

The activity of CEN TC 346-Conservation of Cultural Heritage

Vasco Fassina

Abstract: A specific European standardisation activity in the field of conservation of cultural heritage is essential to acquire a common unified scientific approach to the problems relevant to the preservation and conservation of the cultural property. The scope of CEN TC 346 is to establish standards in the field of the processes, practices, methodologies and documentation of conservation of tangible cultural heritage to support its preservation, protection and maintenance and to enhance its significance. This includes standardisation on the characterisation of deterioration processes and environmental conditions for cultural heritage and the products and technologies used for the planning and execution of conservation, restoration, repair and maintenance. Up to now sixteen EN standards were published according to a matrix-based method in which three main topics have been developed. First is dealing with *general guidelines and methodology*. Second topic is regarding *Evaluation of methods and products for conservation works*. The work was focused on a general draft "Surface protection for porous inorganic materials-laboratory test methods for the evaluation of the performance of water repellent products". The evaluation is based on the measurements of different parameters appropriate to assess the performance of the product using standardized and reproducible methods. Third topic is regarding *Indoor/outdoor climate-Specifications and measurement*. The purpose of the work was to develop standards and recommendations relating specifically to the climate and its influence on the preservation of heritage. Standards developed will assist professionals involved in environmental diagnostics and in the investigation and control of the climate for preventive conservation and maintenance. The assistance includes the choice of methodologies and instruments and the interpretation of results.

Key Word: Cultural Heritage & Standardization, Terminology.

La actividad del CEN TC 346-Conservación del Patrimonio Cultural

Resumen: Es esencial una actividad específica de normalización europea en el campo de la conservación del patrimonio cultural para adquirir un enfoque científico unificado y común de los problemas relacionados con la preservación y conservación de los bienes culturales. El fin del CEN TC 346 es establecer normas en el campo de los procesos, prácticas, metodologías y documentación de la conservación del patrimonio cultural tangible para apoyar su conservación, protección y mantenimiento y realzar su significado. Esto incluye la estandarización de la caracterización de los procesos de deterioro y las condiciones ambientales del patrimonio cultural y los productos y tecnologías que se utilizan para la planificación y ejecución de su conservación, restauración, reparación y mantenimiento. Hasta ahora se han publicado dieciséis normas EN de acuerdo con un método basado en una matriz, en la que se han desarrollado tres temas principales. El primero se refiere a las *directrices generales y la metodología*. El segundo tema aborda la *Evaluación de métodos y productos para conservación de las obras*. El trabajo se centró en un esbozo general, "Protección de la superficie de materiales inorgánicos porosos - tests de laboratorio para la evaluación de la eficacia de los productos repelentes al agua". La evaluación está basada en mediciones de diferentes parámetros apropiados para verificar la eficiencia del producto mediante métodos normalizados y reproducibles. El tercer tema trata sobre las *condiciones ambientales interior / exterior -Especificaciones y medición*. El propósito del trabajo fue desarrollar normas y recomendaciones relacionadas específicamente con el clima y su influencia en la conservación del patrimonio. Las normas desarrolladas auxiliarán a profesionales responsables del diagnóstico ambiental y en la investigación y el control del clima para la conservación preventiva y el mantenimiento. El apoyo incluye una selección de metodologías e instrumentos y la interpretación de los resultados.

Palabra Clave: Patrimonio Cultural y Normalización, Terminología.

A atividade do CEN TC 346-Conservação do Património Cultural

Resumo: É essencial uma ação específica de standardização europeia na área da conservação do património cultural para conseguir uma abordagem científica comum e unificada dos problemas relevantes da preservação e conservação desse património. O objetivo do CEN TC 346 é estabelecer standards nos processos, práticas, metodologias e na documentação da conservação do património cultural tangível, de modo a garantir a sua preservação, proteção, manutenção e a realçar o seu significado. Isto inclui a standardização da caracterização dos processos de deterioração e das condições ambientais para o património cultural e dos produtos e tecnologias usados no planeamento e na execução das ações de conservação, restauro, reparação e de manutenção. Até agora, 16 NE normas foram publicadas de acordo com um método baseado numa matriz, na qual, três grandes tópicos foram desenvolvidos. O primeiro refere-se a diretrizes e metodologias gerais. O segundo tópico aborda a Avaliação de métodos e produtos usados em operações de conservação. O trabalho esteve focado num esboço geral, "Proteção da superfície de materiais inorgânicos porosos - testes laboratoriais para a avaliação da eficácia dos produtos repelentes á água". A avaliação é baseada em medições de diferentes parâmetros apropriados para verificar a eficiência do produto segundo métodos standard e reprodutíveis. O terceiro tópico abrange, Condições ambientais de interior e de exterior – Especificações e medições. O objetivo do trabalho é desenvolver standards e recomendações relacionadas, especificamente, com as condições ambientais e a sua influência na preservação do património. As normas desenvolvidas irão auxiliar os profissionais responsáveis pelo diagnóstico ambiental, pela investigação e pelo controle do clima em conservação preventiva e em manutenção. O apoio inclui a seleção de metodologias, de instrumentos e a interpretação de resultados.

Palavras-chave: Património Cultural & Terminologia standardizada.

1. Introduction

The foremost aim of European standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

The use of standards by industry and the social and economic partners is always voluntary; however, European standards are sometimes related to European legislation (Directives), and conformity to such standards may constitute a presumption of conformity to the legal requirements of the Directives.

CEN (European Committee for Standardization) is responsible for the planning, development and adoption of European standards. It is a legal association, the members of which are the National Standards Bodies (NSBs) of thirty European countries and seven Associates (organizations representing social and economic interests at European level), supported by a CEN Management Center based in Brussels. It is the European counterpart of ISO (International Organization for Standardization) with which it has a standing protocol (the Vienna Agreement) to facilitate technical co-operation. The principal deliverable of CEN is the European standard (EN), which must be published by each of NSBs as an identical national standard, with any per-existing national standards in conflict being withdrawn.

Standard is a document available to the public, drawn up with the cooperation and consensus or general approval of all interested parties affected by it, based on the consolidated results of science, technology and experience, aimed at the promotion of optimum community benefits and approved by a recognized standardizing body on the national, regional, or international level for repeated or continuous application, with which compliance is not mandatory.

CEN and its Technical Committees are also able to offer the Technical Specification (CEN/TS) and the Technical Report (CEN/TR) as solutions to market needs.

2. Need for EU standards

A specific European standardization activity in the field of conservation of cultural heritage is essential to acquire a common unified scientific approach to the problems relevant to the preservation and conservation of the cultural property.

A scientific approach is essential for the conservation of the cultural heritage, as a preliminary basis that will ensure effective planning of ordinary and extraordinary maintenance works, as well to assure their efficacy and durability.

Only thanks to a sound scientific knowledge of the materials constituting the cultural property, of its environmental and conservation conditions, these conservation/restoration works can be successfully carried out.

Unfortunately the great experience developed in this field by the different European countries, for the time being can not constitute a common background because there are too many differences not only in the methods of analysis, but also in the terminology used.

Moreover, this common approach and the use of standardized methodologies and procedures would promote the exchange of information, would avoid the risk of duplication and foster synergy between the European experts and specialists involved in the preservation activity.

In 2001 UNI, the Italian Standard Body presented a request to CEN to create a new TC (Technical Committee) dealing with the conservation of cultural property.

3. Business environment of CEN TC 346

The standardization activities proposed by the CEN/TC 346 are strictly related with the decisions taken by the European Council relevant to the development of cultural programmes and to the conservation and safeguarding of cultural heritage, encouraging the co-operation at European and International level:

"The Community cultural programmes aim to encourage co-operation between Member States and third countries for the improvement of the knowledge and dissemination of European culture and history, as well as in the conservation and safeguarding of cultural heritage and artistic and literary creation (Document Reference: COM (98) 239; Document Date: 1998-04-27)".

"The Treaty on European Union introduced a specific legal base for culture bringing cultural activities into the field of Community activities and policies. Article 128, paragraph 4, states that "the Community shall take cultural aspects into account in its action under other provisions of this Treaty". The present document contains the first report on the consideration of cultural aspects in Community actions under this Article 128, paragraph 4 (Document Reference: COM(96) 160; Document Date:1996-04-17)".

"Article 128 of the Treaty identifies Cultural Heritage as a priority field of action (includes both movable and immovable heritage) through conservation and safeguarding of Cultural Heritage of European significance taking Cultural Heritage into account in regional development and job creation; tourism

and environment; research (Community Action Plan in the Field of Cultural Heritage. Council Decision O.J. 94/C 235/01). (European Spatial Development Perspective, 10 May 1999, 2002-12-20 Page 7".

There are also the Recommendations contained in the STOA (Scientific and Technological Options Assessment) Report "Technological requirements for solutions in the conservation and protection of historic monuments and archaeological remains", which was prepared for the European Parliament, Directorate-General for Research, October 2001. Section 4 recommends the urgent need for a "European Panel on the application of science to Cultural Heritage", to provide vision, guidance and guidelines for 'best practice' at a European level, such as scientifically-based protocols for validating conservation work on monuments and archaeological remains".

Between 1986 and 2007 the European Commission spent more than 120 million Euros to improve the scientific knowledge in conservation of Cultural Heritage and at the end of 2006 a new cultural heritage research programme was launched within the 7th Framework Programme. The number of European Universities, Research and Governmental Institutions contributing basic and innovative research has increased exponentially in these two decades.

With the aim of reinforcing knowledge and decision processes regarding cultural heritage, research programmes that improve intervention methods have been funded in many European countries. When relevant, it is important that this information is used as a contribution for the preparation of European standards.

4. Scope of CEN TC 346

The main objective of CEN/TC 346 is drafting European standards which will help conservation professionals in their conservation and restoration work. It will also ensure that European experts can exchange information on test and analysis methods for the conservation of cultural heritage. This standardization activity will harmonize and unify methodologies in the European area. The initial scope of CEN/TC 346, as approved in 2002, was the standardization in the field of definitions and terminology, methods of testing and analysis, to support the characterization of materials and deterioration processes of movable and immovable heritage, and the products and technologies used for the planning and execution of their conservation, restoration, repair and maintenance.

In particular, the standardization activity on the conservation of Cultural Heritage deals with: - terminology relevant to movable and immovable cultural property, and to the conservation of the cultural property and of the material constituting the cultural property themselves, so that a common European terminology can be created;

-guidelines for a methodological approach to the knowledge of the cultural property and of the materials constituting the cultural property, of the deterioration processes, and of conditions of optimum long-term conservation/preservation work;

-test and analysis methods for the diagnosis and for the characterization of the cultural property and of their state of conservation with regards to outdoor and indoor environmental parameters;

-test and analysis methods (in laboratory and in-situ) for the evaluation of the performance of the products and methodologies to be used in the conservation work (ordinary and/or extraordinary maintenance);

-test and analysis methods for the evaluation of conservation conditions of indoor Cultural Heritage. In particular, standardization on transportation and packaging methods, shall take in due accounts the needs and problems related to itinerant exhibitions and exchanges of works of art, in the permanent presentation conditions in museums, galleries, libraries and archives, in temporary exhibit galleries, in stores and in transport packaging.

This standardization activity will be a useful and valuable occasion to compare, for specific items, different results coming from various European institutions or laboratories. To realize the above work programme five working groups were established as reported in fig. 1.

5. Benefits expected from the work of CEN TC 346

Standardization in the field of conservation of cultural property will:

-improve methodology, protocols, guidelines to allow implementations of better practices or define equipment for preservation and conservation;

-improve the efficiency and pertinence of the diagnosis with a subsequent better management of funding for the conservation/restoration works and therefore increasing the number of conservation projects and spin-off economic benefits/opportunities for new investment, and consequent job creation;

-give precise and appropriate indication on the kind of diagnosis studies to be performed, promoting in this way conservation works on an increasing number of artifacts;

-increase longevity and reduce maintenance costs of conservation works, therefore reducing costs in the on a long-term range because conservation operations will be needed less frequently over time spaced out;

-facilitate professional mobility and international trade and increase the employment opportunities especially for young conservators, restorers, technicians etc...

-facilitate the exchanges between interested parties in Europe, respecting cultural identities, through the use of a common vocabulary;

6. Users of the standards

This standardization is addressed to all parties concerned with the individual subjects covered by the standards including public and government bodies (e.g. Ministry of Culture and Education, Government Agencies); public national and international non-government organizations-NO (e.g. ICCROM, ICOMOS, IIC, ICOM); regional provincial local administrations; restoration schools; ecclesiastical bodies/organizations; stakeholders; public and private analysis laboratories; restoration companies; professionals in the field of conservation and exhibitions planning; distributors and manufacturers of materials used in restoration; companies specializing in the preparation and organization of exhibitions; transportation and packaging companies; lighting installation companies, air conditioning and heating installation companies, informatics and advanced technology companies; cultural institutions and users of cultural heritage: museums, galleries, libraries, archives; architecture and surveyors; peer groups such as architects, custodians, archaeologists, engineers, planners, conservators-restorers, craftsmen, conservation scientists, energy advisers, transport and insurance companies

7. Updating of CEN TC 346 activity

The focus of all the CEN/TC 346 standards is on the tangible cultural heritage. However, every cultural thing has intangible aspects. Conservation of the tangible, when properly carried out, respects the intangible.

The activity was initially developed according to a “matrix-based method” which is a theoretical approach perfect in establishing the most urgent standards.

Up to now seventeen EN standards were published according to a matrix-based method in which three main topics have been developed.

First is dealing with **general guideline, terminology and characterization of materials constituting cultural property**. The following four drafts were published

-EN 15898:2011-Main general terms and definitions. This document defines the main general terms used in the field of conservation of cultural property with particular attention to those terms which have wide use or significance.

It provides terms and their definitions for a set of general concepts which are widely used by those working in the field of conservation of tangible cultural heritage. Its purpose is to bring greater understanding and encourage collaboration amongst those who have responsibility for or an interest in cultural heritage. The need for such agreement and clarification in the use of conservation words has become increasingly recognized in recent years. The definition of the terms here will also help to ensure consistent use of words and concepts within the other CEN/TC 346 conservation standards which define only those terms specific to each individual standard.

The definitions of four terms presented in the draft ('conservation', 'preventive conservation', 'remedial conservation', 'restoration') were developed in parallel with those of ICOM-CC and so have considerable commonality, but they are not identical.

The arrangement of terms reflects the ways in which most heritage professionals approach the conservation of cultural heritage. At its root is consideration of what is to be conserved, its significance and its condition.

Terms and definitions are grouped according to the following clauses:

- Cultural heritage terms
- Condition terms
- Conservation terms
- Preventive conservation terms
- Remedial conservation terms
- Planning and documentation terms

-EN 16095:2012- Condition recording for movable heritage. This standard sets out the purpose and context of condition recording for movable cultural heritage and a framework for a condition report. It specifies the status of a condition report and its essential contents. This standard applies

to all kinds of movable cultural heritage, whether individual objects or whole collections. It can also be used for immovable features in buildings or monuments.

The purpose of making a condition report is to record the condition of cultural heritage following an inspection and assessment. The contents of a condition report can provide not only technical data but also knowledge and understanding about an object or collection, information produced by monitoring its change over time and information that will assist with future planning. Changes in the condition of cultural heritage may diminish its significance and reduce its potential benefits to present and future generations.

Condition reports on cultural heritage are performed by experienced professionals who have received specific training in this activity, particularly conservator-restorers. The quality and usefulness of a condition report depends upon the knowledge and skill of its author or authors. Sound knowledge of the materials comprising the cultural heritage, of the processes that led to their creation and deterioration, and experience in examining such cultural heritage are all required to draft a competent condition report. The author of a report should be aware of the limitations of his/her own knowledge and expertise, and appreciate the risks of going beyond these.

-EN 16096:2012- Condition survey and report of built cultural heritage. This Standard gives guidelines for a condition survey of built cultural heritage. It states how the condition of the built cultural heritage should be registered, examined, documented and reported on. It encompasses evaluation of the condition of a building or other structure mainly by visual observation, together – when necessary – with simple measurements. The relevant data and documentation on the built cultural heritage should be collected and included in the report. This standard can be applied to all built cultural heritage such as buildings, ruins, bridges and other standing structures. It comprises both protected and other historic buildings in general. Archaeological sites and cultural landscapes are not dealt with in this standard.

This standard does not specify how to carry out a diagnosis of the built cultural heritage. For listed/protected immovable heritage specific national rules for expert documentation and works may apply: This standard may be applied to:

- a) identify maintenance measures and the need for further investigation and diagnostics of damage;
- b) defining procurement needs and the requirement for detailed specification;
- c) providing a unified method to obtain comparative data, when carrying out a condition survey for a group of buildings or a region.

-EN 16085:2012- Methodology for sampling from materials of cultural property-general rules. This standard provides a methodology and criteria for sampling cultural property materials for their scientific investigation. It covers, for example, how to characterize the material(s), assess the condition, determine the deterioration causes and/or mechanism(s) and decide on and/or evaluate the conservation treatment(s). Apart from sampling, this document also provides requirements for documentation, and handling of sample(s). This standard does not deal with the decision making process for taking a sample nor how the sample is to be used. Sampling requires people with manual skill and knowledge of the cultural property.

This is a general standard for sampling of materials constituting cultural property in order to characterize them during all stages of conservation. The sampling procedure depends on the type and condition of the material to be sampled, the specific case under study and the type of investigation chosen. Sampling is invasive and invariably causes damage, however small. It should only be undertaken if there is strong justification for it and in the closest consultation with those having responsibility for the object and those who will be studying the samples. The consultation should consider whether the same information could be obtained by non-invasive methods.

Second topic is regarding **evaluation of methods and products for conservation works**. The work was focused on a general draft

pr En 16581 "Surface protection for porous inorganic materials-laboratory test methods for the evaluation of the performance of water repellent products". This standard specifies the methodology for laboratory evaluation of the performance of water repellent products on porous inorganic materials. It is based on the measurement of several parameters which assess the performance of the product using standard test methods before and after aging.

The main goal of a water repellent is to reduce the penetration of liquid water and soluble substances into porous materials by changing its surface properties through capillary action. A water repellent product when applied to the surface of a material decreases its surface tension and prevents wetting of the surface.

Many deterioration mechanisms result from the presence of water and therefore the reduction of water absorption may positively influence the preservation of porous inorganic materials.

A water repellent should fulfill the following requirements:

- to reduce the absorption of liquid water in the material,
- to minimize change of water vapour permeability,
- to minimize change in colour and gloss of the substrate,
- to produce no harmful by-products after the application,
- to have a good chemical stability.

Water repellent products should be applied on the surface of heritage objects only after they have been tested on representative samples of porous inorganic materials in the laboratory. This standard for the evaluation of water repellent treatments is based on the measurement of appropriate parameters to assess the performance of the product using standardized and reproducible test methods.

In order to evaluate the durability and in service performance of a water repellent product applied on the substrate, aging tests representing the environment in which the porous inorganic material is located must be carried out.

The following six standards applied to porous inorganic materials either untreated or subjected to any treatment or aging have been already published:

-EN 15801:2010 - *Determination of water absorption by capillarity*

-EN 15802:2010 - *Determination of static contact angle*

-EN 15803:2010 - Determination of water vapour permeability (δp)

-EN 15886:2010 - Colour measurement of surfaces

-EN 16302:2013 - Measurement of water absorption by pipe method

-EN 16322:2013 - Determination of drying properties.

-EN 15801:2010. This standard specifies a method for determining the water absorption by capillarity. The water absorption experiment provides information about the material's transport properties for liquid water. The draft is based on the process of water capillary rise to calculate the water absorption coefficient (AC) and to determine the amount of water absorbed (Q_i) at different time. Capillarity measurements are carried out on untreated specimens and repeated after treatments and/or ageing of treated material on the same specimen and measuring the amount of absorbed water at the same time intervals.

-EN 15803: 2010. This standard specifies a method for determining the water vapour permeability (WVP). It measures the amount of water vapour passing through the specimen over time in static conditions. A flux of water vapour through the specimen occurs when the partial pressure of water vapour differs between the two opposite surfaces of the specimen.

-EN 15802:2010. This standard specifies a method for the measurement of the static contact angle of a water drop deposited on the tested surface. The draft is used to assess the degree of water-repellency of a surface. Determination of static contact angle is carried out on untreated specimens and repeated after treatments and/or aging of treated material on the same specimens. The contact angle θ of a liquid on a surface is used to estimate the wetting properties of the material by calculating its solid-liquid-vapour surface tension.

-EN 15886:2010. This standard describes a test method to measure the surface colour of porous inorganic materials, and their possible chromatic changes. No reference to the appearance of glossy surfaces is described. The measurement of the surface colour of a specimen is performed on untreated specimens and repeated after treatments and/or aging of treated material on the same specimens. When the number of readings has been determined, the measuring points for the after treatment colour measurement shall be localized by reference coordinates in order to ensure precise repetition of the measurement. A grid delimiting the measurement field may be useful for this purpose, depending on specimen size.

-EN 16302:2013. This standard specifies a method to measure the amount and rate at which water is absorbed through the test surface that is in contact with water. Measurements are carried out on untreated specimens and the measurements repeated after treatment and/or aging of treated material on the same specimens. The test is performed by measuring the volume of water absorbed through a defined surface under low pressure and within a specified time. This test can be performed in situ or in the laboratory and can be used to measure vertical and horizontal water transport. Penetration of driving rain into wall surfaces results in horizontal transport. Under actual conditions, the rate of rain penetration depends on prevailing wind conditions as well as on the composition and condition of the exposed surfaces.

-EN 16322:2013. This standard specifies a method for the determination of the drying behaviour of porous inorganic materials. The drying properties of materials can be calculated from a curve that indicates the weight loss of the mass of water inside the sample, as a function of time, during a drying experiment. Usually the drying of specimens saturated with water consists of two phases.

The first drying phase is characterized by transport of liquid water to the surface followed by evaporation. The surface remains wet allowing evaporation at a constant rate, as water moves to the surface fast enough to compensate for the losses due to evaporation. The evaporation at the surface is determined to a large extent by the test boundary conditions. These are temperature, relative humidity and the flow velocity of the ambient air. The slope of the drying curve during the first drying phase therefore reflects these conditions. The second drying phase starts when the amount of water brought to the surface becomes too small to keep the surface wetted and the rate of evaporation decreases. Transport of liquid water to the surface is no longer possible and only the less efficient vapour diffusion mechanism remains available.

Some materials, e.g. adobe or sandstones containing clay, do not dry in this typical two-phase drying curve. For example, in the case of material treated with water repellent, the first drying phase does not exist.

Third topic is regarding Indoor/outdoor climate-Specifications and measurement. The purpose of the work was to develop standards and recommendations relating specifically to the climate and its influence on the preservation of heritage. Standards developed will assist professionals involved in environmental diagnostics and in the investigation and control of the climate for preventive conservation and maintenance. The assistance includes the choice of methodologies and instruments and the interpretation of results.

The following six standards, intended for use in the study of environments for cultural property, have been already published:

EN 15757:2010. Specifications for temperature and relative humidity to limit climate-induced mechanical damage in organic hygroscopic materials. This standard is a guide to specifying the control of temperature and relative humidity levels to limit climate-induced physical damage of organic hygroscopic materials, in indoor environments of museums, galleries, storage areas, archives, libraries, churches and modern or historic buildings. This class of objects comprises wooden items and structural elements such as floors, doors, panelling and roof timbers, paintings, books, organs, textiles, objects made of bone, ivory or leather. Objects can consist of several hygroscopic materials and different kinds of materials can share one space. They are vulnerable to changes and fluctuations in ambient RH that produce changes in equilibrium moisture content (EMC) in the materials as they absorb and release moisture to adapt to the continually changing environmental conditions. The variations in EMC produce dimensional changes of the materials which may lead to high levels of stress and physical damage as fracture and deformation. Given the extreme complexity of the response of materials constituting cultural properties to variations of temperature and RH, this standard proposes a methodology for arriving at general specifications to limit climate-induced physical damage of organic hygroscopic materials.

-EN 15758:2010. Procedures and instruments for measuring temperatures of the air and the surfaces of objects. This guidance recommends the procedures for measuring temperatures of the air and the surfaces of cultural property in indoor and outdoor environments as well as specifies the minimum characteristics of instruments for such measurements. The document contains recommendations for accurate measurements which ensure at the same time the safety of objects and is addressed to any people in charge of environmental diagnostic, conservation, restoration or maintenance of buildings, collections, or single objects. The temperature of the air and the temperature of the object surfaces constitute important aspects of that environment. Temperature can have a profound effect on the preservation of objects. Physical characteristics of materials

change as they absorb or release heat. Objects expand and contract as the temperature changes, become rigid and brittle if the temperature falls below the glass transition temperature, or are mechanically damaged by the melting and freezing of water in the outdoor environment. The rates of some important chemical reactions, such as the degradation of cellulose (paper, textiles) increase with rising temperature. Temperature influences the activity of fungi and insects responsible for the bio deterioration of organic materials. Temperature may affect some minerals and masonry crystallization. Temperature has also an important indirect effect: a rise in temperature causes lowering of the relative humidity, which results in drying moisture absorbing materials like wood, paper or leather. Such drying may lead to shrinkage and embrittlement.

-EN 15759-1:2012. Indoor climate – Part 1: Guidelines for heating churches, chapels and other places of worship. *The objective of this draft is to provide guidelines for the selection of heating strategies and heating systems in churches, chapels and other places of worship such as mosques and synagogues, in order to prevent damage to cultural property while at the same time creating an indoor climate that allows for a sustainable use of these buildings. It applies to most kinds of places of worship regardless of size and construction. This standard applies not only to the introduction of new heating systems but also to the replacement of old ones.*

This standard applies to buildings that are part of cultural heritage or that house cultural heritage objects. The standard deals with indoor climate conditions, heating strategies and technical solutions for their implementation but not with the technical equipment itself. Churches, chapels and other places of worship such as mosques and synagogues (referred collectively in the text of this standard as “places of worship”) are an important part of the European cultural heritage. The buildings and their interiors, containing cultural heritage objects, are documents of our heritage that society agrees need to be preserved for present and future generations. The indoor climate is a critical factor in conserving the fabric of buildings and the objects they house. An inappropriate indoor climate may result in material damage.

This standard is motivated by the need to reflect the special characteristics of places of worship, conditions which are not addressed in standards for the heating of other kinds of buildings. The defining characteristics of these buildings are their construction (often early building techniques); the fact that they were not designed as living or working spaces; their intermittent use; and the vulnerability of their surface decoration and contents.

-EN 16242:2012- Procedures and instruments for measuring humidity in the air and moisture exchanges between air and cultural property. *This standard gives guidance and specifies procedures and instruments for the measurement of relative humidity (RH) in air in outdoor or indoor environments. It indicates how RH can be directly measured or how it can be calculated from air temperature, wet-bulb temperature and dew-point temperature. This standard contains recommendations for accurate measurements of ambient conditions and moisture exchanges between air and cultural heritage objects. It is addressed to anyone in charge of environmental diagnosis, conservation or maintenance of buildings, collections or single objects.*

Humidity plays a key role in the conservation of cultural heritage because most materials and/or deterioration mechanisms are directly or indirectly affected by humidity levels or changes. This standard is a guide intended to assist in providing an acceptable environment to cultural heritage objects. Humidity in air, expressed in a number of ways, is an important aspect of that environment.

Therefore, the control of levels and variability of humidity reduces the risk of deterioration and is an important preventive measure, minimizing the need for future conservation interventions.

-EN 16141:2013- Guidelines for management of environmental conditions-Open storage facilities: definitions and characteristics of collection centers dedicated to the preservation and management of cultural heritage. *This standard defines the characteristics of specific areas dedicated to the preservation, storage, management of, and access to collections. It lists the considerations that should be taken into account to achieve optimum storage and accessibility. The importance of preserving and transmitting cultural heritage under the best conditions is imperative for all, but first and foremost for cultural heritage institutions. They have the responsibility of preserving, presenting and developing spaces dedicated to the public or reserved for the collections. Stored collections have traditionally been inaccessible to the public but increasingly there is an expectation that collections should be accessible even when not on display, either for the general viewing public or for controlled research and collection management activities. To meet this demand, dedicated facilities are being constructed that allow access and research. These "Open Storage Facilities" or "Collection Centers" place new demands on cultural heritage institutions and this guidance document is intended to assist institutions by describing common best practice in the design and function of such facilities.*

-TS-16163:2013-Guidelines and procedures for choosing appropriate lighting for indoor exhibitions. *This Technical Specification defines the procedures as well as the means to implement adequate lighting, with regard to the conservation policy. It takes visual, exhibition and conservation aspects into account and it also discusses the implications of the lighting design on the safeguarding of cultural property. This Technical Specification gives recommendations on values of minimum and maximum illumination levels. It aims to provide a tool for setting up a common European policy and a guide to help curators, conservators and project managers to assess the correct lighting that can assure the safeguarding of the exhibits. This Technical Specification covers lighting for heritage objects on exhibition in both public and private sites and does not consider lighting in other cultural heritage contexts such as open-air collections, etc.*

Lighting is needed for many specific functions in museums and other cultural heritage buildings, for example, for research, conservation and permanent or temporary exhibitions. Enough light is needed to see well but this may present a challenge when what is being viewed will deteriorate in the presence of light. Where cultural heritage is judged to be worth preserving for future generations the controlled use of light has to be considered. Indeed, light is an environmental factor, which is a threat to many objects. Alone or in combination with other environmental factors (temperature, humidity, pollution, etc.) light causes fading, discoloration and embrittlement of a wide range of materials. This damage is cumulative and irreversible: no conservation treatment can restore change of colour or loss in strength of materials damaged by light. Therefore, the challenge of museum exhibition lighting is to find an appropriate compromise between the long term preservation of the exhibit and the needs of visitors to view them within a suitable exhibition design.

Regarding the work of WG5 which has the role to prepare standards on methods of transportation and packing of cultural heritage outside institutions especially for exhibitions the following standard was delivered.

EN 15946:2011 - Packing principles for transport. *This standard specifies the packing process for objects considered by the owner/custodian as ready to be moved. This standard provides*

recommendations (the word should is used) and lists requirements (the word shall is used) for safe and secure packing of cultural property for transport. It is intended for individuals or organizations involved in the preservation of cultural property in order to reduce the risk of damage.

The standard proposes a common terminology and procedures for packing. The appropriate range of knowledge, skills and competencies is required by every party involved with packing cultural property for transport.

Seven relevant documents are at a final stage and will be published in 2014:

-prEN 16581:2014-Surface protection for porous inorganic materials-Laboratory test methods for the evaluation of the performance of water repellent products.

-pr En 16572:2014-Glossary of technical terms concerning mortars for masonry, renders and plasters used in cultural heritage.

-pr En 16455:2014-Determination of soluble salts in natural stone and related materials used in cultural heritage.

-pr En 16515:2014-Guidelines to characterize natural stone used in cultural heritage.

-pr En 15999-1:2014- Guidelines for management of environmental conditions-Recommendations for showcases used for exhibition and preservation of cultural heritage-Part I General requirements.

-pr En 16682:2014-Guide to the measurements of moisture content in materials constituting movable and immovable cultural heritage.

-pr En 16648:2014-Conservation of cultural heritage-Transport methods

8. Objectives of CEN TC 346 as revised in the new Business Plan approved in Venice in 2012

The work programme in force since 2004 was a matrix-based approach which has a theoretical approach perfect in establishing the most urgent standards. However, this method does not include the "feasibility". The Matrix can fail whenever no interested volunteers having the required experience are found; as opposed, it is successful whenever it optimized existing technical and human resources. In the new Business Plan it was decided to change the title from **Cultural Property** into Cultural **Heritage** and to prepare standards on a need-based approach. It was also specified the scope as following:

"standards will be established in the fields of the processes, practices, methodologies and documentation of conservation of tangible cultural heritage to support its preservation, protection, and maintenance and to enhance its significance. This includes standardization on the characterization of deterioration processes and environmental conditions for cultural heritage, and the products and technologies used for the planning and execution of its conservation, restoration, repair and maintenance."

Moreover some general principles were introduced:

"The relevance of the proposals to the work of CEN/TC 346, considering the problems or difficulties that are intended to be solved, the impacts and benefits of the standards and the urgency of their development.

- The availability of the necessary resources, i.e.: technical resources (the subject is sufficiently developed in Europe); human resources (specific experts are available) and funding (necessary funding to be invested by the interested parties).

- The appropriate Working Groups exist or can be created, in order that each standard is developed by the appropriate specialists.

In order to prevent any overlapping with other TC or ISO committee particular attention will be paid to existing European standards or draft standards being prepared by other CEN/TCs or ISO/TCs. In these cases, the proposers are required to:

"a) State how the proposed work may relate to or impact on existing work, especially CEN deliverables;

b) List relevant existing documents;

c) Explain how the work differs from apparently similar work"

In accordance with the objective of the revised BP the working structure in five WGs established in 2004 is changed as reported in fig. 2 to cover the objectives 2012-2015 described in the new BP.

9. Cooperation with European and International organizations

CEN/TC 346 is open to liaisons with any other European and International cultural and professional organizations dedicated to the conservation of cultural heritage that may provide a positive contribution to standardization activity.

Many International organizations have asked to establish liaison to contribute to the standardization process offering their expertise.

In 2007 a liaison with ICOM-CC, International Council of Museums Conservation Committee, was established. ICOM was created in 1946 and is a non-governmental organization (NGO) maintaining formal relations with UNESCO and having a consultative status with the United Nations' Economic and Social Council. ICOM has 116 National Committees and 30 International Committees. ICOMCC, created in 1968, is the largest of the International Committees with almost 1600 members worldwide. ICOM with over 22,000 members is the international organization of museums and museum professionals committed to the conservation, continuation and communication to society of the world's natural and cultural heritage. Through collaboration with CEN/TC 346, ICOM offers his expertise in the full range of museum-related cultural heritage conservation activities and hopes to benefit from the important work on standardization that CEN is doing. Main goal would be to help disseminate the results of the CEN/TC 346 to its international membership. In 2008 a liaison with IIC, International Institute for Conservation, was established. Since 1950 IIC has promoted the knowledge, methods and working standards needed to protect and preserve historic and artistic works throughout the world. IIC members belong to an international community of professionals who aim to provide the highest possible level of care for the world's cultural heritage. IIC serves as a forum for communication among professionals with responsibility for the preservation of cultural heritage. It promotes professional excellence and public awareness through its awards and scholarships. IIC is an independent international organization supported by around 2300 individuals and 440 institutional members in 65 countries. The council of IIC has decided on collaboration with the CEN TC 346 project, since it fits well with its interest in setting standards in conservation. Liaison status will ensure that, via his representative, to be kept fully

informed on progress with this important work, and that it can keep his members fully informed. It looks forward to promoting the approved standards to his membership and beyond.

In 2009 a liaison with E.C.C.O., European Confederation of Conservator-Restorers Organizations, was established. ECCO has been established in 1991 seeking to develop and promote, on a practical, scientific and cultural level, the profession of Conservator-Restorer of Cultural Property, representing, through their professional associations, more than 5.000 members throughout Europe from 16 countries within the European Union (EU) and the European Free Trade Association (EFTA). E.C.C.O.'s main objectives is to guarantee the safeguarding of cultural heritage through the promotion of a high level of training for the Conservator-Restorer and the work toward legal recognition of professional status. In relation with all these activities the Committee of E.C.C.O. has decided to seek collaboration with the CEN/TC 346 project, since it fits well with its interest in setting standards in conservation. In the same year one more liaison was established with UIA-The International Union of Architects which was founded in Lausanne (Switzerland) on 28th June 1948, to unite the architects of the world without regard to nationality, race, religion, or architectural doctrine, and to federate their national organizations. From the 27 delegations present at the founding assembly, the UIA has grown to encompass the key professional organizations of architects in 124 countries and territories, and now represents, through these organizations, more than 1,300,000 architects worldwide. Over time, the UIA has become an accomplished non-governmental organization, an incomparable professional network of architects that reaches all continents.

In 2010 a liaison with ICOMOS -The International Council on Monuments and Sites was established. ICOMOS was founded in 1965 at Warsaw (Poland) one year after the signature of the International Charter on the Conservation and restoration of monuments and sites, known as the "Venice Charter". ICOMOS is an association of over 10,000 cultural heritage professionals present in over 100 countries throughout the world, working for the conservation and protection of monuments and sites-the only global non-government organization of its kind. It benefits from the cross-disciplinary exchange of its members-architects, archaeologists, art historian, engineers, historians, planners, who foster improved heritage conservation standards and techniques for all forms of cultural properties; buildings, historic towns, cultural landscapes. Archaeological sites, etc. ICOMOS is officially recognized as an advisory body to UNESCO, actively contributing to the World Heritage Committee and taking part of the implementation of the World heritage Convention. It also runs 28 specialized International Scientific Committees on a variety of subjects.

In 2010 one more liaison was established with IFLA-International Federation of Library Associations and Institutions - Preservation and Conservation Section" IFLA was founded in 1927 has set up 48 sections of which one established in 1984 dealing with Preservation and Conservation of library collections. The IFLA Section for Preservation and Conservation consists of a standing committee with 20 members elected for four years, with an option to sit for another four-year period. The members come from many different countries from all over the world. IFLA considers that a liaison status in the CEN TC 346 "Conservation of Cultural Property" would give the opportunity to more closely follow the work done in the development of standards for the protection of cultural property and would be able to follow CEN TC 346 results and further disseminate them through IFLA yearly meetings and conferences.

A close co-operation was established with COST actions. COST is for European Cooperation in Science and technology. The following two COST actions respectively for environment and wood per-standardisations were involved:

-COST D D42 Chemical interactions between Cultural Artifacts and Indoor Environment (EnviArt) 2006-2010.

-COST IE0601 - Wood Science for Conservation of Cultural Heritage (WoodCultHer), 2008-2012.

10. Crucial points influencing the current and future development

One of the major risks in the development of standardization activity in the field of conservation of cultural heritage is the problem of finding funding and planning budgets to finance the activity of the relevant experts involved in the work. Most of the experts involved in the conservation field work for SMEs or small specialist departments in academic institutions / quasi-government agencies where securing funding for new projects is difficult and always needs to be agreed and budgeted well in advance. The fact that resources are limited across Europe makes it essential that there is prioritization of Work Items and standards to insure the more important ones are completed. According to a "Matrix-based method" the most urgent standards can be established, but if no interested volunteers having the required experience were found the matrix failed; as opposed, it was successful whenever it optimized existing technical and human resources.

A second possibility is the "Market-based method" which should work if the market will take in charge the working and traveling costs. However, if the "market" gains from standardization but does not pay for it, it is deprived of any link with the standardization activity. If experts work in the absence of any financial support they have no any reason to follow the market. In Europe some Countries might have resources to support standardization activity and in such a case the National Standards Body can impose priorities. In the case experts are neither paid for their activity nor reimbursed for their traveling expenses, a crucial factor is to find volunteers that are expert in the selected topics.

A third possibility is "feasibility, i.e. a compromise between requests (i.e. Matrix) and potentials" or "exploitation and optimization of the existing capabilities" in terms of technical and human resources, i.e. number and type of experts.

Although at the European level there is a great interest in this kind of activity, there is often a lack of contact between the experts and the National Standards Bodies. In particular, in some cases there is no specific national active mirror committee or group which can deal with the work of standardization on conservation of cultural heritage. It is important to consult as widely as possible through National Mirror Groups, who should discuss how to contact the relevant people; e.g. through their professional national bodies, register of experts.

In conclusion analyzing the different situation in each European country we find that only few governmental institutions allocated financial resources to support standardization and what we need is the financial support of national governmental institutions.

CEN TC 346 Conservation of cultural heritage

WG1-General guidelines and terminology with the responsibility for the drafting of standards on terminology dealing with movable and immovable cultural heritage and guidelines on conservation planning

WG2-Materials constituting cultural property with the responsibility to define tests and analyses methods for the characterization of the materials and for the evaluation of the state of conservation/preservation of materials

WG3-Evaluation of methods and products for conservation works with the responsibility of drafting documents on criteria to select methods and/or products and working conditions in relation to the conservation/restoration, maintenance and preventive conservation work

WG 4 – Environment with the responsibility for the drafting of guidelines for the control of environmental variables, and of standards on the measurement of indoor and outdoor environmental conditions, and on cultural property environment interaction

WG 5 – Transportation and packing method with the responsibility for the drafting of standards on methods of packing and transportation of cultural heritage outside the institutions

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CEN TC 346 Conservation of cultural heritage

WG1-General methodologies and terminology (Italy – Mr. Appolonia)

WG2-Characterisation and analysis of porous inorganic materials constituting cultural property (from Greece to United Kingdom: Mr. Yates)

WG 3 – Evaluation of methods and products for conservation works on porous inorganic materials constituting cultural heritage (Italy – Mr. Fassina)

WG4-Protection of collections (Denmark–Mr. Stub Johnsen)

WG5- Packing and transport (France – Ms. De Wallens)

WG6- Exhibition lighting of cultural heritage-JWG between TC 346 &TC 169 (Italy – Mr. Camuffo)

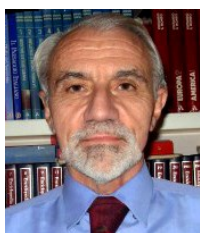
WG7- Specifying and measuring Indoor/outdoor climate (Italy-Mr. Camuffo)

WG8- Energy efficiency of historic buildings (Norway-Mrs. Boro)

WG9- Waterlogged wood (Italy-Mr. Fioravanti)

WG 10-Historic timber structures (Italy-Mr. Macchioni)

WG11-Conservation process (Germany-Mr. Goetz) Scope: description of the successive steps of the conservation of cultural heritage, taking into account the variety of cultural heritage and situations and the terminology in EN 15898:2011



Vasco Fassina

vasco.fassina@gmail.com

Ministry of Italian Cultural Heritage-Superintendence of Fine Arts of Veneto-Venice-Chairman CEN/TC346-Conservation of Cultural Heritage

From 1975 to 2012 he served the Italian Ministry of Cultural Heritage for 25 years as Director of the Scientific Laboratory of Venice Superintendence and successively for 12 years he had the responsibility for the Veneto Superintendence to co-ordinate and promote interdisciplinary investigation projects at worksites and to develop new treatment proposals. The activity was mainly dealing with conservation of building stone and wall paintings materials.

He was involved for 25 years in International Training Programme for conservation of cultural heritage as teacher, coordinator and director of the biennial International Stone Conservation Course of UNESCO-ICCROM held in Venice.

Teaching activities at International level as Visiting Professor: in the Sino-Italy cooperation Project "Training in the Restoration and Conservation of the Chinese Cultural Heritage" through the support of the Chinese Institute of Cultural Property (CNICP) of Beijing, in 2004 and 2007, in the International Course of University School of Monument Conservation in Rhodos, Crete, Ravello, for the Faculty of Architecture in Rosario (Argentina) and Salvador de Bahia (Brazil).

In 2004 he was appointed Chairman of CEN/TC 346 The European Committee for the standardization in the field of Conservation of Cultural Heritage. In 2007-2008 he was appointed by the General Direction for Cooperation and Development of the Italian Foreign Affairs Ministry to evaluate the feasibility study for the establishment of Longmen Stone Relics Conservation Center and of Dazu Stone Monuments Conservation Center respectively located in the Middle and in the South West of China.

For four years (2008-2012) was appointed as Chair of the Scientific Committee of the 12th International Congress on Deterioration and Conservation of Stone, held in New York the last October 2012.

For four years (2006-2010) was appointed as Chair of WG3 Guidelines on harmonization and standardization in COST (European Cooperation in Science and Technology) D42 *Chemical Interactions between artifacts and indoor environment*.

In 2012 he has been appointed as Chairman of the national standardization commission for Cultural Heritage.

Actually is teaching *chemistry applied to conservation and diagnostics techniques for investigation and conservation* at Italian Universities and Academy of Fine Arts in Milano, Bologna, Napoli, Verona.

Artículo enviado el 23/10/2013