MoSS
December 2003

Newsletter

4/2003

A shipwreck research project funded by the European Union Culture 2000 Programme

contents

Theme: Burgzand Noord 10

Education and Culture
Culture 2000

Sallamaria Tikkanen, Riikka Alvik,
The Maritime Museum of Finland

Introduction

Carl Olof Cederlund
Editor

This fifth MoSS newsletter is the last in the first series. Each newsletter in this series describes one of the wreck sites featured in the project. This is the one from the Netherlands.

The three newsletters following will examine one of the project themes: Monitoring, Safeguarding and Visualization. An issue presenting the results of the project will wind-up the series.

For your information Sallamaria Tikkanen, is now on maternity leave and Riikka Alvik from the Finnish Maritime Museum, has taken over responsibility for project coordination. Contact details for Riikka Alvik are the same as for Sallamaria Tikkanen. For more information check out the project web site: *http://www.mossproject.com/*

What is MoSS?

The MoSS project is based on four shipwrecks, all of which are of great significance from a European point of view and show a diversity of intercultural relationships throughout a long period of history. The wrecks are located in Netherlands, Germany, Sweden, and Finland, and they represent different vessel types. The oldest of the wrecks is dated to the 13th century whereas the youngest is from the middle of the 19th century. The wrecks are in different kinds of underwater environments; in sea, lake, and brackish waters, and the conditions on the sites are both stable and unstable. The wrecks have preserved extremely well; two of them are almost intact.

The MoSS project has three main themes: monitoring, safeguarding and visualizing shipwrecks. The first theme includes monitoring the condition of the wrecks, or in other words doing research on the degradation of shipwrecks under water.

The aim of this theme is to develop and improve the methods used in monitoring the physical and environmental conditions of shipwrecks. The second theme is safeguarding, which aims at outlining and developing models to protect shipwrecks so that also the needs of different public groups are taken into account. The third theme is visualizing. The four shipwreck sites will be made physically visible using underwater and other images. The project will be advertised multilingually to the European public.

The MoSS project will consist also of fieldwork, Internet site, publications, posters, leaflets, reports, articles, meetings, and seminars. One of the objectives is to produce information not only to the general public but also to the experts in the area of protecting the cultural heritage. The aim is to awaken European peoples' interest to our common underwater cultural heritage and to have the general public participate in protecting the heritage. The wrecks of the project - ships that sailed on European waters - act as examples of maritime history as they tell us about the many local and international dimensions of the European culture.

The MoSS project is organized by The Maritime Museum of Finland (coordinator), The Mary Rose Archaeological Services Ltd. (United Kingdom), The National Service for Archaeological Heritage: Netherlands Institute for Ship- and Underwater Archaeology ROB/NISA (the Netherlands), The National Museum of Denmark/Centre for Maritime Archaeology (Denmark), The Department for Preservation of Archaeological Sites and Monuments / Archaeological State Museum of Mecklenburg-Vorpommern (Germany), and Södertörns högskola – University College (Sweden).

The MoSS Project is the first international shipwreck project that European Community Culture 2000 Programme funds. The European Community Culture 2000 Programme is a programme that supports international cultural co-operation projects that involve organizers from several countries. The objectives are among other things to encourage co-operation, to promote the common European cultural heritage, and to disseminate the knowledge of the history and culture of the peoples of Europe. In 2001, it was the first time projects on sub-aquatic archaeology were especially called to take part in the program.

For more information, please contact Ms Riikka Alvik (Mrs. Tikkanen is on maternity leave), MoSS Project Leader, The Maritime Museum of Finland.
Tel. +358 9 4050 9057
Fax + 358 9 4050 9060
Email. riikka.alvik@nba.fi

Web site: http://www.mossproject.com

Toon A. de Boer,
NISA

Netherland's Institute for Ship & Underwater Archaeology (NISA)

Just about six years ago the Dutch maritime archaeologists from the NISA, part of the National Service for Archaeological Heritage (ROB), moved from two separate locations to their present building at the waterfront of the "polder" City of Lelystad. The NISA-building is in its design and layout a unique concept for the Netherlands. The "open plan" for archaeological collection, conservation area, restoration, model building shops and diving techniques shop are all open to the public (Fig. 1 and 2). The NISA-collection covers 7000 years of maritime history of the Low Countries and consists of 20.000 items, from shipwrecks to inventory, cargo and so forth.

Fig. 1. The open depot at the NISA: administration and collection research.

The public presentation of the NISA-collection is being reorganised, moving away from the research orientation towards "maritime historical sensation", a process that will take some years. In relation to the MoSS-project there is an excellent opportunity to present to larger audiences the monitoring, research and safeguarding of shipwrecks and thus the combined EU-drive to save the maritime heritage for future generations.

The presentation is the same as we would present any scientific or abstract subject: visualize the issue or problem, tell the story of degradation and vanishing heritage and make clear what can be done about it and how. Intensive use of AV-techniques will help to touch the audience's senses.


Fig. 2. Artefacts found in shipwrecks are visible for scholars and public.

Arent Vos,
NISA

The Burgzand-project and MoSS

Burgzand is the name of one of the shallows in the western Wadden Sea east of the island *Texel*. This area used to be part of the former Texel Roads. For centuries the Texel Roads were an extremely important anchorage (Fig. 1). Here ships with too much draught for sailing the *Zuyderzee* (now *IJsselmeer*) for important merchant cities like Amsterdam, Hoorn, Enkhuizen, were loaded and unloaded, or were waiting for favourable winds to set sail. This area is of great interest to underwater archaeologists, because from historical chronicles it is known that many hundreds of ships foundered here.

From about the nineteen-eighties stories were heard from Texel, that around the Burgzand area the shallows were being washed away and shipwrecks were being uncovered. The first wreck was surveyed by the NISA in 1986. Because of the completeness of the find and to prevent further degradation, the wreck was physically protected. NISA, after all, was by then fully engaged in the excavation of two shipwrecks (Scheurrak SO1 and Molengat). In 1998, after completion of the excavations, attention was directed to the Burgzand and a second shipwreck was surveyed. In the years since, another ten sites were surveyed, so that now 12 shipwrecks have been documented in a general area of 1500 by 2000 meters. The first phase of surveying is always a non-intrusive assessment. Just "things" sticking out of the bottom – which is often quite a bit – are measured and drawn. Questions that have to be answered as quickly as possible are amongst others: which parts of the ship construction are still there and what is their layout? What kind of ship was it and when was it built? What is left of the cargo, supplies, armament, personal belongings etcetera and what can we deduce from it as far as the ship's last voyage is concerned, or the date of wrecking? What is important is that after this survey we have a fairly accurate idea of the potential for further archaeological research. In the next phase of survey, trial trenches can be excavated, which was done on four of the 12 wrecks.

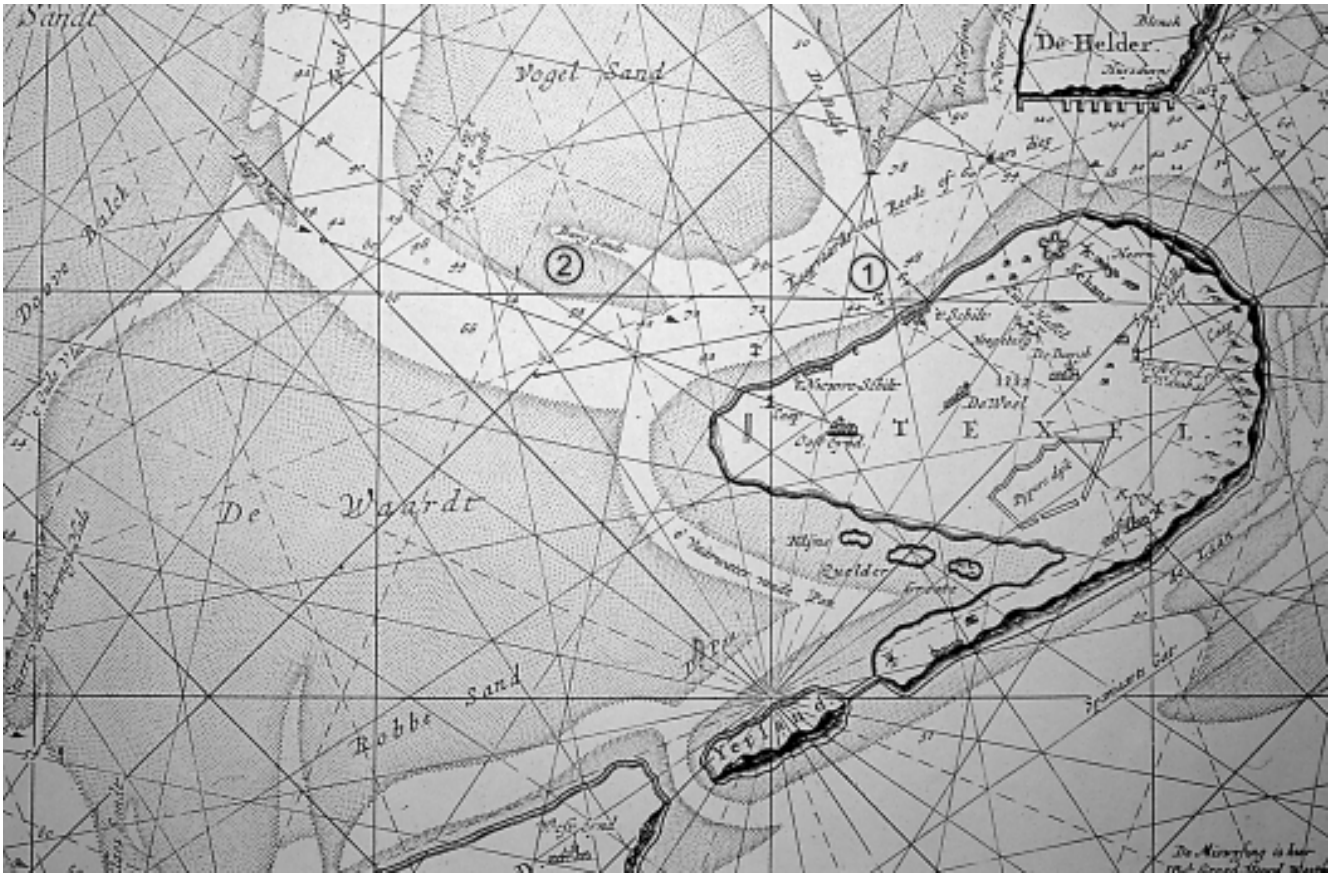


Fig. 1. Seventeenth century situation on the Texel roads. Anchors depict the general anchorage area (1). Note the Burg Sandt (2) (also note that north is down).

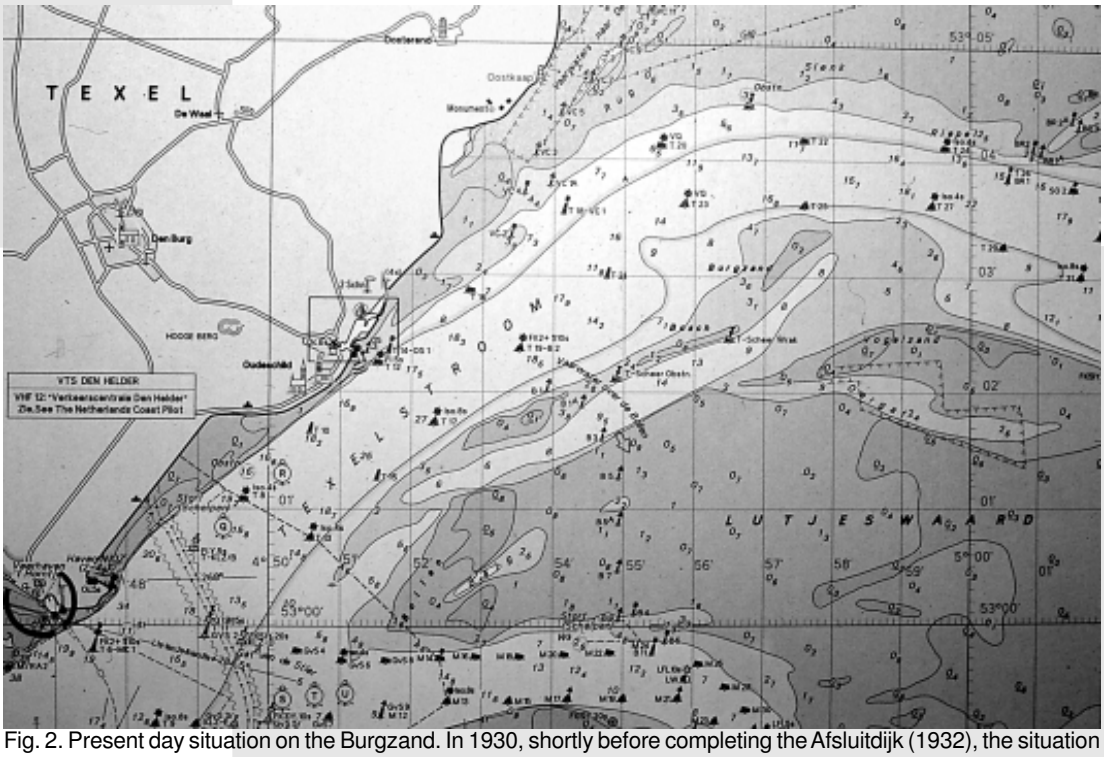


Fig. 2. Present day situation on the Burgzand. In 1930, shortly before completing the Afsluitdijk (1932), the situation was similar to the one in the seventeenth century.

Research potential turns out to be quite high. We deal with ships and cargoes from the period between the beginning of the 17th and the third quarter of the 18th century. Amongst others we have a trader with a varied cargo from the Baltic (BZN 2; 17c), a West India-man with coffee, cacao and several species of tropical woods (BZN 4; 18c), a possible East India-man *de Rob*, which after participating in the battle of the Downs (1639) foundered at Texel in 1640 (BZN 3; 17b), and the well preserved wreck with cargo BZN 10 (17b/c), which has become the subject of further specialised research of the degradational processes for the European MoSS project.

Here clearly is another aspect of the Burgzand-project. Not only did we assess an extremely rich piece of maritime archaeological heritage, it also became evident how very much natural processes threaten this important heritage. Geological research has shown that completion of the *Afsluitdijk* in 1932 has caused enormous changes in the tidal system (Fig. 2). As one of its consequences the Burgzand area has deepened up to seven meters. A new balance is not expected before 2040-2060. Because of this shifting of the sands many wrecks by now stick right out of the bottom and around the construction sometimes deep scouring pits have formed. As a consequence construction and cargo – already weakened by a degradation process of centuries – are constantly and directly exposed to the strong tidal currents. Weak materials, often organic by nature, will wash away upon first exposure and be lost. Under-scoured sections lying above the seabed will, after a while, break away under their own weight or be caught by fishing nets causing serious damage. It cannot be overestimated how destructive this is for archaeological wrecks and how often this phenomenon occurs! Also biochemical processes play a significant role. Most damaging to shipwrecks, the shipworm (*Teredo navalis*) should be singled out. Sometimes during surveys, it turns out to be very hard to find wood samples for dendrochronological dating that are not completely bored in their cross-section. In the following years severe deterioration of the quality of the remaining wooden ship construction will with all possibility be seen.

To stop these processes, or at least to slow them down, the most interesting sites are covered with a strong gauze or mesh. By now four complete wrecks have been successfully protected and it is expected that this physical protection remains effective for at least four or five decades, even with the expected general drop of sand level of another one to two meters. The method is less suited if the wreck is already sticking out far above the surrounding sea bottom. Thus, a wreck like BZN 4, the West India-man, is seriously threatened and another wreck, BZN 11, had to be given up for this reason. The BZN 10 wreck however, after earlier provisional protection, is now [2003] completely protected under some 2000 square meters of gauze.

Martijn Manders,
NISA

Preliminary results investigating the ship construction of the BZN 10

Introduction

During the nonintrusive assessment that had been undertaken between the 7th and the 22nd of August 2000, it was clear that a complete starboard side of a ship was sticking out of the seabed (Fig. 1). The length of the starboard side, measured above the second deck is 35 meters. The width as well as the height of the ship is unknown. Two flush decks, almost certainly the first (lower deck) and the second deck (upper deck) with a considerable flare can be followed over the whole length. Between these two decks a space of 1,50 m was measured in the middle of the ship. The second deck has been lowered in the bow. No keel, stem or sternpost was found. Possibly these are still under the sand.

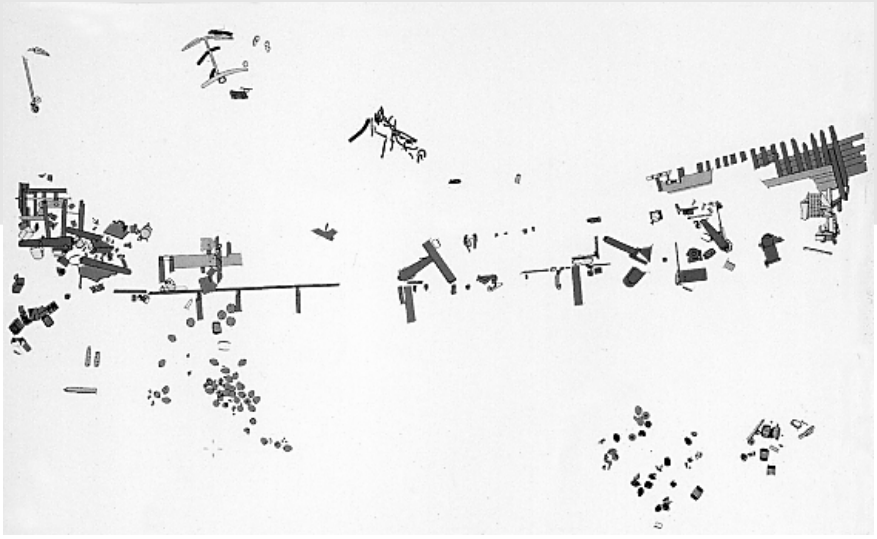


Fig. 1. Visible elements at the bottom surface of the BZN 10 wreck-site in 2000.

Aft of the ship

In the aft of the ship five shell planks are sticking 115 cm out of the last frame (possibly a fashion piece) (Fig. 2). These planks have aslant endings (2). Three of these five planks are 7 cm thick and are possibly wales (the other planks are 4 cm thick). These wales have nail holes running through that betray that they were possible connected to the (missing) portside (4) with planks. The second shell plank from the top is made of pine. On this plank a construction was attached that seems to be a ventilator for the captain's cabin (see also MoSS newsletter issue 2002:1). The sixth plank from the top is narrowing at the end. Possibly this one was rounding somewhat inwards (5). Under this plank starts the counter. Further on, lower in the ship, a row of planks (5 cm thick) are sticking straight up out of the sand (6). The form of the outer endings of these planks shows that this ship must have had a squared stern (7).

Thirteen frames are rising above the top shell plank (1). These frames are 10 cm thick and 20 cm wide. The angle between the frames and the planks is not 90 degrees but the frames list to the stern side. Originally the frames were standing up straight and the shell planks upwards because of the flare of the deck. The spaces between the frames vary. Maybe the frames are sticking out to support a poop deck or are part of the bulwarks. Where the frames stop sticking out of the construction a bulkhead can be distinguished.

Bow section

The bow section of the ship is round. A man's figure carved in wood has been located but left in its place. Above the castle deck the bulwarks are still in place. The construction here is different from the possible bulwarks in the stern section. Here, transverse beams are tailed into the frames.

The upper deck is lower in the bow section. The galley is situated far to the bow of the ship. It is a construction of bricks, tiles and iron hearth-plates. The construction has fallen apart. It is not sure yet if the galley was situated on the starboard side or if it has fallen down over that side after the sinking of the ship.

An interesting detail of the construction is the support of two deck knees on both sides of the deck beams. This construction is used for the beams of the first and the second deck. The deck beams are approximately 30 cm wide and 30 cm thick but the knees vary in size. Mid ship the deck beams stand about 2,5 meters apart. The waterways of the two decks are 10 cm and the deck planking is 5 cm thick.

During the assessment two gratings were found: one in the aft (105 x 75 cm) and one in the bow section (measurements not known). Both gratings are not "in situ" anymore.

Possibly the most extraordinary detail of the construction is the use of wood type. Beside oak, also great amounts of pinewood (*Pinus sylvestris*) have been used for important construction parts. See table below.

The reason why so much pine has

been used is not clear. We know wood originates from Northern Germany (Calendar Pinus sylvestris Region Germany North) with a post quem felling date of 1646 AD. Possibly this is not a Dutch ship. Much wood for our ship building industry originates from Germany, most pinewood however came from Norway. Because of the fact that the local red earthenware used on board might be of Northern German origin as well, the idea came up that the ship might be from there.

Rigging

Outside the wreck, on the starboard side and partly buried under sand, a substantial part of the rigging has been located. During the assessment these parts were discovered, quickly documented and immediately covered to protect them against the heavily eroding tidal movements. Interesting parts of the standing as well as the running rigging with wormed, parcelled and plaited rope among which hawser laid-rope (6 to 7 cm in diameter) and cables (14 to 15 cm in diameter) have been drawn and measured. Also deadeyes, chain plates, snatch blocks, single and double pulley blocks, brace blocks and seizing trucks have been sighted.

Ships part	Wood species visible	Extra information
Shell planking	Oak and pine	One plank in the aft is pine
Frames	Oak and pine	Top frames in the aft are pine
Ceiling	Oak and pine	In the aft pine, in the bow both
Wainscot	Pine	Only seen in the aft
Waterways	Oak	Both decks
Deck planking	Pine	Only seen in a few places
Deck beams	Oak and pine	Two deck beams are made of oak
Deck knees	Pine and oak	By far most made of pine
Sculptures	Pine	One figurehead was found in the bow

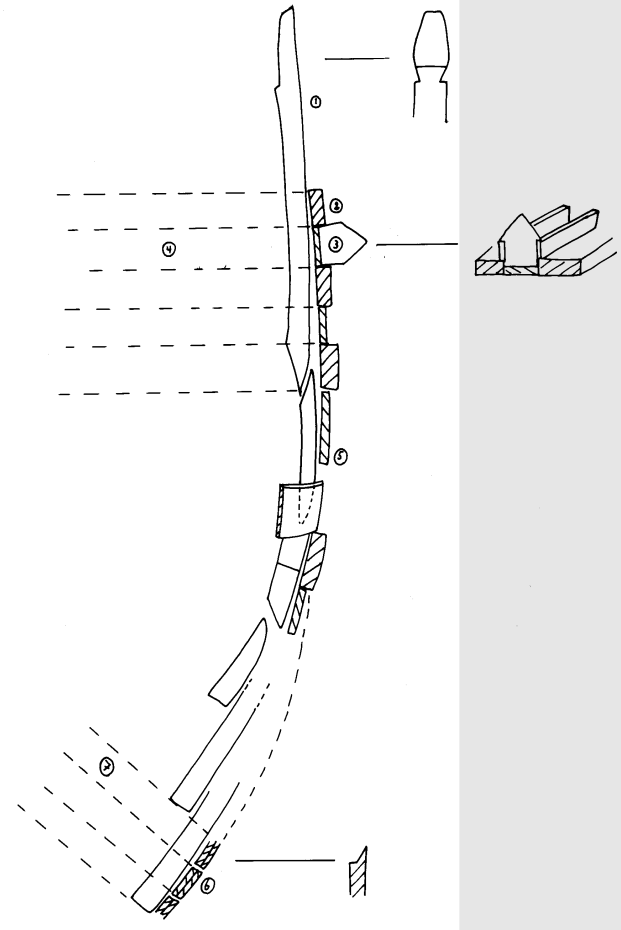


Fig. 2. Cross-section, seen from aft, of the BZN 10-wreck (for numbers see text).

Near the bow a few very large cables were found which probably belong to the two large anchors found nearby. One of the anchors has a stock of approximately 2,50 meter and a shaft of about 1,60 meter in length.

Ordnance

In the hold, the ship was carrying a cargo of Iberian jars, boxes with schist slates and casks with grapes. It was therefore definitely a trader. Between the first and the second deck no cargo was found. Instead nine iron cannons were discovered with four-wheel-gun-carriages. The cannons are heavily concreted. It is estimated they were about 1,80 to 2 meter long. The calibres of the cannons have not yet been measured. The gun carriages are 55 cm wide and 105 cm long. One gun port was found outside the ship near the bow section. It is 64 cm wide and clearly not “in situ”. The ship seems to be reasonably well armed. This is not strange for a merchant ship trading with the Iberian Peninsula. The route to the south of Europe was known for its pirates and privateers.

Conclusion

The BZN 10 wreck might be of North German origin. It was an armed trader with a maximum length of approximately 35 meters and two flush decks with a considerable flare. This ship had a square stern. Much of the wreck was still under the sand when it was assessed. Future research would probably tell us much more about shipbuilding in the 17th century.

André van Holk,
NISA

The interpretation of the artefactual remains from the wreck site BZN-10

Introduction
The interpretation of the artefactual assemblage plays an important role in the valuation process. In this chapter the finds will be discussed that were located during the survey. The discussion will be focused on two issues: what is their role in the assessment and what can we learn from them archaeologically? It is important to realise, however, that it was a non-intrusive survey, in the sense that there was no excavation, no real digging going on. The finds were collected from the surface, as the tidal movements of the sea uncovered them. This has two implications:

- The artefact assemblage gives only a very partial picture of the find-complex as a whole;

- It is more likely that in the upper layers intrusive material - not belonging to the ship - is present.

Finally it has to be stressed that the research concerning the artefacts is still under way. The results presented here therefore are of a preliminary nature.

Association of the artefact assemblage with the wreck
The question of coherence is especially valid in the environment of the Waddenzee, which combines high dynamics and a high density of wrecks. It is clear that artefacts from deep down in the hull are more likely to belong to the ship, whereas finds from the surface can be "polluted" by intrusive material. The material type or the way an artefact is produced can reveal the age of an object and so it can become clear if the object belongs to the ship or not. A plastic bottle belonging to the inventory of a 17th century shipwreck? Impossible! An object can be dated by establishing its type, e.g. its chronological position in a series of types, which show a development in time.

We will start to divide the objects in two groups: the ones that belong to the find-complex and the ones that belong to the group of so-called non-related artefacts.

The find-list of the BZN 10 wreck comprises 99 numbers of finds recovered from the sea bottom above the wreck. The first thing to do now is to find out, which objects belong to the closed artefact ensemble of the shipwreck and which are intrusive.

Five objects definitely do not belong to the find-complex. Among them are a modern piece of fishing gear, two 19th century sherds of white industrial ware from a cup and a plate, a 19th century pipe-bowl and a 12-13th century rim-sherd of a globular pot. Because most of the remaining pottery dates to a fairly closed period of time, from the 17th to the 18th century, older and younger artefacts are excluded from the inventory.

For some other ceramics it is to be discussed whether they belong to the ship inventory or not. Two red-earthenware sherds show heavy wear and tear, which means that they can be intrusive. The date of one of these sherds is indeed early: between 1575 and 1650. The remaining ceramics seem to form one coherent group although the period covered is rather wide: 150 years. Up to now there seem to be two different options for dating the complex, as will be shown below. Depending on the period, some pottery may be intrusive.

For the remaining artefacts, which cannot be dated exactly (at this moment) in general applies that the possibility exists that they are also intrusive.

Since we have now determined which artefacts belong to the artefact-ensemble we can start asking other questions, as what date is the ship, where did it come from and where was it going?

Date of the wreck
Of crucial interest from a research point of view, but also for the assessment of the BZN 10 wreck, is the date the ship foundered. Dendrochronological research suggests an earliest felling-date of the trees, used to build the ship, after 1646 AD. That means that the ship was probably built sometime in the second half of the 17th century. This date refers to the *building date* of the vessel after this year. The finds associated with the wreck, i.c. the bulk of the ceramic remains can either be dated from the early 17th to the mid 18th century or the centre of gravity has to be shifted to the second half of the 17th and 18th century (1)(2). Two clay-pipes were of a common type and can be confidently dated to around 1700. If they are associated with the wreck, this date seems, for the moment at least, the best guess. This is also in line with an eventual building date in the second half of the 17th century. A date in this period does not make the wreck a rare phenomenon. Several 17th century wrecks have been located in the Waddenzee.

It is clear that the artefacts on board BZN 10 do not unequivocally date the vessel. Further dating research

of individual artefacts has to be undertaken.

Another research and validation topic that could be elucidated by the artefact-assemblage is the question of the homeport of the vessel.

Classification of the artefact assemblage

In order to understand the meaning of an artefact assemblage on shipboard and also to take a further step concerning the validation, it is helpful to categorize the finds into functional classes.

One of the questions - both from a research and validation point of view – is where this ship comes from. According to their function some artefacts may say something about the homeport and some about the route that was followed.

In order to do that we have to differentiate between the several elements of a shipwreck find. In a broad sense we can distinguish:

1. The ship with standing and running rigging
2. Equipment
3. Inventory
4. Personal belongings
5. Cargo
6. Non-related artefacts

The artefacts under the headings 2-4 are often referred to as the artefactual inventory. We can differentiate between objects belonging to the ship, like blocks and ropes of the standing and running rigging; objects used by the crew to make the ship function; objects which belong to the crew; objects from the cargo (these are just on board during the last fatal voyage) and finally objects – as has been mentioned above - which don't have anything to do with the ship-wreck in question, but - for example - belong to other ships wrecked in the vicinity. A refinement of this functional classification can give an insight into the social structure and size of the crew.

The almost complete starboard side of the ship was intact; also many pieces of the standing and running rigging were discovered, they are placed in the first category. To underline the completeness of the starboard side is the remarkable find of the wooden ventilator.

Fig. 1. Iberian olive jar from the BZN 10 wreck (Photo: L. Witte, KB).

Of course there are other ways to divide an artefactual inventory into categories. We can for example study the material from which an object is made. We then get a division by material type. This can be informative about the choices that were made for different material types and thus can reflect the differences in social status between sailors and officers. Apart from that we can learn about the origin of the objects and so get an idea about the origin of the ship, in the sense of the place of departure.

Homeport and trading route

Research of artefactual inventories from other shipwrecks has shown that elements from two subcategories from the inventory - galley utensils and eating and drinking gear – are often purchased in the homeport.

In the case of BZN-10 several finds belong to this category. Among them objects made of copper and bronze, like a skimmer, a copper handle and two pieces of a kettle, another bronze handle and piece of a kettle. These objects are however difficult to link to a centre of production where as the red-earth-enware sherds belonging to at least two tripod pipkins, are easier to locate in Northern Germany. If this is an indication for a homeport of the vessel it makes the ship unique, because this would be the first (large) seagoing merchantman based there. The two fragments of Bartman jugs, made from stoneware, might be intrusive. Even if they belong to the inventory, for example to store liquids, their place of production is not relevant for the origin of the ship. Stoneware is quite easy to link to a production area, in this case Frechen (near Cologne), Stadlohn or Vreden (near Münster), but since stoneware was an export product, it could have come from many different harbours. More interesting as an indicator of origin is the use of a lot of pine (Pinus *sylvestris*) in the con-

struction of the ship. This certainly means that the ship is not Dutch.

In this context yet the military equipment forms another interesting category. The ship was armed with several canons (see Manders; this Newsletter). Besides that more than 100 musket bullets were found. The heavy armament of the ship can be indicative of the route on which the ship sailed regularly. Especially ships going south, towards the Mediterranean were armed, because of privateers from [for example Dunkirk], which made this an extremely dangerous route. Dutch ships going to the Baltic were often unarmed, for two reasons: the route was less dangerous and in case of danger warships from the Admiralty of Amsterdam convoyed the ships. This is also the reason that a lot of ship owners were of Baptist/ Mennonite religion, as their religious belief was against the use of violence. So the tendency for ship-owners to specialize on a certain trade route was reinforced. When a similar religious situation holds for Northern Germany (the possible area were BZN 10 comes from) we could deduce from the heavy armament of the vessel that the trade route is more likely to be directed southward than northward.

Personal belongings could point to the place of origin of the crew. This corresponds not necessarily to the homeport of the ship, because already in this period a crew might be partly foreign. In this category belong some pipe bowls, a belt buckle and a button. Only the pipebowls can be traced to a production place, probably the Netherlands. However, these pipes are, just like the stoneware jugs, export products. So they could be purchased anywhere.

Fig. 2. Copper objects from the cargo: pans from pairs of scales, thimbles and rumbler bells (Photo: L. van Dijk).

Fig. 3. Split-wood boxes in different sizes (Photo: L. van Dijk).

Cargo
For several reasons the cargo is a highly interesting element of the find-complex and therefore will be treated separately. Apart from clues about the trading routes, we can learn about the way of packing materials and the use of semi-manufactured products in the 17th century.

A prominent place among the cargo is formed by hundreds of jars, referred to as Spanish olive jars (Fig. 1). Some of these jars still were packed in plaited baskets, dramatically exposed by the erosive tidal currents of the Waddenzee. The jars contain a white substance probably benthonite earth with urine, used for the processing of wool.

In the bow of the ship pinewood boxes, filled with schist slates, were stowed. The slates were already cut to be used as roof-tiles. The cargo consists of a large variety of objects, amongst them copper pans from pairs of scales, wire yarn worked up on spools and partly packed in rolls wrapped in paper or textile, thimbles in three different sizes and rumbler bells partly connected two by two by copper wire (Fig. 2). The pans of the scales have five different sizes ranging from 5,6 cm to 15 cm in diameter. The depth of the pans also differs from 1,5 cm to 5 cm deep. The smaller, flat ones have possibly been used to weigh coins, gemstones, and precious metals or to put the weight in. The bigger, bowl-like pans can be used for herbs or spices. The pans have hallmarks consisting of a weight with characters **IDL**. The rumbler bells also have hallmarks, unfortunately unreadable. One of the bells is also marked with a **4**. Probably also part of the cargo is a collection of small split wood boxes (Fig. 3). Maybe they fitted into one another and were transported that way.

On the surface were also visible tens of small barrels, filled with grapes and the remains of small fish, possibly anchovies.

Finally there is the intriguing find of the seed or nut from a Central / South American palm (*Orbignya spec*). Is it intrusive? These seeds can travel thousands of miles by currents. Striking is the fact that other Orbignya nuts have been found in two Dutch shipwrecks, dating from the second half of the 17th century.

It is evident that more research is needed to establish the origin of the various objects.

Conclusion
We are dealing with a very interesting ship from the second half of the 17th century, possibly of German origin. The ship is a heavy armed merchant vessel. At this moment nothing can be said with certainty about the trade route (maybe from a southern direction) or whether she was waiting to be unloaded at the Texel Roads and caught by surprise in a heavy storm. Especially the cargo, with its very diverse composition, is very promising as we consider that only finds from the surface were collected. What surprise does the hold, further down, have in store for us?

(1) Vlierman, K. 2001, Voorlopige conclusies op basis van verzamelde objecten tijdens de verkenning van de wrakplaats "Lelie 2" in het duikseizoen 2002 (Internal report NISA).

(2) Kleij, P. 2002, Verslag ceramiekdeterminatie Burgzand Noord 10/Lelie 2 en Texelstroom 13 (Internal report NISA).

Leon Vroom, Frank Koppen,
NISA

On the use of the data logger system WaterWatch 2681 at marine archaeological site BZN

In order to measure the environmental conditions around the BZN 10 wreck a data logger WaterWatch System 2681 manufactured by EauxSys Ltd (UK) has been deployed. This logger is able to measure several seawater and sediment parameters (Table 1). Two loggers were delivered at NISA in March 2002 and technicians of EauxSys gave a small hands-on training course for the NISA technical staff. At NISA the authors are responsible for the underwater technology applied at archaeological sites including data loggers.

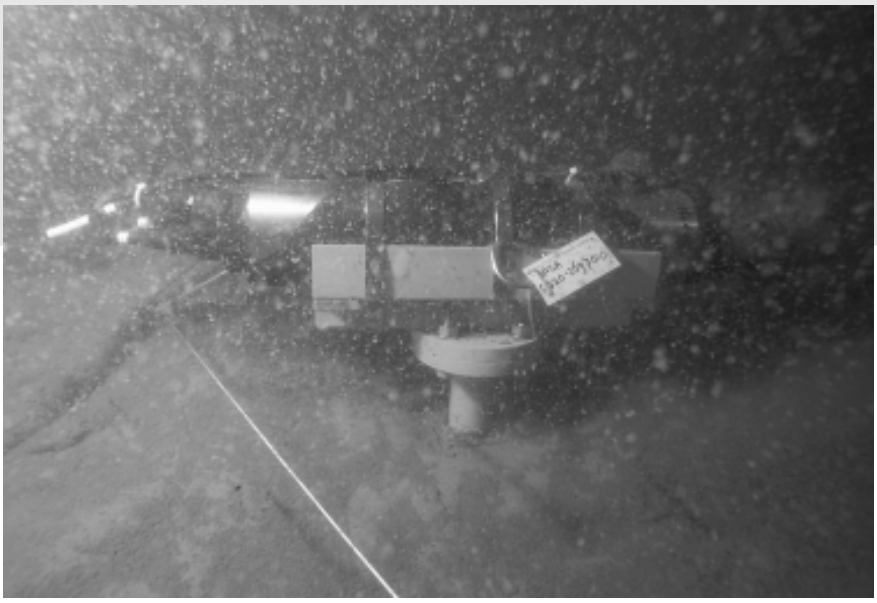


Fig. 1. Data logger installed at the BZN 10 site (Photo: R. Obst).

Test runs with the data loggers were carried out in the NISA diving pool. Main goals of these tests were getting an impression of the general behaviour of the instruments and building up some experience how to handle the systems. The results were disappointing. The systems appeared to be far from fully developed; some sensors were lacking and the hardware, casing and software showed several stupid faults. This was a problem, because of the need to deploy the loggers within a few weeks. With hard work and some luck the most serious problems could be solved in time. A faulty date / time recording was overcome, by keeping track of the deployment and recovery times.

At the BZN 10 site a 2-meter pole with a flange was placed in the sediment using a water jet. A holding-bracket (with a mating flange) suitable for the logger + the external battery container was developed at NISA (Fig. 1). Mounting or dismounting of the data logger by a diver was now a matter of only four bolts. This could be done easily even under the standard low visibility conditions and the local tidal currents.

The first deployment was carried out from June 12, 2002 to July 11, 2002. The results were encouraging. Although not all the sensors were available the overall results were satisfactory, taking into account that this was the very first try. A remarkable fact was the abundance of marine organisms that almost covered the logger including the sensors (Fig. 2). The BZN 10 site is located in the biologically active Wadden Sea and this was clearly demonstrated. The use of anti-fouling paint during the following deployments reduced these problems to an acceptable level.
The windows of the turbidity sensor and the sensor face of the DO-sensor must stay clear. The logger has a wiper-system that should keep these surfaces clean. This wiper is not strong enough to inhibit the bio fouling, which accumulates. After a while the wiper is blocked and the rotating axis breaks internally. EauxSys can easily repair this, but a permanent solution has not been found yet.

Parameter	Unit	Reason for measurement
Temperature	degr. C.	Degradation processes are influenced
Conductivity	mS / m	Needed for the calculation of the salinity of seawater
Pressure	dbar	Indicator of the tidal movements of the water
Oxygen	mg / l	Dissolved oxygen is important for degradation processes and marine life
pH		Indicator of the oxidizing power of seawater
Redox	mV	
Sedimentation		Indicator of sedimentation rate
Turbidity	FTU	Indicator of the amount of particles in the water

Table 1.The measured parameters.

The second deployment was a big disappointment. Only during the first 14 days of the 2-month deployment did the logger acquire data. The battery was completely empty and the housing (made of stainless steel type 316, SS) showed severe put-corrosion (Fig. 3). The problems were of such a magnitude that one of the goals of the MoSS-project was in

danger. External specialized help and advice was needed. One of the data logger experts of the Royal Netherlands Institute for Sea Research, Ing. S. Ober was able to provide this support. He recognized two types and causes of corrosion.
The earlier mentioned put-corrosion was caused by a shortcut of the battery power to the seawater via the SS-housing. This current-leak dissolved the housing locally very effectively. The manufacturer, EauxSys, found the cause of the shortcut to be seawater. The underwater connectors used (Brand: Seacon) had a production-error. Connectors and housing were replaced under warranty.

Another type of corrosion was found at the place were the SS-mounting clamps (of the holding bracket) were in contact with the SS-housing. This corrosion was only superficial and was caused by an oxidized water in between the clamps and the logger housing. An oxidized water is formed when flushing does not refresh the seawater. An oxidized water acts as a strong acid. This can be avoided by preventing the capture of water underneath clamps, etc. by using rubber as filling material. Rubber acts also as an isolator preventing electrolytic corrosion.

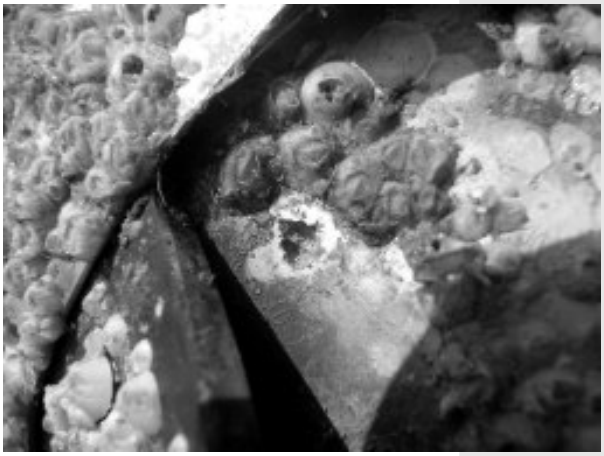


Fig. 3. Detail of the put-corrosion on the data logger housing.

It is common practice that sensors of marine data loggers are calibrated before and after a deployment. Drift of the sensors can be detected and in most of the cases the measured data can be corrected for the drift with a linear interpolation during the post processing of the data. Calibrating marine sensors is specialized work. A suitcase supplied by EauxSys containing test fluids is suitable for checking sensors. The calibration of the sensors is done in two ways. EauxSys carries out regular factory calibrations and an in situ calibration is carried out using the sensors of NIOZ, which are mounted under a jetty very near to the BZN 10 site. These NIOZ-sensors (conductivity and temperature) are state of the art, maintained carefully and calibrated against international standards.

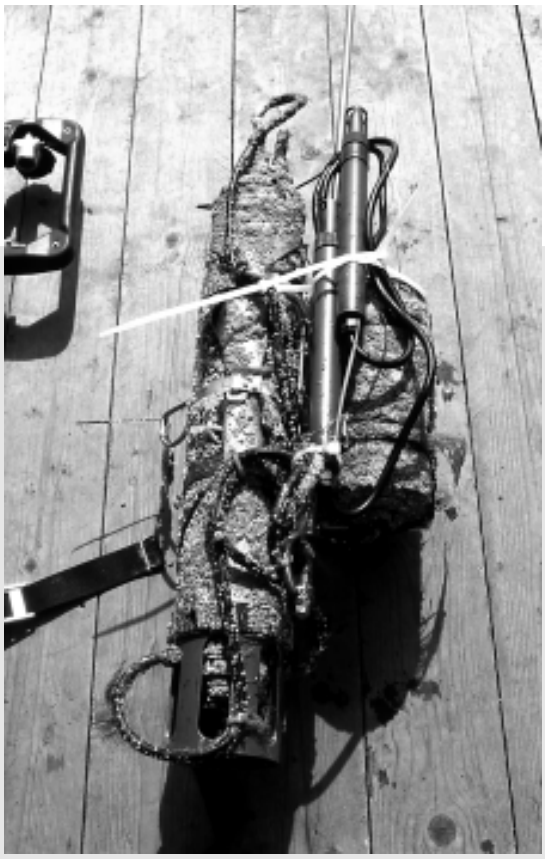


Fig. 2. The waterwatch System 2681 after two months use: fully overgrown with barnacles.

In the first year the data loggers were deployed 4 times covering 360 days at the site. During 175 days the loggers worked properly. The loggers were significantly modified during that period. The batteries were moved inside the logger housing. The external battery case and the interconnecting cable were removed from the system. The sediment sensor, missing at first due to development problems, is now deployed. In order to reduce the risks of corrosion the SS-housings is now epoxy coated. Sample data of a few parameters are shown in the graphs on page 12. Presented are Temperature, Dissolved Oxygen and Turbidity at the BZN-site during 17 and 18 December 2002.

Summarizing: the scientific results of the first year are satisfying, the technology improved significantly and all participants learned a lot from the fieldwork and from each other during the MoSS-meetings over the year. This supports the expectation that the results of the second year will be better and obtained on a more routine basis.

Thijs Maarleveld,
NISA

The Wadden Sea and heritage protection in The Netherlands

Although the first regulation for the protection of specific archaeological sites in the Netherlands dates from 1734, it was only recently that heritage protection was embedded in national law. This happened in 1961 with the adoption of the Monumentenwet. Archaeological sites under water were not an issue at the time. They do not figure in any of the preparatory work, in the text or in the explanatory memorandum. It is small wonder, therefore, that fierce discussions arose as soon as historical and archaeological interest for the underwater world awoke in the seventies. Some of the finders wanted to be keepers and appealed to private law and salvage regulations to substantiate their private interest. Others saw heritage as a common -and therefore public! - interest and appealed to the State to take responsibility. Although accepted now, this responsibility was slow to develop. In 1985 the Minister of Culture established a department of underwater archaeology that has since been integrated into the National Service for Archaeological Heritage (ROB/NISA). He also declared that the Monumentenwet did not specifically exclude underwater finds and that he would consider the legislation to apply to under water sites in Dutch territory. His interpretation was not challenged in court and was properly and explicitly codified in the legal amendment of 1988.

The protective regime of the Monumentenwet is relatively simple. It rests on two pillars: the obligation to report finds and the prohibition to carry through unlicensed excavation. In fact the system amounts to a blanket protection of all wreck-sites older than 50 years that provoke scientific or culture-historical interest. Excavation licenses are the prerogative of academic or government institutions. In practice that is not as exclusive as it seems: licensed institutions can have professionals, but also a-vocational archaeologists to do projects under their responsibility. A close cooperation between a-vocational divers and the National Service has consequently qualified the development of underwater archaeology in The Netherlands.

In 1992 the Dutch government was one of the signatories of the revised European Convention on the Protection of the Archaeological Heritage (Malta treaty). This started a process of fundamental revision of the organisation of archaeological heritage protection, a process that will culminate in new legislation. A draft is presently presented to parliament. A different system of financing and a different organisation of archaeological work are the most dramatic changes. Archaeological mitigation has been made part of the spatial planning process. Costs are attributed to every single spatial project, making all parties in such situations responsible and not just the State and its National Service. This change results in a boost of archaeological activities. To accommodate that growth small and larger companies offering archaeological services have been founded. Licensing and certification of private parties is part and parcel of the transformation. All parties are emphatically obliged to feed the central registration of archaeological data. The information is stored and accessible through the G(eographical) I(nformation) S(ystem) ARCHIS, in the care of the National Service for Archaeological Heritage.

Despite the dramatic changes that the implementation of the Malta treaty brings, the basic principles of protection remain the same. It is still the combination of the obligation to report and the prohibition to carry through unlicensed excavation, which provides blanket protection, above as well as under water. In addition, specific sites can be listed as national monument. The first under water site was listed in 1987. It is the site BZN3 in the Burgzand area of the Wadden Sea. It is a shipwreck-site containing the broadside of a 17th century east Indiaman. As you can read elsewhere in this newsletter, the listing was combined with successful consolidating measures that have been monitored ever since.

Despite the alignment of regulations applying above and below the water surface and despite the integration of authorities at the national level, the management of underwater cultural heritage still has its specific idiosyncrasies. For one thing, the borders between maritime zones qualify the extent to which protection can be enforced. In the North Sea, the State has full protective competence over its territorial waters and a contiguous zone up to 24 miles from the shore. Further out, it has competence over mining and offshore installations as well as over environmental issues and spatial planning in the zone that includes the Dutch sector of the continental shelf as well as the Exclusive Economic Zone. The obligation to report and the prohibition of unlicensed excavation apply in relationship to spatial interventions, restrictions on scientific research and environmental protection. Moreover, the Netherlands, like the other European countries, committed itself politically to the operational rules of the UNESCO Convention on the Protection of the Underwater Cultural

Heritage (Paris 2001). These rules, listed in the so-called Annex of the Convention, put serious practical limits on ill-considered operations, be they for purposes of salvage or of research. Moreover, The Netherlands is seriously considering ratification of the Convention.

In heritage management, the Wadden Sea, to which much of this newsletter is devoted, is a special case (Fig. 1). Natural heritage and cultural heritage are both very prominent. It features a cornucopia of (ship-) archaeological sites. Excellent preservation has been warranted by the specific dynamics that ensured rapid site-formation. Similar dynamics presently cause massive erosion in the western area. The dynamics as such, are highly valued. They are at the basis of an exceptional ecosystem. Consequently, large tracts are protected under the Nature Conservation Act. The Wadden Sea, after all is the largest wetland in North-western Europe and the largest foraging area for migratory birds. Its protection warrants that the natural dynamics are not compromised by development or inappropriate use. It calls for dynamic management in which proper attention for natural and cultural heritage are integrated. That is more than listing of an individual site and protection of other archaeological sites under the blanket provisions of the Monumentenwet. It means active monitoring, assessment of the intrinsic cultural value of sites as well as of the specific dynamics protecting or eroding the site and it means interventions. These interventions can be consolidating measures, but of needs also include full-scale excavation if the natural dynamics cannot be stopped. Evidently the intensification of archaeology in the planning process and the concomitant systematics of costing do not apply. It is the (national) management of the protected area that should provide adequate funds. In view of its outstanding universal natural and cultural value and as an onset to an integrated dynamic management plan The Netherlands has listed the Wadden Sea in its "tentative list" for the World Heritage Convention since its accession to that convention in 1992. A tripartite nomination, together with Germany and Denmark, is subject of deliberations within the framework of the Wadden Sea Ministers Conference. Much of the work presented in this newsletter is tuned to facilitating future management in an integrated European context.

Fig. 1. In order to support decision-making, The ROB has developed several predictive tools. One is the Indicative Map of Archaeological Values (IKAW). It covers The Netherlands and the Dutch Sector of the North Sea Continental Shelf. Here the area around Burgzand is shown. Prior knowledge and our present understanding of the processes involved in conservation are rendered cartographically. Dark shades indicate a high potential of good quality sites. Light shades indicate a lesser expectation. Work on the Indicative map is a major project, which needs constant refining and updating. The MOSS-project produces important feedback.

Rob Oosting,
NISA

Monitoring and Safeguarding wrecks in the IJsselmeerpolders

Monitoring, safeguarding and research on the degradation of ship wrecks of wood in the Netherlands finds its origin in the IJsselmeerpolders. A lot of data from as long ago as the early eighties can and will be compared with data on the degradation of shipwrecks that have been collected for the MoSS project.

Since 1942 more than 400 shipwrecks have been found on the former seabed of the Zuiderzee. These shipwrecks were for the greater part found following the reclamation of the new land. Still 2-3 new sites a year are discovered. Up until 1975 many shipwrecks (about 300) were excavated and dismantled. Since then research has been done to look for a method to protect shipwrecks "in situ", to give further generations the opportunity to study these wrecks.

The developed method is raising the ground-water-table in a plastic container (Fig. 1). The idea behind this is that restricting oxygen inhibits biological degradation of the wreck. Practically it works as follows:

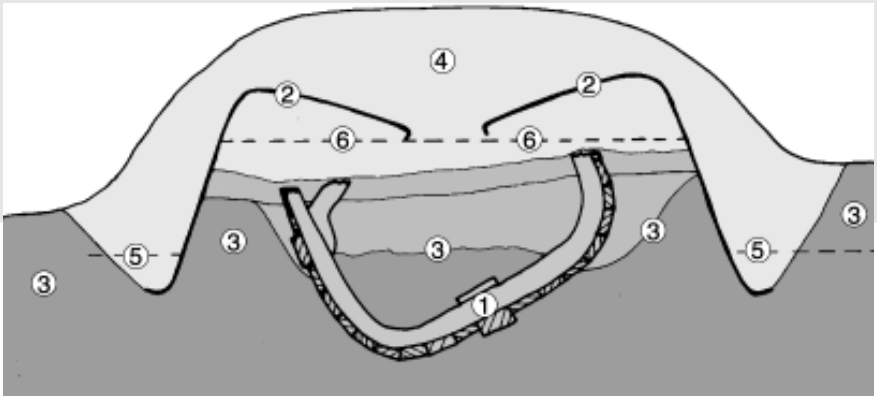


Fig. 1. Method of protecting shipwrecks in the IJsselmeerpolders.
1. shipwreck
2. plastic foil
3. original sediment
4. sediment deposited on wreck after placing the plastic foil
5. ground water level outside the "plastic tub"
6. ground water level inside the "plastic tub"

- Under the wreck lies an impervious layer of clay;

- Above the wreck a layer of light sandy clay is deposited;

- A vertical plastic foil is placed around the shipwreck to retain rainwater;

A perforated plastic foil is placed over the mound, which overlaps the vertical foil. Rainwater passes through the cover into the plastic containing wall around the wreck. The horizontal plastic foil also inhibits evaporation.
18 shipwrecks have been protected in this way. Monitoring on some of these shipwrecks between 1985 and 1987 shows good results. Fig. 2 shows us the data for the wreck of a Waterschip (1) on lot Kz 47 in Zuidelijk Flevoland. The ground-water-level in the plastic tub varies from 60 cm (maximum) above the surface to 8 cm (minimum) below the surface. Outside the tub the ground-water-level varies from 110 cm (maximum) below the surface up to 60 cm (minimum) below

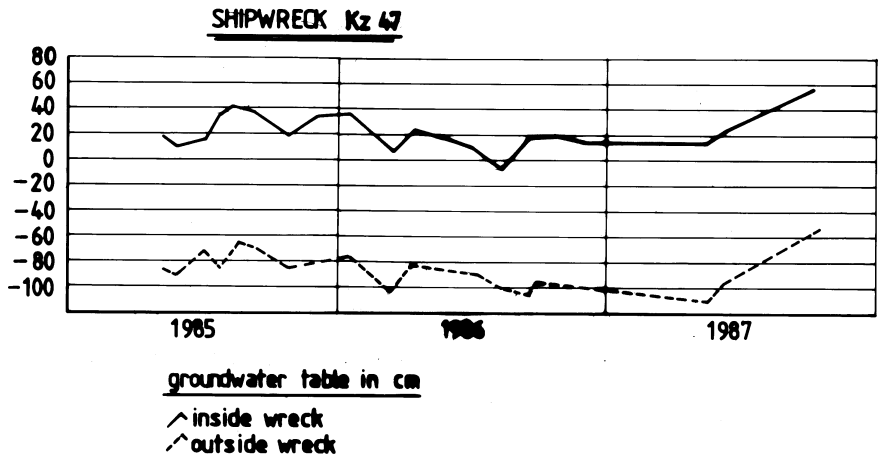


Fig. 2. Ground water table in cm below the surface (upper graph = inside plastic tub; lower graph = outside plastic tub).

the surface. This means an average increase of the ground-water-table in the plastic tub of 1 meter.

In the summer of 2003 samples from the shipwreck Kz 47 were taken for the Bacpoles-project (Fig. 3). In this European project research is done on bacteriological decay of the wood. The results of this project are expected before the end of 2005. Sampling the Kz 47 gave us the opportunity to inspect the soil and wood within the plastic tub. The upper parts of the wood were in a moderate condition, the lower parts were in a good condition. The soil above the ship was wet. In spite of the fact that it was an extreme hot and dry summer the ground-water-table was approximately 60 cm below the surface while the ground-water-table outside the tub was more than 210 cm below the surface.

Fig. 3. Sampling of the Waterschip on lot Kz 47 for the Bacpoles project.

(1) Waterschepen were used from the 16th century until the end of the 19th century not only as fishing vessels but also as tugboats to tow big seagoing vessels.

Martijn Manders,
NISA

Safeguarding: The physical protection of underwater sites

The Netherlands has a long tradition of "in situ" preservation of maritime archaeological sites. In 1988 the BZN 3 wreck, a ship of the East India Company (VOC) was the first wreck under water being physically protected as well as by law. This wreck was covered up with layers of polypropylene mesh (or gauze) and 6000 sandbags. Now, the physical protection of shipwrecks under water has developed and changed somewhat. The protection of the sites has always been led by common sense. Over the years our skill has increased but there are not enough scientific data to support our methods and ideas.

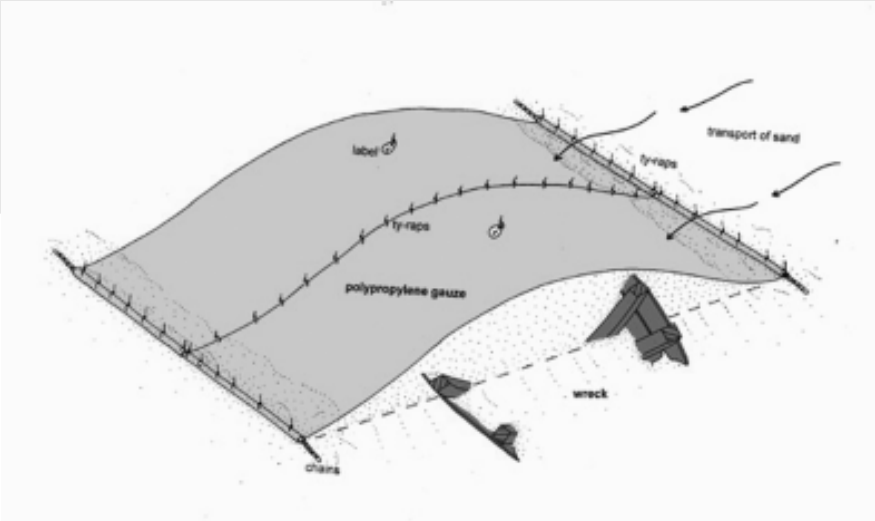


Fig. 1. Method of physical protection of shipwrecks underwater.

After more research on the processes that are responsible for the deterioration of shipwrecks and that control the speed of degradation, we can evaluate the current methodology. To this end, the test mound of the BZN 10 wreck has been physically protected and this protection is monitored regularly. The physical monitoring is as follows; twelve [Shirley Test] strips wrapped in cellulose are buried in the sediment, together with 28 open PVC pipes with small oak and pinewood blocks. After installation these samples have been covered with polypropylene scaffolding mesh (100 % polypropylene and 50% density). The mesh is loosely placed over the site (to be able to catch a maximum amount of sand and silt) and weighted down with old iron chains. Divers bring down one roll of mesh at a time. The iron chains are already fixed on the ends on the 3-meter wide mesh. They are rolled up to take them down to the site and rolled out under water. Afterwards the

Fig. 2. A few weeks before this picture was taken, the mesh has been placed on the wreck site. It is completely filled with sand (Photo: R. Obst).

lengths of mesh are connected to each other with cable ties (Fig. 1). The same principle of physical protection is also used on the BZN10-wreck itself. The conditions are therefore comparable.

In the Burgzand Area more wrecks are protected in the same way (See Vos; this Newsletter). Similar tests are carried out on the Darsser Cog in Germany and the Avondster wreck in Sri Lanka.

Effects

The mesh has positive effects on the protection of wreck-sites; it prevents more wreck sediment being taken away by currents and it even builds up a layer of sand and fine silt under the mesh (Fig. 2). This creates an anaerobic environment that should protect the wreck and its artefacts against organisms that need oxygen: The same kind of environment that has protected the wreck for more than 300 years (Fig. 3). Will this protection also work against the severe attack of the shipworm or against anaerobic and sulphate-reducing bacteria? If the layer of deposited sediment is thick enough, it will certainly work as a vital protection against marine wood-borers. Another, immediate positive effect of this protection is that mesh and sand create a sloping mound over the wreck that is less vulnerable for physical degradation from fishing nets and abrasion of sand and other material moved by the sea.

Other advantages of protecting shipwrecks with scaffolding mesh are: the fact that it is not difficult to place it on the site; the protection can be extended easily; the mesh forms itself around the wreck and can adjust when there is a fluctuation in the depth of the seabed; nature takes care of the protection by moving sand up and down the wreck mound; the

Fig. 3. Testing area protected with mesh. The labels indicate the positions of the anaerobic samples (Photo: R. Obst).

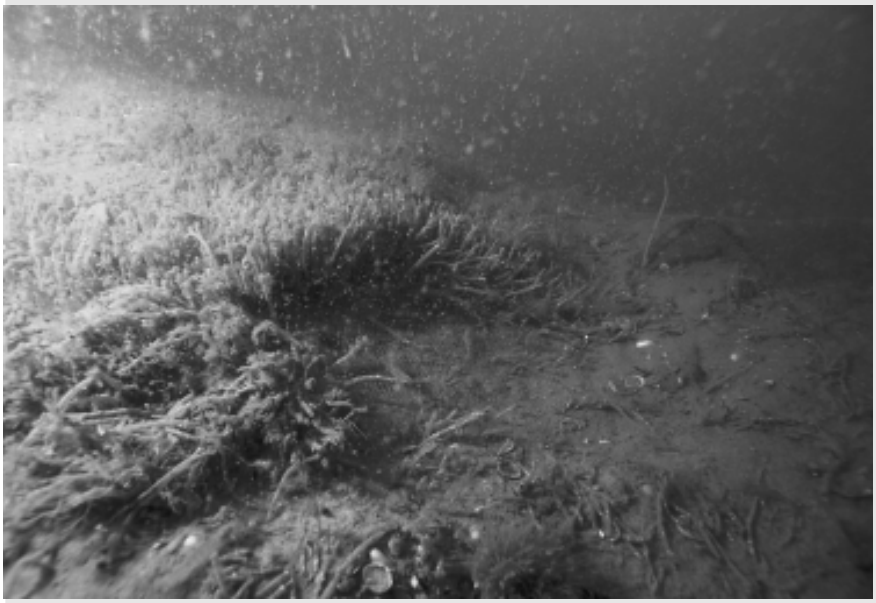


Fig. 4. This mesh has been placed on the wreck site one year before. All kinds of organisms have colonized the mesh (Photo: R. Obst).

mesh is easy to remove again and last but not least; covering a whole wreck doesn't cost much: the material to cover a wreck-site doesn't exceed a few thousand Euro. A problem with this mesh is that after a few weeks the holes in the mesh tend to block by the growth of organisms (Fig. 4). On the 17th century wreck of a Dutch VOC-ship in Sri Lanka this happened within two weeks (1). This wreck has sunk near a river outlet and has been covered by fine silt over more than two centuries. Due to the construction of a road, that moved the shore closer to the wreck, this silt is rapidly washed away and the surfacing wood is deteriorating very fast. At the "Avondster" site, there is hardly any current; however the swell moves the sediment over the seabed. The preliminary results of the physical protection with mesh on this wreck are that no sediment is moving out of the wreck anymore and within one month a 15 cm thick layer of fine silt has covered the protected parts. To compare: in the Wadden Sea the sediments built up to more than one meter within a few weeks. The mesh that was used on the Avondster site is of 60 % density. It has therefore a closer structure. Maybe a mesh with an opener structure will be leaving more silt on the wreck in a shorter period. It also might catch sand and silt for a longer period than two weeks. In the Netherlands it depends on the season how quickly the holes in the mesh close. In the summer the growth of organisms is much stronger than in winter, probably due to a higher temperature of the water. When this happens and when not enough sedimentation has been settled on the wreck, then there is a risk that the mesh will rip. This method can therefore not be used in wrecks with a lot of high vertical elevations or differences. It is also important that there is enough sand carried in suspension or transported along on the seabed.

To protect and not excavate (yet)
Over 500 archaeological interesting shipwrecks found under water are registered at the ROB/NISA. Roughly the same amount is known from the "polders". It would be impossible to intensively investigate (excavate) all of the archaeologically interesting wrecks in Dutch waters within a short period. And if we do, nothing is left for future generations. It is therefore necessary to keep the conditions of the wreck as good as possible until extensive research can be started. A non-intrusive assessment is always executed as soon as possible. Protection of the wreck is based on this research. These assessments also form the bases of prioritizing wreck sites. The informative value of the wreck is taken into consideration as well as whether wrecks can be protected cost effectively and for how long. Prioritizing underwater archaeology is under intense discussion at the moment. Some say it is not right to make a distinction between different kinds of shipwrecks; all are as important in trying to reconstruct the past. Basically this is true. However prioritising in the Netherlands is a matter of being realistic within limited budgets and personnel.

With the help of the physical protection of shipwrecks underwater it is possible to create an archive of wrecks from which we have basic information. This can help us in the future to select the right wreck to be excavated that can answer specific questions that we have about our maritime past.

(1) See for more information www.hum.uva.nl/galle. The author is a consultant and trainer for the Sri Lanka diving team working on the Avondster wreck.

Seger van den Brenk,
Rijkswaterstaat

Innovative research at the BZN10 wreck site

Introduction
In July 2003, the Renard Centre of Marine Geology in combination with: Nederlandse organisatie voor toegepast natuurwetenschappelijk onderzoek (The Netherlands Organisation for Applied Scientific Research, TNO) carried out a seismic 3D survey at the BZN 10 wreck site. The goal of this survey was to see whether the 3D seismic system, called OPUS3D can be used to detect buried wooden objects up to a depth of 4 meters below the seabed. The results of this 3D seismic research will be published in October 2003.
At the same time, the Directorate IJsselmeergebied of Rijkswaterstaat performed a high-resolution multibeam survey in the area, which results are published in this paper. Both surveys were part of the IMAGO project, but the results will be used also to monitor the sediment movements around and the physical protection of the BZN 10 wreck.

The IMAGO project
In May 2001 Rijkswaterstaat started the IMAGO project (Dutch acronym for Innovative Measurements of Sunken Objects). The goal of this project is to investigate whether techniques exist which can detect manmade or uncommon (particularly wooden) objects in the water bottom. These objects include for example (wooden) shipwrecks, ammunition, airplane wrecks and prehistoric forests. The immediate justification of the IMAGO project was the unexpected presence of buried objects in the working area of Rijkswaterstaat.
The dredging of a shipping channel between the cities of Amsterdam and Lemmer has been delayed several times by the unexpected discovery of buried shipwrecks. In order to prevent such delays in the future, a proposal was written for investigating methods to detect artificial objects in pre-dredging surveys. Detection of such objects in an early stage of a dredging project will dramatically decrease risks (and thus the costs) of the project.

Multibeam survey
The research area in the Wadden Sea (300 x 250 m) was mapped with a Reson 8125 multibeam system. Within the area, four different wrecks were mapped: BZN 3, BZN 8, BZN 11 and BZN 10. With the highest possible resolution, details greater than 10 cm were mapped (Fig. 1 and 2). Within the MoSS-project this precise method of mapping the seabed is now used to monitor changes in depth around the wreck site (Fig. 3a, b and c - page 22).

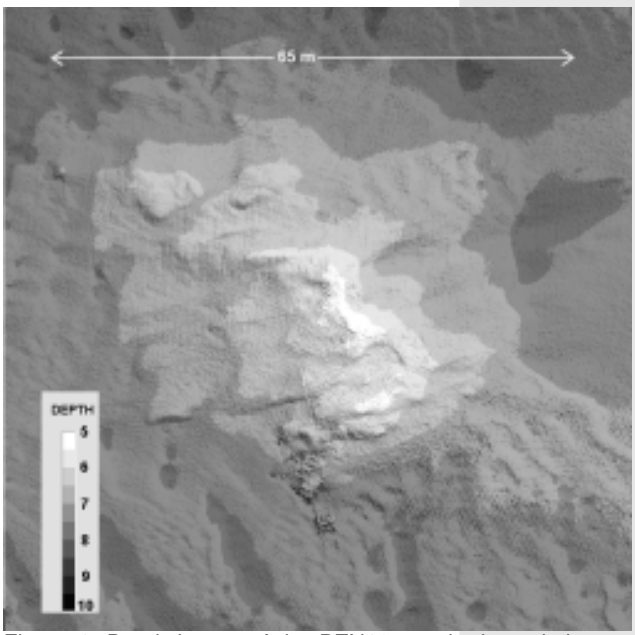


Figure 1: Depth image of the BZN10 wreck site, relative to Amsterdam Level. The data is based on a 10x10 cm grid of the multibeam survey, July 2003. Details like the five frames with aerobic wood samples and even the data logger can be distinguished.

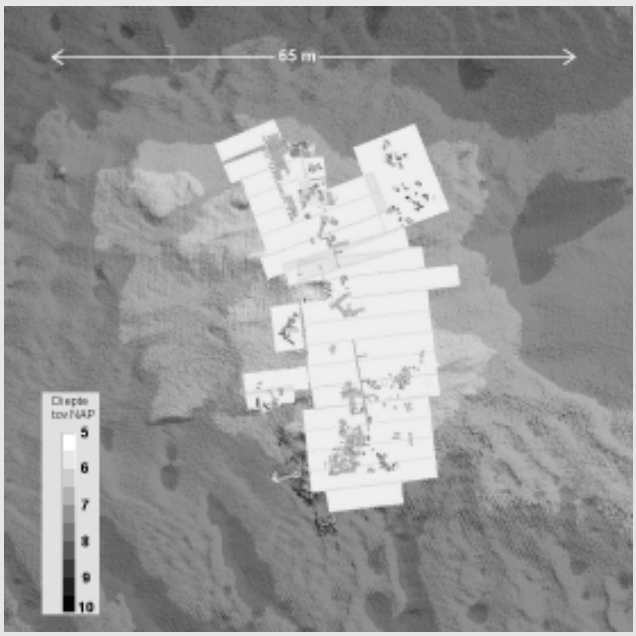


Figure 2: Multibeam depth image relative to Amsterdam Level overlain by a drawing of the BZN10 wreck site.

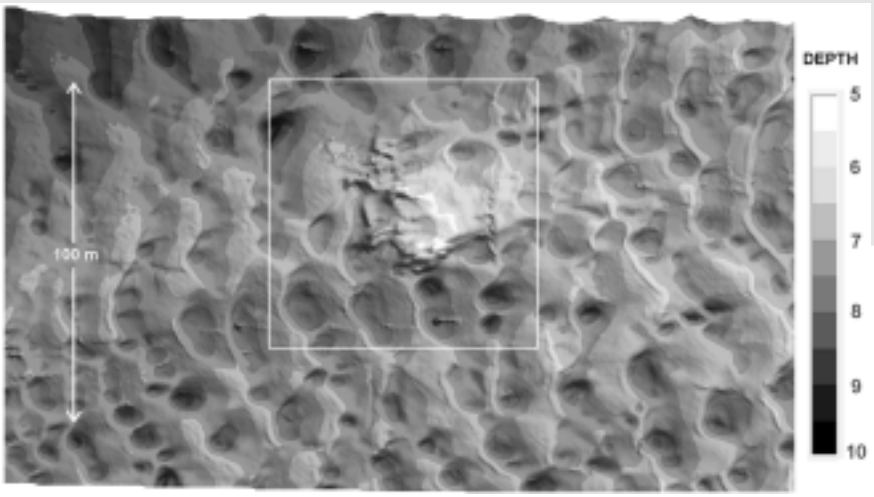


Figure 3a: Depth image relative to Amsterdam level of the multibeam survey of April 2002. The white square represents the wreck site of figure 1. The clear pattern of north-south running mega current ripples are caused by high tide currents in an east-west direction. The survey was performed just after the first phase of the covering of the wreck.

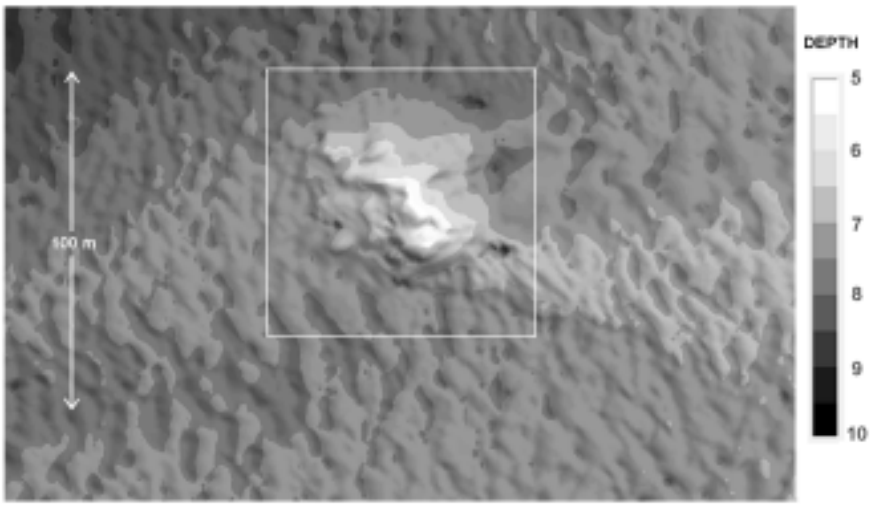


Figure 3b: Depth image of the multibeam survey of July 2003. The area has flattened out, the current ripples are less pronounced but still present. This survey was performed during the second phase of the covering of the wreck.

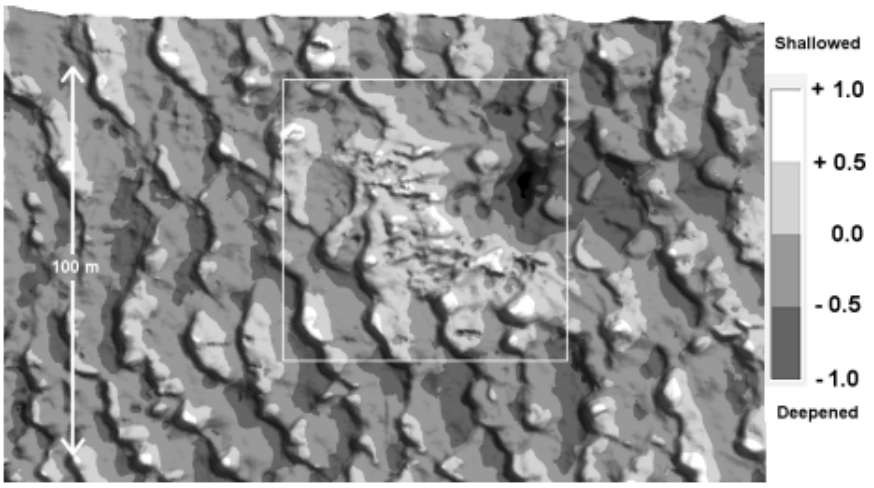


Figure 3c: Map showing depth change based on the difference between the two multibeam surveys. Within the surveyed area (100 x 200 m) the average depth has increased with 20 cm within a period of 15 months, which means that some 4000 kubic metres of sediment had disappeared (eroded) from the area.

Carl Olof Cederlund,
Södertörns högskola

The second international MoSS seminar on the *Visualization of Shipwrecks and Shipwreck Sites* in Stockholm and at Forsvik, 27-28th of June 2003

The second international MoSS seminar took place at the Vasa Museum in Stockholm and also at the Forsvik Industrial Heritage and Forsvik Shipyard Association, Sweden, on Friday 27th to Saturday 28th, June 2003. It was arranged by Södertörns högskola (University College) and The National Maritime Museum of Finland, Helsinki, as the coordinator of the MoSS project. It was arranged in cooperation with The Swedish National Maritime Museums / the Vasa Museum, Stockholm, and The Forsvik Industrial Heritage / Forsvik Shipyard Association, Karlsborg.

The lecture program of the two-day seminar can be found in the MoSS Newsletter 2003 / 1. The seminar was designed to highlight different aspects of the visualization theme of the project, focusing on the Swedish naval ship Vasa from the early 17th century and the Eric Nordevall, one of the earliest paddle steamers in Sweden (1837-1856). The seminar started at the Vasa Museum in Stockholm, Friday the 27th of June and followed the next day, Saturday the 28th, in Forsvik, Karlsborg west of lake Vättern.

The seminar in the Vasa Museum was open to the public. The seminar and the lectures had been publicized in the museum's summer newsletter.

After the Vasa seminar delegates were transported by bus to Forsvik for a late supper.

On Saturday, 28 June 2003, in Forsvik the day started with an introduction to the Industrial Heritage and Forsvik Shipyard Association by the Chairman, Director-General Birger Bäckström and by Lars Bergström, Director of The Forsvik Industrial Heritage.

There then followed a series of presentations on the visualization of shipwrecks in Northern Europe, concentrating on the building of a full-scale replica of the paddle steamer Eric Nordevall. The wreck of the E. Nordevall is the subject of the Swedish participation in the MoSS project.

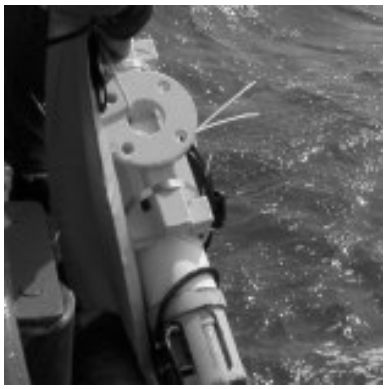
The delegates and guests discussed the presentations during the day in open session. The Eric Nordevall shipwreck and the developments of the project since the discovery of the wreck site in 1980 was used to illustrate the problems involved with monitoring, safeguarding and visualization of shipwreck sites in northern Europe. A presentation on marine archaeological parks in Canada added an international dimension to the programme and was an important addition to the seminar. The importance was recognized of comparing best practice and experience from outside Europe.

The general public to Forsvik Industrial Heritage and Forsvik Shipyard Association were invited to sit in on the lecture program. The annual Forsvik Days coincided with the Moss seminar and many people were visiting the site.

The seminar ended with an excursion in a traditional steam sloop and a dinner.

The delegates to the international MoSS seminar in Forsvik studied the building of the full-scale copy of the paddle steamer E. Nordevall at Forsvik Shipyard Association. This paddle steamer is the wreck used by the Swedish MoSS partner as a study object in the project. (Photo: Carl Olof Cederlund.)

what's on?



meetings & seminars

Meetings:

The project meetings are staged for discussion within the project and are mainly held by the representatives of the different nations in the project. At the meetings the participants discuss about the general issues of the project, the research work done at the sites and evaluating the methods and results of it. Important matters are also how the information is going to be published and used within the different themes of the project. There are also sub-groups for the different themes in the project. The next meeting will be held in Helsinki, Finland and will be arranged by The Maritime Museum of Finland.

Seminars:

Maritime archaeology and history scholars, experts, practitioners and people interested in underwater cultural heritage from all around the world are invited to these open seminars to hear and discuss about the themes and the results of the project.

The third seminar of the MoSS-project will be held in Portsmouth, UK on the 3rd to the 6th of June 2004. The aims of the seminar are monitoring, safeguarding and managing the shipwreck sites. More detailed information will be available during spring 2004 in our Internet site www.mossproject.com and the forthcoming newsletters.

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PL 913, FIN-00101
Helsinki, Finland

Editor: Carl Olof Cederlund
Phone +46 8 608 4201
carl-olof.cederlund@sh.se

Language checking:
Charles Barker
Phone +44(0)23 9275 0521
charlieb@maryrose-as.com

Layout: Vesa Hautsalo
Phone +358 9 4050 9072
vesa.hautsalo@nba.fi

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