A large, dark, elongated archaeological artifact, possibly a wooden beam or plank, is being lifted from a body of water. The artifact is suspended by a black cable with a yellow hook and a red shackle. A green strap is also wrapped around the artifact. The background shows a wide expanse of water under a clear blue sky, with a distant shoreline featuring trees and buildings.

Recognising archaeological finds in aquatic sediments and how to handle them

Production credits

Recognising archaeological finds in aquatic sediments and how to handle them

Written by: S. Caspers, Caspers Communicatie and M.C. Houkes, Maritime Programme, RCE

In collaboration with:

J.F.M. Bos and D. Knoester (RWS Sea and Delta)

E.F. Gehasse (RWS Water, Traffic and Environment)

M. Manders and H. Huisman (RCE)

Commissioned by: Rijkwaterstaat Water, Traffic and Environment

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Cultural Heritage Agency

Postbus 1600
3800 BP Amersfoort
the Netherlands

Rijkswaterstaat Water, Traffic and Environment

Postbus 5044
2600 GA Delft
the Netherlands

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Maritime archaeology

Archaeologists study the remains of societies that existed in the past. Maritime archaeologists deal specifically with the relationship between man and water. The physical remains of that relationship, under water and on land, include harbours, embankments, waterways, landscapes, shipwrecks and

lost cargo. They reflect a past and a culture, and as such are of scientific interest to archaeologists and historians. Finds from shipwrecks are particularly valuable, giving us a direct insight into life at sea at a particular time. A situation 'frozen in time', as it were, just as it was then.

Introduction

Objects in aquatic sediments are often extremely well preserved. The absence of oxygen can even allow objects made of vulnerable materials like wood, iron, textiles and animal skins to survive under water. This booklet explains how to recognise and handle archaeological finds if you should unexpectedly encounter them while working at sea or on inland waterways.

What is an archaeological find?



Aquatic sediments are scattered with stones, pieces of timber and remains of plants and animals. Only some of these items are interesting to archaeologists, namely only objects worked or used by people in the past. A major proportion of the Netherlands' maritime heritage is situated under water: in saltwater like the Southwestern Delta, the Waddensee or the North Sea, or in freshwater like rivers, canals and the IJsselmeer. Every archaeological object is linked to our ancestors and has, together with its context, its own story to tell about life in the past: where it came from, who made and used it, and how it ended up in the water.

Structure of this booklet

This booklet first explains how to handle (potential) archaeological objects, and the statutory obligation to report such finds. It then gives some examples of archaeological objects you may encounter. Archaeologists categorise finds on the basis of material types. This booklet is structured in the same way, examining in turn objects of wood, stone, flint, pottery, glass, bone, leather, textile and metals. To give you an idea of how much information a chance find can yield, the booklet ends with an example, presenting the story archaeologists have reconstructed on the basis of a set of finds.

Machu archaeological reporting form

Please try to complete at least the fields marked *

Name of object:	<input type="text"/>
Original name of object:	<input type="text"/>
Type of object: *	[Select] ▼
Possible year of date:	<input type="text"/>
Date of discovery: * (yyyy-mm-dd)	<input type="text"/>
material:	<input type="checkbox"/> wood <input type="checkbox"/> Other organic <input type="checkbox"/> Iron / steel <input type="checkbox"/> other metal <input type="checkbox"/> Pottery / glass <input type="checkbox"/> stone <input type="checkbox"/> unknown
National registration number or code: 	<input type="text"/>
Location object area: *	<input type="text"/>
owner terrain:	<input type="text"/>
owner object:	<input type="text"/>
Physical status:	[Select] ▼
Activity at location: *	<input type="checkbox"/> fishing <input type="checkbox"/> dredging <input type="checkbox"/> Sand extraction <input type="checkbox"/> infrastructural development <input type="checkbox"/> other
Depth  (in metres at LAT)	<input type="text"/>
Position East long, in dec. degrees (WGS84) *	<input type="text"/>
Position wreck North lat: *	<input type="text"/>
Remarks:	<input type="text"/>
Enclosures:	<input type="text"/>
Contact details	
Name: *	<input type="text"/>
E-mail: *	<input type="text"/>
Address / organisation:	<input type="text"/>
Commissioning organisation: *	<input type="text"/>

Finds on board: what next?

Duty of notification

All (potential) archaeological finds made in Dutch territorial waters, including the contiguous zone, must be reported to the Cultural Heritage Agency (RCE) in Amersfoort, in accordance with Dutch legislation (Monuments Act). It is also advisable to report any finds on municipal territory to the local authority in question. This ensures that important information on the past is not lost.

Why report finds?

Archaeologists are able to assess the scientific value of an object. It is therefore important that someone with the right training and experience examines it. Some objects appear unsightly and unimportant, but their age, relationship to other finds or to the environment can make them very important for our understanding of the past.

How to report finds

Whenever an archaeological find is made: take photographs and mail them – with a brief description and any other information, such as the name of the finder, the coordinates of the location and the date – to the Cultural Heritage Agency. See opposite for the information required.

The form shown can be found at:

http://fd7.formdesk.com/archis/machu_archeologie_nl

email: info@cultureelerfgoed.nl
or phone +31 (0)33 421 7456

Leave the find in place

Archaeologists try wherever possible to leave archaeological remains in situ (at the place where they are found). This means that the remains are not excavated, but are left intact. If you suspect you have encountered a concentration of finds or a structure under water, leave an area with a radius of 50 metres around the spot undisturbed.



Section of tree trunk showing annual growth rings. This tree grew some 8000 years ago.

Initial handling of finds

If you find an object, do not clean it! It should preferably be kept in water in a sealed container or bag, so that it does not dry out and is not exposed to oxygen in the air. It is important that finds from saltwater are kept in saltwater, and that finds from freshwater are kept in freshwater.

Is the object too big for a bag or container? Try to keep it wet, by wrapping it in plastic and spraying it regularly, for example. Keep the find out of the sun and wind to prevent it from drying out and stop mould from growing on it.

If you find several objects at once, different types of material should preferably be packed separately.

Why?

Keeping the object in the best possible condition allows better analysis at a later stage. In the case of a wooden object, this can lead to identification of the type of wood, where it was grown and when it was felled (which can be seen in the annual growth rings). Metallurgical analysis can be performed on metals, to provide information on casting or forging techniques, and also on the origins of the ore. The shape of an object often allows it to be dated quite precisely, as well as providing information on building techniques, and thus on the type of shipwreck, or the place where the object was made. If all this information is combined, a few simple finds may tell us the story of an inundated settlement, a disaster at sea, or provide another piece in a puzzle to help us understand trade relationships, food economy or even tell us more about how the Romans worshipped their gods!



Framing timber



A ship archaeologist's nightmare: the piled up remains of a shipwreck

Material types

Material type | Wood

Potential finds

Most wooden objects found are parts of wooden structures like shipwrecks, quaysides or port structures. The wood may consist of pointed posts, beams or planks. These pages show examples of parts of ships and other construction timber.

Parts of shipwrecks that are commonly found are sections of hull, bilge, sides, bow and stern, keel and framing timbers. These finds are almost always made of wood that has been worked to some extent: sawn, trimmed, worked with an adze, curved or featuring dowel holes or nails.

On the left is an example of a framing timber (part of the hull structure) from a shipwreck, and also an example of every ship archaeologist's worst nightmare: a pile of wood from a shipwreck, taken out of its context and allowed to dry out. This will have almost completely destroyed its information value.

Example:

Dredgers working near Terschelling found an unsightly piece of wood. It turned out to be framing timber from the 13th/14th century. This made it the oldest part of a ship ever found under water in the Netherlands, and certainly in this area. It was tangible evidence that many ancient shipwrecks probably lie beneath the thick layers of sand deposited in the eastern part of the Dutch Waddenzee.



13th-14th-century construction timber



9th-century revetment posts of alder



16th-century bridge foundation post of oak

Material type | Wood (cont.)

Construction timber can include debris or remains of wooden houses, and also the remains of quaysides, port structures or bridge foundations. It may be virtually unworked wood that has merely been sharpened to a point, or it may be trimmed beams or parts of neatly interlocking ‘building kits’, such as foundation wood connected using dovetail joints.

On the left are examples of construction timber, from a revetment made of alder and part of oak bridge foundations.

Wooden objects from the cargo, the rigging or the ship’s equipment, or from an inundated settlement – such as wooden cups, barrels or parts of tools or furniture – may also be found.

Examples

During preparatory work for the deepening of the summer bed of the river Maas, several wooden posts were found, possibly the remains of a Medieval embankment facing. During investigations at Cuijk and Maastricht, the remains of Roman bridges were discovered. Remains of carvings in the bridge foundations were found in Maastricht. In Cuijk, one of the foundation posts found even bore an inscription specially made by the builders to worship the gods.



Stone cannonball, 14th-15th century



Fragment of a polished stone axe, c. 5000 BC

Material type | Stone

Potential finds

Stone archaeological objects found under water are often ballast stones, cannonballs (left, above) or prehistoric axes (left, below) and spearheads. Where there are inundated settlements, remains of foundations or burial sites may be found, such as the stones that once covered coffins. Votive altars are also sometimes fished up, as happened at a Roman cult site near Colijnsplaat.

Worked stone or pile of rocks?

Modern ships fill their ballast tanks with water to make the vessel more stable. On older ships, stones were used for the same purpose. A pile of stones might therefore conceal the remains of a shipwreck.

Isolated stones that have not been worked or used can simply be returned to the river or seabed, because they play an important role in the underwater ecology.

Example

When the East Indiaman the 'Batavia' sank off the coast of Australia while on its way to the city of the same name, it was carrying over 130 blocks of sandstone. They served as ballast during the outward voyage and, on arrival, they were to be used to build a new gateway to Batavia Castle. Such a find gives us a good idea of how the Dutch East India Company (VOC) cleverly used all the available space on board, without compromising on safety.



Late Mesolithic flint,
some 8000 years old

Material type | Flint

Potential finds

Archaeological objects of flint are generally prehistoric; more than 3000 years old, in other words. This, and the fact that, unlike other stone, flint has glass-like properties, is the reason why it is discussed separately here. Flint objects include axes, arrowheads, spearheads and various types of small tools such as scrapers and cutting implements.

During the ice ages the area that is now the North Sea was dry land, as the sea level was many metres lower than it is today. Flint tools are a tangible reminder of the people who lived in this area during that period. Such objects generally come to light during dredging operations, sand extraction and fishing. The four chip-like fragments shown on the left are known as 'blades'. They often had (and indeed still have!) sharp edges, which could be used for cutting. The bottom two fragments are chunks of flint (cores) from which these blades were struck.

Please note

Ensure that the object does not sustain any damage: signs of wear (known as 'use-wear traces') can sometimes allow us to identify what the tool was used for; scraping animal hides, for example.



17th-century stoneware



Various types of pottery from around 1600

Material type | Pottery

Potential finds

Pottery objects may include a range of everyday items, such as cooking pots, plates, bowls, colanders and jugs, and also bricks, paving tiles and wall tiles. Pottery is generally found in the form of sherds.

However, sherds tend to slip through fishing nets, so fishermen often find intact objects.

Pottery objects can easily be dated, and the place of manufacture can also often be identified. Sometimes it is even possible to find out the name of the person who made the object!

Pottery allows trade relationships to be traced, ranging from Italian pottery in the Roman period and German stoneware in the Medieval period (left, above) to Chinese porcelain imported by the Dutch East India Company (VOC). Lower-quality imitations of Chinese porcelain were also produced in Europe.

Please note

Pottery should not be cleaned, as pots and cooking vessels may contain food residues.

If the sherds are clumped together, leave the lump intact and keep it in a plastic bag or box.



17th-century wall tile



17th-century brick

Building materials

Building materials like bricks and tiles may indicate the remains of an inundated settlement. They are also found in canals or harbours near the centre of historic towns or villages, of course. Often what is found is demolition rubble, but sometimes foundations or the remains of walls are found in their original position under water. In some cases the materials are part of a lost cargo.

Tiles may be richly decorated, particularly from the Medieval period onwards, and this allows them to be dated fairly accurately.

Bricks are usually dated in relative terms, based on their dimensions and hardness.

The top image on the left shows a wall tile; below it is a photograph of a piece of wall made of yellow brick. These yellow bricks were regularly exported in the 17th century. Bricks and tiles would also sometimes be used to build a fireproof section in a ship's galley.



18th-century wine bottle

Material type | Glass

Potential finds

Glass may come from the cargo or inventory of a ship, or it could represent settlement waste. This might include bottles for wine or oil, or small perfume bottles, drinking glasses, glass covers for compasses and hourglasses or window glass.

A wine bottle has even been found with its original contents – no longer drinkable after two centuries under water, but expert wine tasters were able to ascertain that the wine came from Portugal.

Please note

A complete bottle with an intact stopper or cork may still have its original contents. Conditions under water prevent the glass and the cork from drying out, which would allow air into the bottle. Always leave sealed, intact bottles closed, to keep the contents suitable for future analysis.

Glass must not be cleaned! The objects must be kept as they are when they are found (including mud, encrustations, moisture etc.) to preserve any decoration or inscriptions.

If the sherds are in a large clump, keep it intact, to prevent smaller sherds from being lost.



Prehistoric axe made of red deer antler



Skull of a Medieval cow (uncleaned)

Material type | Bone and bone objects

Potential finds

Bone material worked by humans

In the Stone Age, beside stone tools, people would often use animal bones to make tools and other everyday objects. Later, too, bone was used to make things like arrowheads, combs, awls, knives and skates.

Human bone material

It is always possible that human bone material will be found. Treat such remains with respect. The most spectacular find ever made in the North Sea was part of the skull of a Neanderthal, evidence of at least 35,000 years of occupation in this region. Remains of Medieval cemeteries are also found on occasion.

Animal bone material

There is a lot of animal bone material on the sea bed in the North Sea. The bones of animals that died a natural death can allow scientists to reconstruct past landscapes and climate. Butchering waste from animals that were hunted and eaten can provide a lot of information about slaughtering methods, diet and food economy in the past.

The majority of bone material found comes from the last ice age (from 116,000 to 11,500 years ago). This material is often brown. Fossil remains from earlier ice ages are more greyish in colour, since they are already partly turned into stone. They may include the remains of woolly mammoth, giant deer, sabre-toothed cats and musk oxen.



Restored 18th-century leather shoe



Sole of a 15th-century shoe (uncleaned)

Material type | Leather

Potential finds

Archaeologists find lots of objects made of leather on old ships and around historic towns and villages. They include shoes, knife sheaths, jackets, bags and even leather skates.

Sometimes the items are waste, nothing more than threadbare shoes, but sometimes they have been lost. On board shipwrecks, however, they might be part of the cargo, or include unworked animal skins or semi-finished products.

Please note

Do not clean the leather! It is best to leave as much sediment around leather objects as possible. Leather is very weak, and the stitching that holds the object together will usually have disappeared. The leather will generally be the same colour as the sediment around it, which will often contain smaller parts that may be lost during the cleaning process.



17th-century felt hat

Material type | Textiles

Potential finds

Textile in sediment is very fragile and will often have been degraded by moisture and acids. Fabrics like silk, linen and cotton quickly rot away in sediment. They are rarely found in locations more than a century old. Woollen fabrics (including felt), on the other hand, can remain preserved for hundreds of years. Most textiles lose their original colour after spending years in the sediment, and will now appear grey or brown.

Textile remains are most likely to be encountered in shipwrecks, cemeteries and waste layers. Most remains are fragments of clothing, sails, semi-finished products and sacks in which cargo was transported. These are important finds, because they tell us how people dressed (fashion), what material was used for the ships' rigging, what products were traded and how they were stored in the hold.

Example:

The remains of graves of 17th- and 18th-century whale hunters have been found on Spitsbergen. It is clear that these were people who lived a poor and dangerous life, given the many abnormalities resulting from disease and injury found in the bone material. The remains of their clothes suggested that they wore them until they were threadbare, altering them dozens of times. Only once the clothes were completely worn out were they used to dress the bodies of dead sailors. Their fellow sailors would have shared the better items of clothing among themselves. The hat was an exception; this was clearly such an intimate possession that the body was not given a 'hand-me-down' to take to the grave, but in fact a brand new one.



Unrecognisable due to corrosion: iron, glass and pottery



Part of a cargo consisting of rolls of tin plate

Material type | Metal: iron, lead, copper, tin and silver

Potential finds

Metals come in many different forms, alloys and combinations. The most common metal finds at archaeological sites are iron, lead, copper alloys and tin, and occasionally gold and silver. A few examples of these different types are given below:

- Iron: nails, cutlery, scissors, hooks and tools, cannonballs, cannons, other weapons or parts of ships or rigging; bars or ballast
- Tin: plates and jugs; bars
- Lead: musket shot; bars, patches, rolls, net weights or ballast
- Copper alloys: cannons, cauldrons, plates, coins, bars
- Silver and gold: coins, jewellery

Please note

Contrary to what one might expect, metal objects are fragile. Never remove corrosion or encrustations yourself; leave this to a specialist in order to avoid damaging the object. A layer of corrosion may contain many details. Try to keep metal objects separate from other materials if possible. Keep iron, in particular, out of the sun.



Above: Anchor

Left: Boat hook, with part of wooden haft



Above: 16th-century rapier

Left: Cannon, muzzle-loading (17th-18th century)

Material type | Metal (cont.)

Weapons

Cannons were carried not only by warships, but also by some merchant ships. They were used as protection from pirates. A type of iron cannon is shown opposite. Other kinds of weapons would also be found on board, such as the sword (rapier) shown opposite.

Equipment and tools

Various items of equipment would be found on board ship, including anchors and boat hooks. The latter are also often found in old harbours, often with part of the haft still attached.

Caulking irons are regularly found in shipyards. These implements, which resemble short chisels, were used to seal the seams between planks with material like moss, fabric or tar.

Example:

A remarkably large concentration of Medieval knives was found in the bed of the river Amstel underneath a bridge giving access to the centre of Amsterdam. Did a knife maker have his workshop nearby? Or were people carrying knives refused access to the city, causing them to throw them into the river?



Ship's bell from the Sophia Albertina



Detail of the inscription on the bell

Finally: an example

How a ship's bell found off Texel led to the discovery of an 18th-century Swedish man-of-war

In 2002 amateur divers diving near the Noorderhaaks sandbank off Texel found a bronze ship's bell bearing the inscription 'G:MEIJER FEC:IHOLM: 1738'. They recorded the location and reported the find to the Cultural Heritage Agency (RCE), which launched an investigation at the site in summer 2004.

Beneath a large mound grown over with sea anemones, the RCE diving team found the remains of a heavily-built vessel at least 20 metres long. They also found cargo and ballast, including iron bars and stones, and a total of 23 cannons, including several of Swedish manufacture. There was barely any other find material, apart from a small wooden munitions chest containing hundreds of pistol balls.

An analysis of the growth rings in a framing timber revealed that the tree had been felled in Scandinavia around 1750. The ship would have been built shortly after. The type of cannon found, with thickening around the trunnions, was used in the eighteenth century. The heavy construction of the ship and the cannons suggested this was a warship, possibly from Sweden.

With these details, it was possible to conduct a precise historical investigation, and the vessel was eventually identified as the Swedish man-of-war *Prinsessan Sophia Albertina*. The *Sophia Albertina*, built between 1760 and 1764, ran aground on the Noorderhaaks sandbank on 20 August 1781 and sank that same night, having been separated from her convoy the day before in a storm and thick mist. More than 400 people lost their lives.

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www.rijkswaterstaat.nl
0800-8002 [in the Netherlands only]

Cultural Heritage Agency

Smallepad 5 | 3811 MG Amersfoort
Postbus 1600 | 3800 BP Amersfoort
the Netherlands
+31 (0)33 421 456 | fax +31 (0)33 421 7799
info@cultureelerfgoed.nl
www.cultureelerfgoed.nl
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