loans are made in one year?



3-10 exhibitions per year (*she doesn't say the number of pieces*).



10-100 pieces.



About 360 outgoing objects to 17 institutions (2019).



3-4 loans per year.



10 loans per year.



100-250.



Approx 500 per year.



About 35 per year, on average.

13. Do you personally follow the condition report of the pieces?



Yes.



No, the conservator does it.



Yes.



No, the conservators and curators do it.



Yes.



Yes.



Yes, but only the paperwork. If there are changes in the conditions, I send the condition report to the conservator.



No, there's a conservation technician that does all the condition reports before the object leaves the building and that condition report stays with the object until it is returned.

14. Do you personally follow the bureaucratic part?



Yes.



Yes.



Yes.



- (*she doesn't answer*)



Yes.



Yes.



Yes.



Partially, I manage the different aspect for outgoing loans, from receiving request to the time it leaves the building, including coordinating the conservation work, crating, documentation, ect. I let other departements know what work needs to be done and for when.

15. Do you follow the insurance steps for the loans?



Yes.



Yes, but most of the loans are to Finnish museums, with whom we don't require COI:s, it is based on mutual trust.



Yes.



Yes.



Yes.



Yes.



Yes.



Partially, the curators provide insurance values for objects and the registrar requests insurance certificates from the borrower.

16. Do you need other figures to manage the loans?



Yes, but only for transport and packaging.



Yes, the conservator and the museum director that approve the loans.



Yes, first we decide together if a loan can proceed and on what terms. Before the loan will be promised it is discussed by the curators, conservators, collection managers, etc. Then I manage the bureaucratic part of the loan myself.



Yes, in the museum, the loans team consists of registrars, loans curators, conservator, packaging and shipping company.



Yes, the approval of the director of collections and the help of the museology technician for the packaging of objects.



Yes, we have one registrar whose primarily role is to facilitate outgoing loans from the collection.



Yes, I have an assistant, at the moment, and there is a registrar for touring exhibitions with an assistant; a registrar for exhibitions (also the chief reg-

istrar) and a registrar for acquisitions.



Yes, as the acquisitions and loans coordinator, I work under the supervisor of collections management, I coordinate all the loans with the assistance office loans and acquisitions registrar.

17. Do you decide if the artwork can travel or not? What kind of considerations do you take to decide?



The last word belongs to the director. The condition of the piece and suitability to travel are considered, as well as the scientific depth of the exhibition, the relevance of the piece within it, previous trips of the piece in the recent past.



No, the conservator and collection manager decides if the work can be lent, mainly based on physical condition.



No, it's decided by the curators, conservators and collection managers. Considerations: do we need the object for our permanent exhibition (for the scientific story, education, etc)?, do we need the object for a temporary exhibition?, is the condition good enough to travel?



Yes, according to the condition report of the conservators.



Yes, with the director, taking in consideration the fragility of the object, its availability according to the period requested, the duration of the loan.



No, our conservators decide, related to the health of a work.



No, the conservator has to assess every object and then she makes her recommendation to the curator.



All our outgoing loan request go through a Loans Forum discussion and then the final decision is made at our Collections Committee Meeting on recommendation by different parties including conservation, research, collections, ect.

18. What kind of monitoring do you carry out during the transport?



Temperature and relative humidity with the possibility to check them outside the box, vibrations.



None.



None, we try to pack it in the right way. It depends on how the travel will be (truck, plane) and what kind of object it is.



I don't know, the shipping company is responsible for that.



Handling of crates, specialized trucks with suspension and with temperature and humidity control, size and weight of crates for entry into the museum...



None. Nowadays, due to COVID-19 couriers may not be allowed in transit. We are researching GPS and other devices for tracking and security.



We only use fine art shippers with customized trucks that have air-ride suspension; they are insulated and have heating-control. We send a courier on most of the trucks, who watches the temperature reader in the cab (which reads the temperature in the back of the truck, where the crate is). We rarely use anything to monitor vibration. If it is that sensitive, then we do not lend it.



Depending on the object traveling we will monitor temperature and humidity.

19. Do you work also as a courier for the artwork?



Yes, sometimes also more than one registrar follows the artwork.



If needed. We don't usually require couriering.



Yes. My function is registrar and collection manager.



- *(she doesn't answer)*



Yes and I like it for traveling and meeting people in other institutions, to see how they work in other museums.



Yes.



Yes.



No, our collections managers or conservators are usually couriers, sometimes curators also courier objects.

## SURVEY ANALYSIS

We can collect and summarize all the answers in the following way:

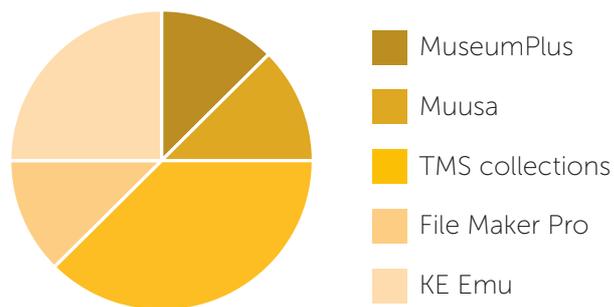
2. What kind of formation do you have to work as a museum registrar?



### Database

3. Does the museum have a database available in the market or customized?

100% Available in the market

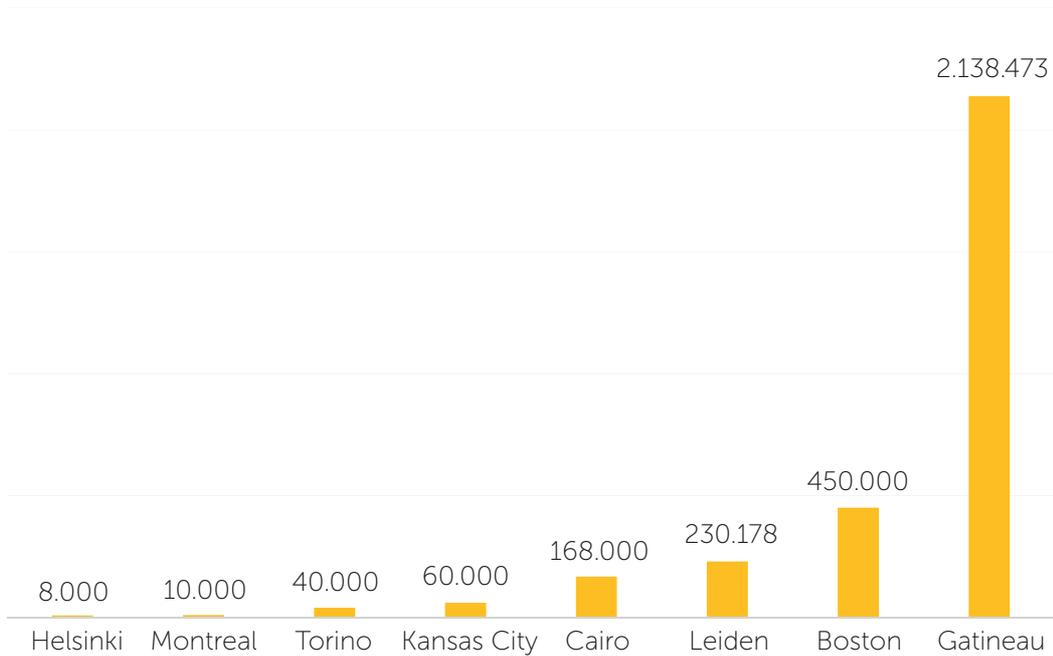


4. How do you manage the traceability and the handling of the pieces?

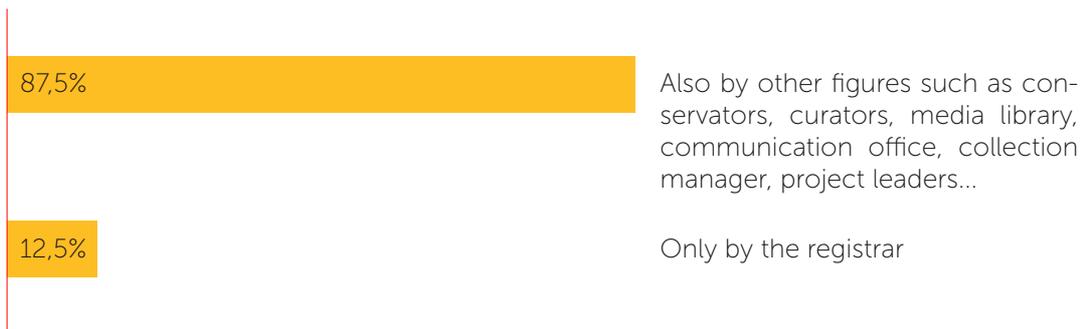


abstained: 1

5. How many artworks does the database contain?

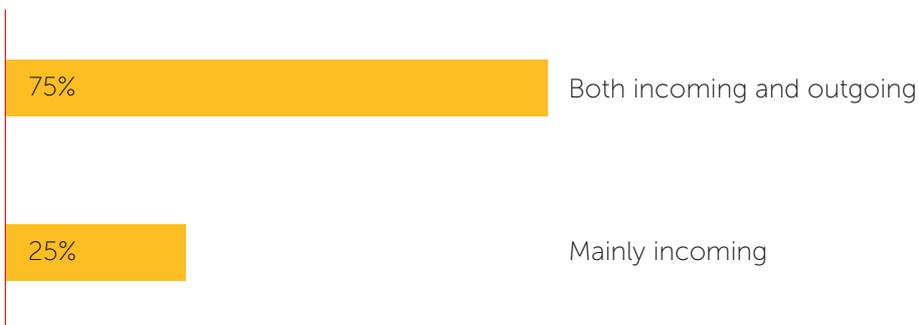


6. Is the database used only by the registrar or also by other figures?



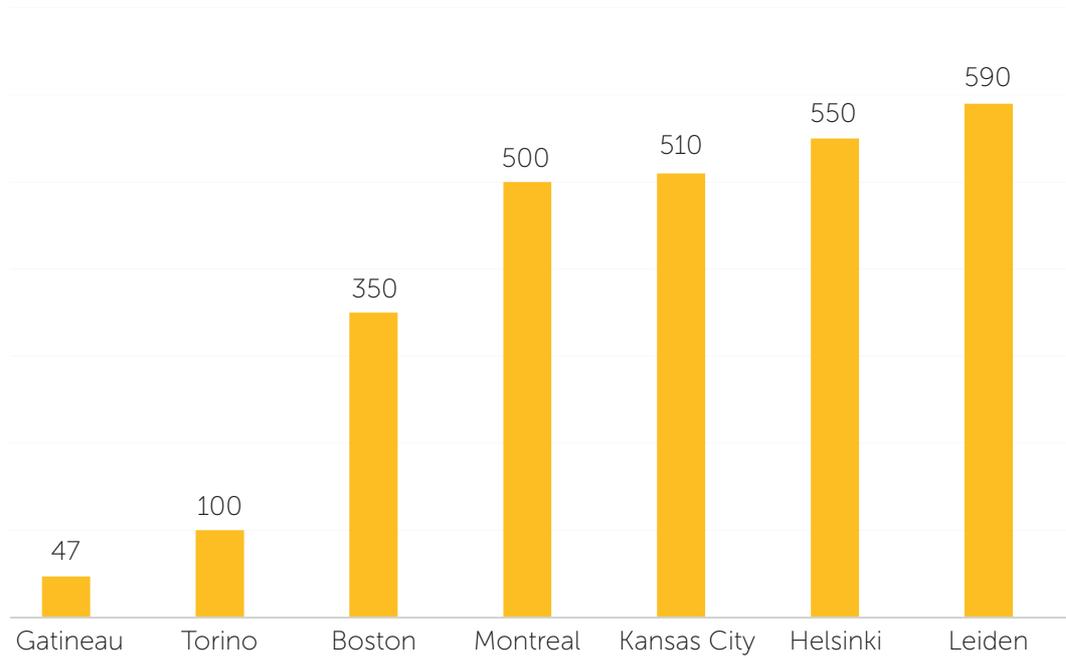
### Loans

7. Is the museum where you work mainly deals with incoming or outgoing loans?



*Incoming loans*

8. How many incoming loans are made in one year?

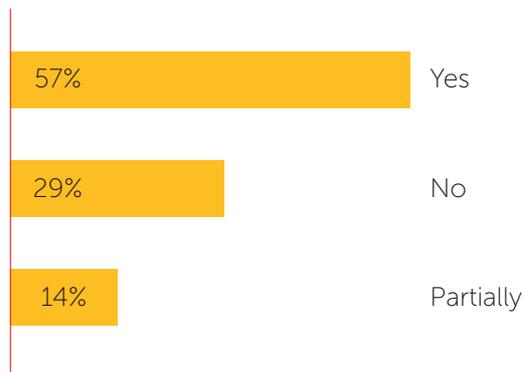


abstained: 1

9. Do you personally follow the condition report of the pieces?



10. Do you personally follow the bureaucratic part?



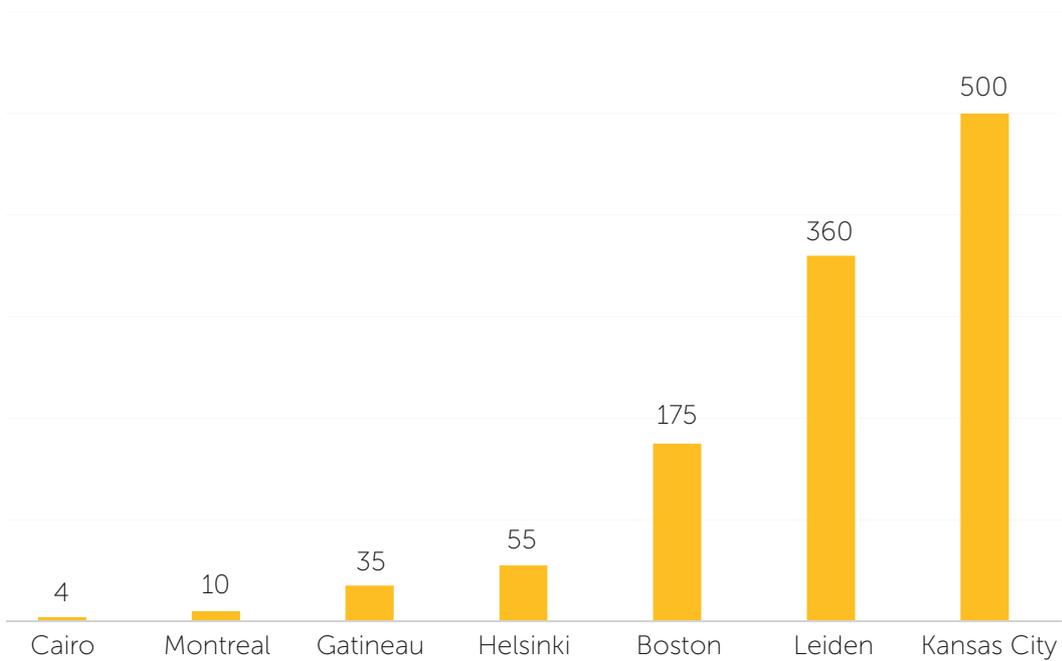
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*Outgoing loans*

11. Do you manage also the outgoing loans?

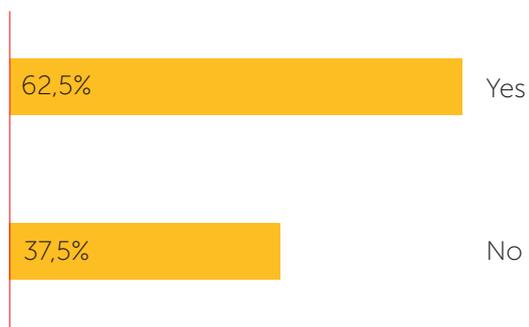


12. How many outgoing loans are made in one year?



abstained: 1

13. Do you personally follow the condition report of the pieces?



14. Do you personally follow the bureaucratic part?



abstained: 1

15. Do you follow the insurance steps for the loans?



16. Do you need other figures to manage the loans?

100% Yes



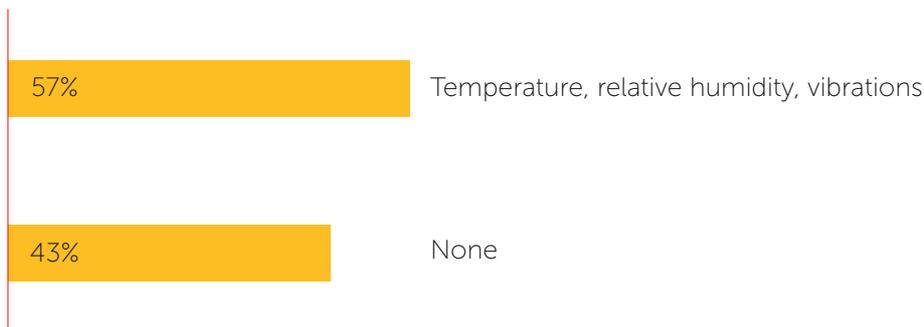
17. Do you decide if the artwork can travel or not? What kind of considerations do you take to decide?



Considerations:

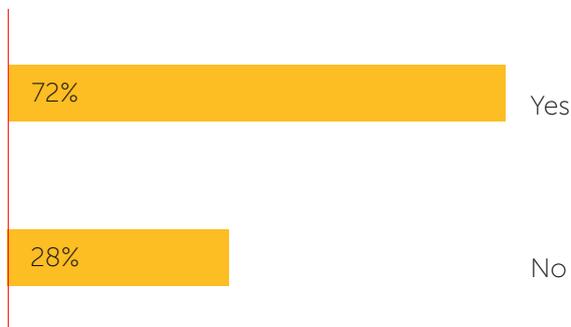
- condition of the piece
- suitability to travel
- availability of the artwork in the requested period
- duration of the loan
- previous trips of the piece in the recent past
- scientific depth of the exhibition
- relevance of the piece in the exhibition

18. What kind of monitoring do you carry out during the transport?



abstained: 1

19. Do you work also as a courier for the artwork?



abstained: 1

As we can notice from the answers' analysis, all the involved museums have a standardized database available in the market, which they use for the vast majority also to register the movements and the traceability of the artworks during the loans. Generally, the database is used also by other figures than the registrar, who however has all the rights to make changes, while other people are sometimes limited to consultation only.

The interviewed museums are very different for the owned number of pieces: they range from 8.000 pieces of the Helsinki Museum to over 2 million of the Gatineau Museum. The museums have an intense activity both for the incoming loans and outgoing loans. It's interesting to see how the biggest museum in terms of artworks' quantity, the one of Gatineau, is actually the most "static" museum, so the one that grants and receives fewer loans; while the smaller museums are

those with great activity.

For what concerns the registrar activity, we notice that generally she deals more with the outgoing loans than the incoming ones. For the outgoing loans, the registrar follows the Condition Report, the bureaucratic and insurance part, and often she deals also as a courier for the object. During the transport, not all the museums have declared to monitor the artwork.

For what regards the incoming loans, the registrar mainly focuses on bureaucratic aspects.

The registrar works together with a lot of other professionals, coordinating their work and, very often, deciding with them whether to grant a loan.

To take this decision, most museums rely exclusively on the physical conditions of the piece, such as its fragility, its capability to travel, its availability in the request period. Only the Museo Egizio of Turin has reported taking into consideration also the value of the object itself, and so the importance and meaning of it within the exhibition, and the scientific depth of the exhibition. These are, in fact, very important factors, to which the Italian legislation dedicates a great space in its documents, clearly explaining that the artwork must add value to the exhibition, increasing its importance and depth.



# PART 8 CONCLUSION

# FINAL NOTE

The analysis that emerges from the thesis shows a complete profile of the registrar figure: recently recognized as a museum profession in Italy, although in the United States and England it exists since 1950s, the figure is taking on an increasingly crucial role within the museum structures.

She's a multi-purpose figure, who interacts with many professionals and coordinates their work, she acts as an intermediary between the curator, the conservator, the restorer, the director, the transport and insurance company, and all the other external figures. The registrar deals with very different aspects that require various knowledge and skills, and she can be defined as the one who is concerned with the internal management of museum collections: she's the one that organizes the collection and its documentation, that develops and maintains a record system, she's responsible for the storage system and its management, she's the project manager for what concerns the transport and movement of the artworks.

We identify the following tasks:

- the inventorying and the cataloging: this activity is carried out through a database, a tool where all the data regarding an artwork are collected. There is information about the core data (name, author, period), technical data (material, technique, dimensions, weight), history of the object, conservation and restoration activities, traceability of the piece during all its movements (inside the museum and outside the museum for external exhibitions), data and contracts about all the eventual loans and the people involved in them, and also information about the bibliography and literature where the artwork appears. Every object in the database is accompanied by many pictures and multimedia files.

Often, the registrar is the only one who can edit the database, while other professions can just view the information inside it.

Nowadays, museums are going to publish online the materials contained in the database, to make accessible its collection to everyone: this represents a turning point for the public use of the cultural heritage and the open source;

- the deposits' management: in the storages there are about 80% of the museum collection, that's why the correct management of the deposits is fundamental. The registrar is responsible for the control of the micro-climate and the internal environment, which includes the examination of temperature, relative humidity,

light, biological attacks, indoor air quality, ventilation, vibrations.

Since that the environment can alter or accelerate the degradation process of the materials, it's important to know the values and the characteristics of each material, to keep it in the perfect conditions for the correct conservation;

- the artworks' movement: this is the most delicate phase that begins with the loan request sent by another institution and ends with the return of the piece to its original location. The loans can be incoming loans, when a museum receives an artwork from another institution, or outgoing loans, when an artwork leaves its original location to be lent to another museum for a temporary exhibition.

This task involves many different skills: museology, art history and restoration are necessary to decide if grant a loan or not, by understanding the meaning of the piece and the exhibition; museography and architecture allow to read the Facility Report and the museum and exhibition plan; technology, science of materials, technical physics are fundamental to ensure the correct preservation of the piece; structural skills are useful to design a suitable packing for the transport; economic and juridical skills are helpful to fill out all the documents required, like authorizations and loan contracts.

Since there's no yet a defined profile to carry out this job and there aren't specific degree courses, the background of a registrar can be various and touch very different fields: as we can see from the survey, some registrars have a bachelor but they don't say in which course. Because of the different skills of a registrar, probably an eventual future specialization for this role should be open and accessible to people from every kind of university background.

Anyway, in the latest years, there has been a debate about the formation of the registrar, with many potential "candidates" to cover this role: in this sense, the figure of the architect is particularly suitable. Specifically, by referring to the three main activities of the registrar, it's noticed that:

- for what concerns the database and the cataloging, the technical preparation of an architect is very useful to complete the technical data sheets of the artworks, as she has an appropriate technical language and a high sense of attention to detail. Besides, a very effective management method can be the use of the BIM, software used for the architectural design, which can provide valuable help in the organization of the collections and the exhibition spaces at the same time: this tool would allow economizing the internal management of the museum, allowing the integration between container and content;

- in the management of the deposits, the technical physics is fundamental to monitor the environment (control of relative humidity, temperature, light exposure...): for example, the knowledge of the function of the air-conditioning system allow to understand the related problems that may affect the internal environment. The science of materials, instead, is necessary for the materials' conservation, paying attention to the possible degradation risks.

- for the artworks' movement, the structural knowledge for the design of the packaging and structures that support and envelop the piece constitutes another strength for the architect figure. Moreover, in the installation of the object in a new location, the skills in the setting-up and exhibition are very useful, because they allow easy reading of the plan and museum structure, the design of the showcases and the exhibition space with all the necessary precautions (such as the type and intensity of the light to valorize the piece). Finally, the history and theory of restoration are a valid aid in the decision to accept a loan, because they provide interpretative keys that allow evaluating the depth and importance of the piece itself within the exhibition: as we have seen, the Italian legislation remarks the fact that a piece can be granted only if it constitutes relevant importance inside the future exhibition.

Furthermore, since the architect is a multi-tasking profile with a certain flexibility in the management of various projects, she adapts well to face new challenges that an artwork loan may require, by implementing its problem-solving skills - for example, the search for creative solutions for the packing of a particularly complex piece.

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