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Conservation of cultural heritage — Guidelines for the management of waterlogged wood on archaeological terrestrial sites

bsi.

National foreword

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Erhaltung des kulturellen Erbes - Leitlinien für die Handhabung von Nassholz an terrestrischen archäologischen Stätten

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European foreword

This document (EN 16873:2016) has been prepared by Technical Committee CEN/TC 346 "Conservation of Cultural Heritage", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

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Introduction

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. To minimize these threats and prevent damage, several actions shall be taken in the field which shall 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.

1 Scope

This European standard provides guidelines for safeguarding waterlogged wood on terrestrial sites of archaeological or historical significance. It deals with the protection of archaeological and historical waterlogged wood, from the time of exposure during and after excavation, until it reaches 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. Composite artefacts, and other waterlogged materials are specifically excluded from this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
deposition archive
formal handing over of the entire excavation record, including the conserved artefacts, to a museum or other receiving institution

3.2
block-lifting
removal of a fragile find by lifting from the ground with surrounding burial matrix, with or without extra support, limiting the risk of damage

3.3
burial matrix
soil, peat, sediment or other medium found in direct contact with an artefact

3.4
cleaning
removal of unwanted material from an object

Note 1 to entry the criteria for something being “unwanted” always have to be stated, e.g. potentially damaging, obscuring detail, un-aesthetic

[SOURCE: EN 15898:2011, definition 3.5.3]

3.5
condition
physical state of an object at a particular time

[SOURCE: EN 15898:2011, definition 3.2.1, modified, Note 1 to entry deleted]

3.6
conservation
active remedial treatment of waterlogged wooden finds designed to prevent further deterioration or degradation and bring them into a stabilized condition for research, archiving or museum display

3.7
controlled reburial
systematic redeposition of finds at the original excavation site or another appropriate location for the purposes of their long term preservation

3.8
cushioning
provision of soft but stable packing or padding material beneath and around fragile artefacts to provide protection, support and shock absorption, so as to mitigate the risk of damage during lifting, handling and moving

3.9
degradation
result of the process of wood deterioration through physical, chemical and biological factors

3.10
discarding
disposal of wood material through the considered application of a selection and retention policy

3.11
in-situ preservation
maintaining finds in their original context whilst monitoring and controlling factors influencing degradation in the burial matrix

3.12
labelling
process of fastening a label or tag carrying a unique identification number or code onto the artefact and/or its packaging

3.13
lifting
removal of an artefact from its buried position in the ground

Note 1 to entry: Lifting techniques aim to support and protect the wood surface and overall structure.

3.14
maintenance
periodic preventive conservation actions aimed at sustaining an object in an appropriate condition to retain its significance

[SOURCE: EN 15898:2011, definition 3.4.1, modified, examples deleted]

3.15
post excavation storage
long term maintenance off-site before commencement of further recording, analysis and conservation treatment

3.16
preservation by record
data generated from a process of documentation will become the only evidence of a find after it has been discarded

3.17
recording
systematic documentation of the artefact's original position, context, dimensions, appearance, structure and other features, using a range of techniques

3.18
revealing
removal of burial matrix covering the find or artefact during excavation

3.19
sampling
process of removing a sample

[SOURCE: EN 16085:2012, definition 3.3]

3.20
temporary storage
maintenance of finds on site after excavation until transport or other decisions relating the future of the finds are made

3.21
waterlogged site
wet or water saturated burial environment

3.22
waterlogged wood
wood whose internal structure has been completely filled with water through long term burial in a water saturated environment

3.23
wood conversion
evidence for wood processing and wood working

4 Guidelines for management of waterlogged archaeological wood

4.1 Introduction

Waterlogged wood remains, bearing signs of human working, are usually referred to as artefacts. Unworked archeobotanical wood finds may also be part of the assemblage recovered. 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. The state of degradation of wood is variable and the visual appearance and integrity of the wood is often misleading.

All activities should be carried out by personnel trained and experienced in the management and handling of waterlogged archaeological wood.

4.2 Pre excavation project planning

When a desk-top or field survey indicates waterlogging on the site of a proposed excavation, it should be assumed that finds of archaeological wood are likely. Such excavations shall be planned to include the extra resources that the discovery of waterlogged wood will demand. Specialist competencies will be required such as wood recording, analysis and dating, and experience in techniques for recovery, and conservation. The Project Design and programme of work shall be developed by specialists in the relevant disciplines, including archaeologists, conservators, and stakeholders. A time frame for the project stages should be established.

In the planning process the following issues shall be addressed and outcomes documented:

1) the 'selection and retention' strategy for the wooden finds after recovery (e.g. *in situ* preservation, controlled reburial, discarding or conservation) and final archive deposition;

2) an assessment of the condition of the wood considering the large variability in wood degradation;

3) length of time finds are to remain on-site before being transported to the conservation facility;

4) facilities, equipment and materials required for wood recovery and processing on site;

5) strategies for dealing with unexpected volumes in terms of quantity and size of finds;

6) identification of institutions and laboratories with the necessary facilities, skills and competencies to provide input on-site and post-excavation;

7) arrangements for research, publication and display of the finds, including public outreach;

8) identification of necessary finances, and of potential sources for emergency funding;

9) health and Safety issues shall be considered.

4.3 Management and protection on site during excavation

4.3.1 General

It is essential that 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 shall 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.

4.3.2 Revealing

Revealing a find on site should be carried out by qualified personnel. The use of metal trowels and other tools with sharp edges cause damage to finds and their use shall be kept to a minimum. Special care shall be taken while uncovering the outer degraded layers, including preserved bark, which may need special protection. Heavily degraded and fragmented finds should be supported by leaving the surrounding soil matrix in place. This will help to ensure that archaeological information and any associated materials are retained, and to assist in the removal of the artefact using a technique such as block-lifting.

4.3.3 Labelling

Every artefact should have a unique and individual identification code or number indelibly written on a durable material and securely fastened to the artefact and its packaging. As the finds will pass through many stages during and after excavation, each find, including any separate parts, shall be labelled on site. Labelling may also be employed to record the orientation of individual timbers in a complex wood structure to assist later re-assembly. Where such a system is used, label positions should be recorded on site plans and elevations.

4.3.4 Cleaning

Cleaning of wood on site should be kept to a minimum as it will often lead to surface damage and loss of information. When cleaning is necessary, it should be carried out by qualified personnel. Superficial burial matrix may be carefully removed with fresh water and a soft brush or sponge.

4.3.5 Recording and documentation

A record (paper-based or digital) should be created for each piece of wood, to include data such as context and association, basic dimensions, and indication of condition. Any actions taken relating to the wood, such as sampling, photography, drawing etc., in the field shall be noted. When sampling for wood species identification, growth ring studies and dendrochronological dating on site is unavoidable, it should be carried out according to EN 16085. Sample processing and analyses shall be carried out in the laboratory.

Large and complex timber structures, such as boats, may need to be digitally recorded *in situ* at this stage using coordinate measuring equipment, to assist with later reconstruction and interpretation. Surface details, such as tool marks, signs of use and wear, and surface finishes (paint, tar, etc.) as well as examination and recording of wood conversion and archaeometric data, such as growth ring count are best revealed and recorded under laboratory conditions.

Whether recording occurs on site or in the laboratory, the wet condition of the find and any samples shall be maintained at all times.

Since it is unlikely that all structural timbers and other categories of wood will be permanently retained as part of the site archive, it is essential that any discarded material is preserved by record.

4.4 Lifting

4.4.1 General

Removing artefacts from the ground requires planning and preparation and the number of moves shall 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. When block lifting techniques are employed, the impact on the surrounding archaeological contexts shall be evaluated.

4.4.2 Lifting small finds

As small artefacts are more sensitive with respect to irreversible damage through drying, they shall be maintained in their wet condition during lifting and provided with external support. Small finds with little degradation may be lifted by hand but provided with suitable packaging and support immediately. Fragile finds should be carefully undercut to release them from the burial matrix, and slid onto a stiff support to aid safe removal from the ground.

4.4.3 Lifting large and heavy finds

All timbers, even the relatively un-degraded, should be provided with and secured onto a support frame to minimize direct handling of the find and to prevent movement during lifting.

The support frames should be professionally designed to suit the need of the individual timber providing sufficient load-bearing strength and protection to all parts. The lifting support should be designed to follow the timber throughout subsequent handling and temporary storage as changing support system is expensive and can cause mechanical damage.

The support frames shall be deep enough to protect fragile edges from mechanical damage and be lined with cushioning to prevent damage to degraded wood surfaces through point-pressure, abrasion or contact with other, harder materials. A safety and risk assessment should be undertaken before any lifting operation, and handling equipment (hoist, cranes etc.) should be operated by trained personnel only.

4.5 Management of the finds after lifting

4.5.1 General

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 shall be submerged in water-filled containers or at least wrapped in watertight packaging, kept completely wet and stored in a cool, dark place. Small artefacts should not be free to float around in large containers but kept in suitable trays.

Even if wrapped in watertight packaging, finds should, where possible, be submerged in containers. Finds submerged in containers, shall 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 shall be checked at least weekly, and storage containers kept covered to minimize evaporation, light exposure and contamination. The use of biocides should preferably be avoided.

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 shall be monitored to ensure that they remain wet and physically protected.

4.5.2 Packaging for handling and transport

Packaging systems shall be designed to ensure adequate protection of all types of finds at all times. The packing materials shall be inert, non-biodegradable, not adhere to or cause damage to the artefact surface. The outer layers shall be waterproof and labelling shall be clearly visible.

Large finds will need cushioning to protect the surface and edges from impact bruising. Small artefacts may be stored together in suitable rigid containers, with material to avoid movement and abrasion. Finds consisting of several elements shall be kept together and packed to prevent abrasion between them. Packing and labelling shall be kept simple and systematic as different personnel may be responsible for subsequent unpacking / handling.

Labelling should be carried out as described in 4.3.3. Two identification labels shall be used; one securely fastened to the artefact and a second copy clearly visible on the outside of the packaging. A check list of the packages and their contents shall be kept.

4.6 Transport

The wet condition of the finds shall be maintained during transport and damage caused by shock, friction or vibration shall be avoided. Small finds in containers shall be restrained to prevent movement and excess water kept to a minimum.

Heavy or large finds and containers shall be loaded in an orderly manner to minimize the chance of movement or crushing during transport. Loading and unloading shall be supervised by a conservator or other responsible project personnel. When unloading the packages, labelling should be cross checked against the finds lists.

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