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# European Standards for Archaeological Wood – theoretical background, purpose, and application.

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**Abstract.** The successful management of archaeological wood finds from waterlogged sites starts in the planning phase of any excavation. From the moment of exposure, waterlogged wood finds are extremely vulnerable to a range of man-made and natural threats. There is a real risk of losing the artefact if it is not handled and conserved properly. This paper describes the process leading to the creation of CEN TC346 Standards for waterlogged wood, and how they will be applied within archaeological excavations and conservation. These, it is confidently expected, will provide European archaeologists, conservators and archaeological curators clear guidelines and decision-making tools for effectively managing finds of wood from waterlogged sites.

## Introduction

Anyone experienced with working with waterlogged organic archaeological materials will appreciate their great potential as sources information, but also their extreme vulnerability - as compared with most other freshly excavated materials. Various sources of information and guidance exist to advise archaeologists and others on how to manage finds of wood on archaeological sites, but they tend to lack consistency and authority. The concept of applying internationally recognised standards within the heritage conservation field is quite new and archaeological fieldwork, although now often closely associated with commercial site development and construction, is not yet regulated by EU standards. So, to have standards within the field of archaeological conservation is a very novel, even ground-breaking concept.



## Background to European standards and CEN

Founded in 1961, and with its HQ in Brussels, CEN (*Comité Européen de Normalisation* in French) is one of the three European Standardization Organizations (together with CENELEC and ETSI) that have been officially recognized by the European Union and by the European Free Trade Association (EFTA) as being responsible for developing and defining voluntary standards across the European Union.

CEN is composed of the standards organisations of the 28 EU member countries, and four associated states. The primary functions of these national bodies are to promote and maintain standards across most areas of industry, production, commerce, and the service industries, including:

- Building & Civil Engineering
- Health & Environment
- Materials & Chemicals
- Electrochemical
- Management systems
- Consumer products & services
- Information management
- Risk

By providing a platform for the development and harmonising of standards, CEN sees its overarching role as encouraging and supporting economic growth within Europe by removing trade barriers to the ultimate benefit and welfare of European citizens and the environment.

The national bodies are also responsible for compliance in the application of these standards, and offer the all-important training in quality assurance, certification and verification in these areas. Each European Standard (EN) introduced by CEN becomes a national standard, translated into the national language, although the 'official' languages of CEN are English, German and French.

CEN is organised in Technical Committees (TC) according to specific standard domains. The work of each TC is organised in working groups (WG). Once a draft of each standard is finished to the satisfaction of the Working Group members, it is submitted to CEN, who will send it out to each national standards body for comment by their 'mirror group'. These are groups of specialists within each country, competent to make comments and, finally, vote on accepting the standard or not. When comments have been received back from each country's mirror group, the Working Group will either incorporate suggested changes in the draft standard, or give reasons why the comment has not been acted on. Each national mirror group will then vote on whether to accept the standard, CEN Council acting as the final arbiter before acceptance. To the whole process is allocated a maximum time of four years.

### Technical Committee (TC) 346 - what does it do?

Conservation Science is a very recent field which has only really developed in the last five decades and the international scientific community is nowadays much larger than it used to be even twenty ago. As a result, it is now widely accepted that the protection and conservation of our cultural property cannot be successful without science and research. In 2001 UNI, the Italian standardization body, presented a request to CEN to create a new TC (Technical Committee) to deal with the conservation of cultural property. The scope of CEN/TC 346 is the standardization in the field of definitions and terminology, methods of testing and analysis, to support the characterisation 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.

The TC 346 standards are intended to provide a benchmark for how work should be carried out, which is significantly missing in the Conservation field which is, at present, mainly unregulated. So, the lack of uniformity of processes, materials, regimes, protocols, planning and management can all put heritage at risk. The shared vocabularies, terminology and glossaries, plus the standard published references on which each standard is based, will tend to give uniformity across the sector and foster the idea of 'best practise'. This will not only improve the quality of our work, but create trust across borders and between professions. Standards are voluntary, and are intended to give the tools to do a good job, with confidence. They are not prescriptive in terms of taking away professional judgement,

nor are they legally enforceable, but could be applied within, say, a contractual dispute. They tie in comfortably with the regulations and guidelines of professional conservation organisations such as ICON/PACR (UK) and ECCO (Europe). At a purely practical level, standards allow the production of project briefs to be expressed in a clear and unambiguous way so that contractors may tender for a job in the confidence and certainty that the client knows exactly what is required and how it should be achieved.

### **Working Group ‘Archaeological Wood’.**

The idea of starting activities in the field of standardization applied to preservation of Wooden Cultural Heritage, has been originated in the framework of a COST action. COST– European Cooperation in Science and Technology – is the longest-running European framework supporting transnational cooperation among researchers, engineers and scholars across Europe. COST Action IE0601, was concerned with “Wood Science for Conservation of Cultural Heritage”, with the tag ‘WoodCultHer’. A meeting of IE0601 held in Copenhagen in 2011 focused on the potential need for standards in waterlogged wood. During the meeting proposals for two standards were developed and submitted by the group of COST experts for approval by CEN TC346 council. The TC, during Venice general meeting in 2012, decided to adopt a new WG on ‘Waterlogged Wood’.

The individuals making up the working group “Archaeological wood” (WG9) of TC 346 were nominated by their national standards bodies to represent their countries as national ‘experts’. The work is undertaken entirely voluntarily, group members being supported either by their employing institutions or their national standards bodies.

### **Waterlogged Wood Standards – purpose, structure and content**

Artefacts and archeobotanical finds bear witness to past societies and cultures, and have an archaeological value and significance for which they are either preserved by record or through conservation treatment, to form part of a permanent archive for research and dissemination. Many different types of terrestrial waterlogged environments are likely to contain archaeological wood. Most usually encountered are bogs and wetlands, palæo river channels, urban waterlogged deposits, and ‘dry’ occupation sites containing pits and wells that penetrate beneath the water table and contain waterlogged organic artefacts.

The types of find encountered on such sites can vary between individual small artefacts to large complex structures such as prehistoric track ways or platforms built of a large number of wood elements, logboats and ship remains, building foundations, domestic assemblages and manufacturing waste.

From the moment of exposure, waterlogged wood finds are extremely vulnerable to a range of man-made and natural threats. There is a real risk of losing the artefact if it is not handled and conserved properly. To minimize these threats and prevent damage, several actions must be taken in the field which must include proper management of the site and handling of the finds. These activities should be carried out by professionals, specifically qualified in the management and handling of waterlogged archaeological wood.

Aim of the standards on waterlogged wood is to provide a management tool which sets out methodically what has to be done to provide a good outcome, but not go into the detail of exactly how each action is achieved. So the knowledge, experience and skill of the individual archaeologist, conservator or other specialist is not circumscribed but, in fact, enabled by the knowledge that work carried out by others on the same project, is done in the best possible way.

### **EN 16873 Guidelines for the Management of Waterlogged Wood on Archaeological Terrestrial Sites.**

The standard provides guidelines for safeguarding waterlogged wood on terrestrial sites of archaeological or historical significance. It deals with the protection of finds from the time of exposure during and after excavation, until they reach the conservation laboratory. The standard cannot be applied to the management of controlled reburial, in-situ preservation, long term post excavation storage or excavations under water.

The standard is arranged in logical sections, starting with pre-excavation planning through exposure, cleaning and recording of wood finds, on to on-site protection, lifting and short-term storage, ending up with packaging and transport.

For each of the above-mentioned steps the standard gives some detailed indication which main elements can be summarised as follows.

The management and protection on site during excavation on land sites the finds are kept constantly wet and protected against the damaging effects of climate, especially the drying effects of sunlight and wind. Precautions should also be taken against accidental physical damage. Finds must be kept wet and covered overnight, and for all other periods when the site is not being worked on. Exposure of waterlogged finds for recording or viewing should be kept to a minimum.

Also the removal of artefacts from the ground requires planning and preparation, and the number of moves must be kept to a minimum. As the wood surface is the most degraded part of the artefact it needs to be protected and kept wet during lifting and moving. In order to select the appropriate lifting technique, the physical condition and mechanical strength of the wood has to be assessed using a non-destructive technique. When the structural integrity of an artefact is in danger it should be block lifted.

Temporary storage on site after lifting should be for as short a time as possible regardless of size and type of the finds. Exposure to light, high temperature and open air are destructive to degraded wood, therefore the finds must be submerged in water-filled containers or at least wrapped in watertight packaging, kept completely wet and stored in a cool, dark place. Even if wrapped in watertight packaging, finds should, where possible, be submerged in containers. Finds submerged in containers, must be kept as cool as possible to avoid fungal and bacterial activity (4 to 8°C is recommended) but not frozen. The water level and cleanliness must be checked as often as possible, and storage containers kept covered to minimise evaporation, light exposure and contamination.

Long term post excavation storage time should be kept to a minimum as longer-term storage (months) has special and complex requirements not covered by this standard. However stored, finds must be monitored to ensure that they remain wet and physically protected.

### **PWI 00346052 - Characterisation Of Waterlogged Archaeological Wood As A Management Tool**

Even if waterlogged archaeological wood appears intact or in good condition it could be in an extremely unstable state. Uncontrolled drying, even short time exposure to the air, will cause irreversible shrinkage and collapses of the wood structure destroying the integrity of the object.

In waterlogged environments the microbial activity determines in wood a degradation that starts from the surface of the object and proceeds towards the interior. It affects the structural properties of the material (strength, hardness and density), its porosity and the proportion between the constitutive components of wood cell.

The application of a preservation strategy will only be successful once the full knowledge of the material to be preserved has been obtained. Characterisation of the physical, chemical, biological properties and the microbiological decay of the wood are essential element of this, in order to properly manage the finds in the site and to define the types of choices for further action regarding in-situ, reburial, conservation or preservation by record.

The goal of characterizing waterlogged archaeological wood is to support both the assessment of the archaeological value of the find(s) and the development of a preservation strategy. The type of characteristics to be determined shall be dictated by the archaeological significance of the find and by the state of preservation of the wood.

The characterisation strategy should be developed in accordance with the site environment (underwater, terrestrial), archaeological context and value, sampling policies, type and size of finds and available time and resources. A team of relevant specialists should be involved as early as possible in order to establish characterisation strategies, sampling and analysis.

In characterization sampling represents a critical issue. The sampling strategy shall be agreed on and coordinated between the stakeholders and decision makers. In cases when sampling is not possible, an alternative strategy for characterisation shall be developed.

Regardless of sampling possibilities, characterisation might take place in situ, directly on the find and without removing it from its context or ex situ, in the field, or in a laboratory after the removal or sampling of the finds. Characterisation can be invasive or not invasive, depending on the applied techniques. In any case the selected strategy must ensure that the results are indicative to/ represent the condition of the whole find.

This standard, still in preparation, will then proceed with a logical arrangement of analytical techniques, and guidance on how the various types of characterization can be achieved and applied. In fig.1 a conceptual flow chart shows the different aims and the different features that can be necessary to achieve according to characterization objectives.

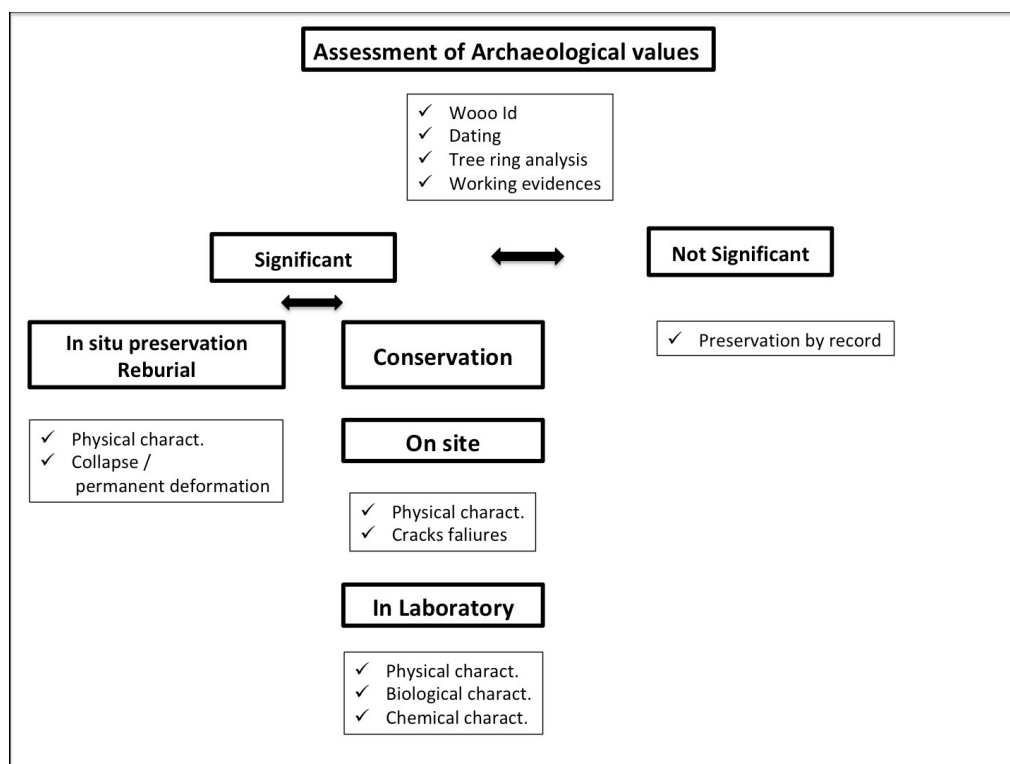


Fig.1 Flow chart of characterization process in waterlogged archaeological wood

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