SUBZONE

Maritime archaeological site survey Huis te Warmelo 1708-1715.

Research report

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Helsinki-Tallinn 2017

Summary

Subzone Oy conducted during the summer 2016 an archaeological survey of the shipwreck located 1 nautical mile West from Kalbådagrund lighthouse, Porvoo, Gulf of Finland. Lat 59° 59,2089' Lon 25° 33,6103' (ETRS89/WGS84).

The main goal was to identify the wreck, that has register number 2381 in the Finnish National Board of Antiquities Registry of Ancient Monuments. The name in the register is Suomenlahti avomeri. Other names used of the wreck are Frigate of Porvoo and Kalbådagrund Gunship.

Earlier archival research conducted by Subzone Oy in 2015, showed that the wreck is not a Russian nor Swedish man-of-war. The size of the wreck and the number of guns, as well as the location all together did not match to Russian or Swedish man-of-war that had sunk in the end of 17th century or during 18th century.

One of the North Holland Admiralty warships, Huis te Warmelo, sunk at Kalbådagrund in 1715. The archival material of Huis te Warmelo, studied and collected by historian Peter Swart, was compared to the data collected during the research.

The measurements, building style, guns, gun carriages, structures of the ship and location supported the assumption that the wreck is Huis te Warmelo. The research did not reveal any discrepancies that the ship wreck is Huis te Warmelo.

Because no state loses 40 gun man-of-war without reports and marking in the archives, and no other warships sunk in the Gulf of Finland during end of 17th century and 18th century matches with the size, number of guns and location, we can be sure that the one that does match is the right one. The wreck, that has register number 2381 in the Finnish National Board of Antiquities Registry of Ancient Monuments and located 1 nautical mile West of Kalbådagrund, is the wreck of the North Holland Admiralty warship, Huis te Warmelo.

Content

Introduction

The Kalbådagrund gunship wreck was found in 2002 by Finnish Maritime Administration during hydrographical surveys. She lays at the bottom of the Gulf of Finland (Suomenlahti), off the town of Porvoo. The Finnish Maritime Administration provided a report with multibeam sonar image of the target to the National Board of Antiquities in 2004. The wreck site is open to the divers and since 2004 various hobby divers have visited the wreck. According to the Finnish National Board of Antiquities Registry of Ancient Monuments, the diving team of Jussi Kaasinen photographed and video shot the wreck in 2006. A video by Pasi Raasakka from Jussi Kaasinen's team was the first documentation of the wreck done by divers. Jussi Kaasinen's team estimated the wreck to be a warship from 18th century. The photos from the year 2006 by Jussi Kaasinen's team are presented in the Registry of Ancient Monuments. In 2011 Mikhail Ivanov was measuring and observing the details of the wreck and made the first sketch of the wreck which he provided to the National Board of Antiquities. Mikhail Ivanov also noticed looting of the dishes in 2011 and reported that to the National Board of Antiquities. In 2013 and 2014 the Badewanne diving team was photographing the wreck and the photos from 2014 are presented in the Registry of Ancient Monuments.

Between 29.06 – 02.07.2016, 24.08.2016 and 26.08.2016 maritime archaeological surveys were undertaken at the Kalbådagrund gunship wreck site in the Gulf of Finland by SubZone Oy in partnership with the Cultural Heritage Agency of the Netherlands and support from the City of Medemblik.

The purpose of the research was to confirm the identification of the shipwreck and to compile the proper documentation of shipwreck site using only non-destructive methods like filming and photographing.

Technical data

Register number: 2381
Permit number: MV/60/05.04.01.02/2016
Municipality: Porvoo
Name: Suomenlahti, Kalbådagrund gunship,
The Dutch warship Huis te Warmelo
Coordinates (ETRS89/WGS84): Lat: 59° 59,2089', Lon: 25° 33,6103'
Date of surveys: 29.06 – 02.07.2016, 24.08.2016 26.08.2016 - video filming
Research area: 1400 m^2
Company: SubZone Oy
Responsible researcher: Maili Roio
Report: SubZone Oy
Museovirasto, arkeologian keskusarkisto
The Cultural Heritage Agency of the Netherlands
The County of Medemblik

Personnel:
Immi Wallin – project manager, data post processing
Maili Roio – maritime archaeologist, responsible researcher
Kari Hyttinen – diver, videographer, data post processing
Cemo Timucin – diver
Pasi Lammi – diver
Ivan Borovikov – diver, videographer, data post processing
Pekka Vaittinen – diver
Mikhail Ivanov – diver
Toni Nevalainen - diver
Marii Asmer – social media
Peter Swart – archive research in the Netherlands and UK

Technical equipment:
Research vessel Yoldia (Fig 1)
Length 12,2 m
Beam 4 m
Draft 1,7 m
Gross Tons 19 T
Engine Doosan L136 147kW Heavy Duty
Communications, Navigation and Sounding Electronics:
VHF Marine Radio (2), EBIRB, AIS A-Class, Radar (4kW antenna), DGPS, Autopilot Robertson AP-35, Depth Sounder (100-200 kHz), Side Scan Sonar (400/900 kHz), Deck crane Hiab 250, Life raft 10 pers., compressor for breathing air, breathing gas mixing system (Trimix)
Side Scan Sonar

DSME Sonar Beam UTech S-150S 400kHz

Underwater cameras

Canon EOS 5D Mark III with Easydive Leo housing, various lenses

Sony a7s with Nauticam housing, various lenses

Lights

2x100w led Northern Light Scuba

2x32000 Lumen led Northern Light Scuba

2x1kW led Northern Light Scuba

2x80w Lumen led Easydive

Diving equipment

Each diver had drysuit and closed circuit rebreather unit and 3-4 bailout cylinders (One diver with open circuit system)

Data processing equipment

2xpc each with 64bit OS, 32G memory, Intel i7 8 cores 2.80 GHz CPU, 3TB HD, Two NVIDIA GeForce GTX 980 GPU

Fig. 1. The research vessel Yoldia. Photo: Immi Wallin.

Fig. 2. First fieldwork day on board: Pasi Lammi, Cemo Timucin and Kari Hyttinen. Photo: Maili Roio.

The beginning of the identification of wreck

In 2014 SubZone measured and documented the wreck site by video, calculated the cannons and made some other basic observations. It became clear that this was a warship, 35 m long, from its shape built around 1700 and with 17 cannons on the upper deck and about the same amount on the lower gun deck. After that, Immi Wallin started to study the literature regarding the warships in Baltic Sea in the late 17th century and early 18th century. Together with Marcus Hjulhammar (professor of Baltic maritime history at Helsinki University) they went through the archives in Sweden.

1.09.2014 Wallin sent e-mail to Maili Roio from the Estonian Heritage Board and asked if they had any markings of an early 18th century 40 gun frigate that sunk off Porvoo in Gulf of Finland. Unfortunately, Roio didn´t find any information about the cannon ship.

In January 2015, Wallin went to St. Petersburg and visited the Poltava shipyard, where they are building a replica of Poltava, a ship from Tsar Peter the Great's fleet. Wallin made contact with the Russian historians who were experts of the Russian fleet in 1700-1725. In the summer of 2015, it was clear that the wreck was neither Russian nor Swedish after extensive research there turned out to be no match for any Swedish or Russian warship in that area. Wallin's conclusion was that the wreck may have been well of another provenance.

In November 2015 historian Peter Swart, specialized in the history of the West Frisian Admiralty, studied a sea map in the Maritime Museum Rotterdam. On this map, drawn by mapmaker Abraham Maas dated between 1716-1726, then in St Petersburg, indicated

due west of the island of Hogland a note ‘Hier is het Noord-Hollands oorlogsschip op gebleven 1715’ translation: Here the North Holland warship was left. This clearly indicated the loss of a North Holland war ship. In this year the admiralty of West Frisia (North Holland) lost only one ship in the Baltics, the 125 feet long frigate named ‘Huis te Warmelo’.
County archaeologist for Medemblik, Michiel Bartels, was asked to investigate if such a vessel was probably found in the Gulf of Finland. Bartels inquired with Estonian colleague Erki Russow who directly contacted Roio if they know anything about such a wreck. Roio understood immediately that the lost Dutch war ship was most probably the wreck Wallin studied in 2014 and she had the question forwarded to Wallin. Now the most striking answer was send: yes, we found such a ship on the coordinates of the 18th century map.

Site and environment

The wreck lays at the bottom of the Gulf of Finland (Suomenlahti), south of the town of Porvoo and southeast of Helsinki (Fig. 3). The wreck is located in Finnish territorial waters west of Kalbådagrund lighthouse. The Gulf of Finland is relatively shallow 38 to 100 meters. The maximum depth around the wreck site is 62 meters below sea level.

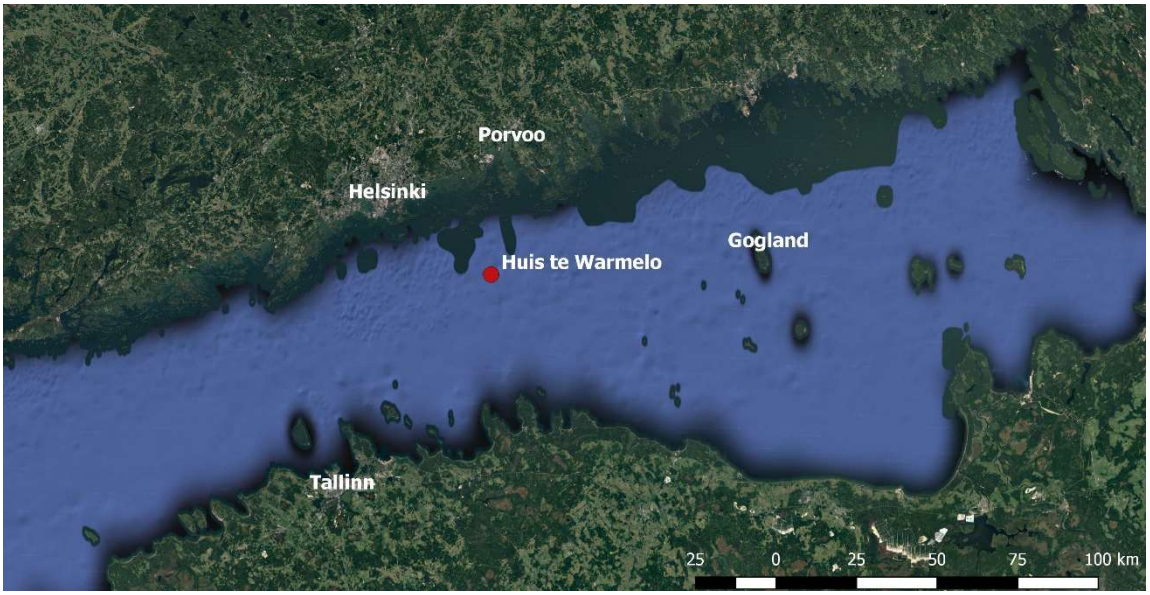

Fig. 3. Location of wreck Huis te Warmelo. Map: Google Map, Maili Roio.

The gulf water has very low salinity – between 0.2 and 5.8 ‰ at the surface and 0.3–8.5 ‰ near the bottom. The average water temperature is close to 0 °C in winter; in summer, it is 15–17 C at the surface and 2–3 °C at the bottom. The gulf is usually frozen from late November to late April; the freezing starts in the east and gradually proceeds to the west. Complete freezing is usually reached by late January, and it might not occur in mild winters (Wikipedia).

Condition

The timber of the wreck observed to be in remarkably good condition. The ship proved to be a very well kept warship showing no damage from battle, fire or shipworm. The hull, decks, masts and armament are still present. The fore mast up to the first extension is still standing up right (Fig. 4.). The main mast and mizzen are fallen to the port side of the wreck (Fig. 5, 6).

Fig. 4. The top of the fore mast. Video frame capture: Ivan Borovikov.

Fig. 5. The main mast at the seabed. Video frame capture: Kari Hyttinen.

Fig. 6. Detail of the main mast at the seabed. Video frame capture: Kari Hyttinen.

The wreck is partly buried in the seabed, which has provided excellent conditions for preservation. Two deck levels are above the floor surface. The wreck is in the sediment up to the hull's waterline on the starboard side and up to the upper (main) gun deck on the port side. The bowsprit has tilted down so, that the front end of it is inside the sediment. The beakhead has fallen to the seabed and the figurehead is partly under it (Fig. 7).

Fig. 7. The detail of beakhead. Video frame capture: Ivan Borovikov.

The whole stern up to wing transom is in place. The aft castell has collapsed behind the stern and most of it is inside the sediment. The stern post, rudder and tiller are in place (Fig. 8). The starboard outer side planks have fallen to the seabed.

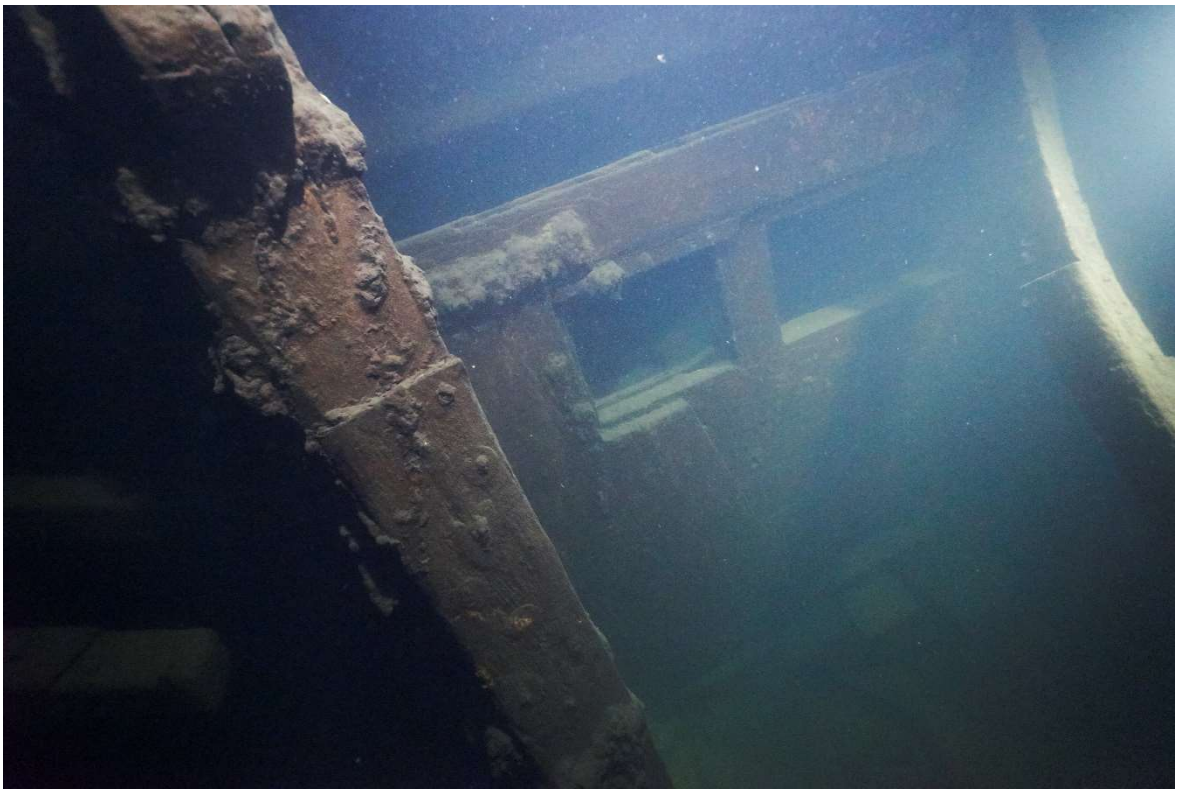

Fig. 8. View of the stern and rudder. Photo: Janne Suhonen.

The ship sank in cold (+4 Celsius), relatively clear, brackish water where water movements are low.

Unfortunately, the wreck has been looted in 2011. Dishes laying on the seabed behind the wreck have disappeared between 07.05.2011 – 14.07.2011 (by observation of diver Mikhail Ivanov). Before removing the dishes, they were the remains of a cupboard and partly in the sediment. There were no dishes left after the looting.

Between Subzone's dive to the wreck site in 2014 and Subzone's first research dive on 29th of June 2016, damage to at least two cannons had occurred. Someone had scratched the cannons probably trying to find markings (Fig. 9.)

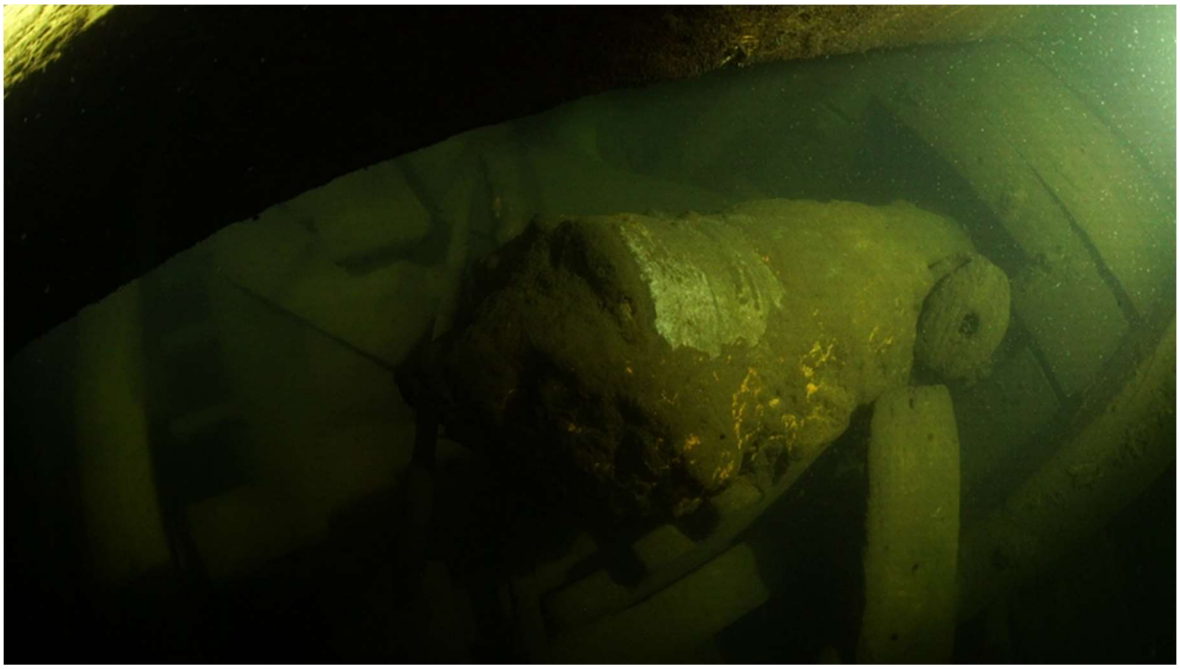

Fig. 9. Scratching on a cannon on port side main gun deck under the large binding strake behind capstan. Video frame capture: Kari Hyttinen.

The second known looting took place on 30.07.2016. The group of divers visited the wreck site and one diver had lifted an artefact from the Huis te Warmelo wreck (Fig. 10). A jug was lifted from the wreck during a photographing session without National Board of Antiquities permission, but taken immediately to the National Board of Antiquities. A jug belongs now to the collection of the Maritime Museum. The National Board of Antiquities handled the incident with the diver involved, and it was decided not the take the case further. According to diver the jug was on the deck, under a fallen plank, only partly visible.

Fig. 10. Frechen stoneware jug from the wreck (1675-1725, Bartels 1999). Photo Immi Wallin.

Site plan

The site lies on a flat clay/ sandy seabed with mud a top layer in 62 meters depth. The site is oriented approximately north-south (Fig. 11.).

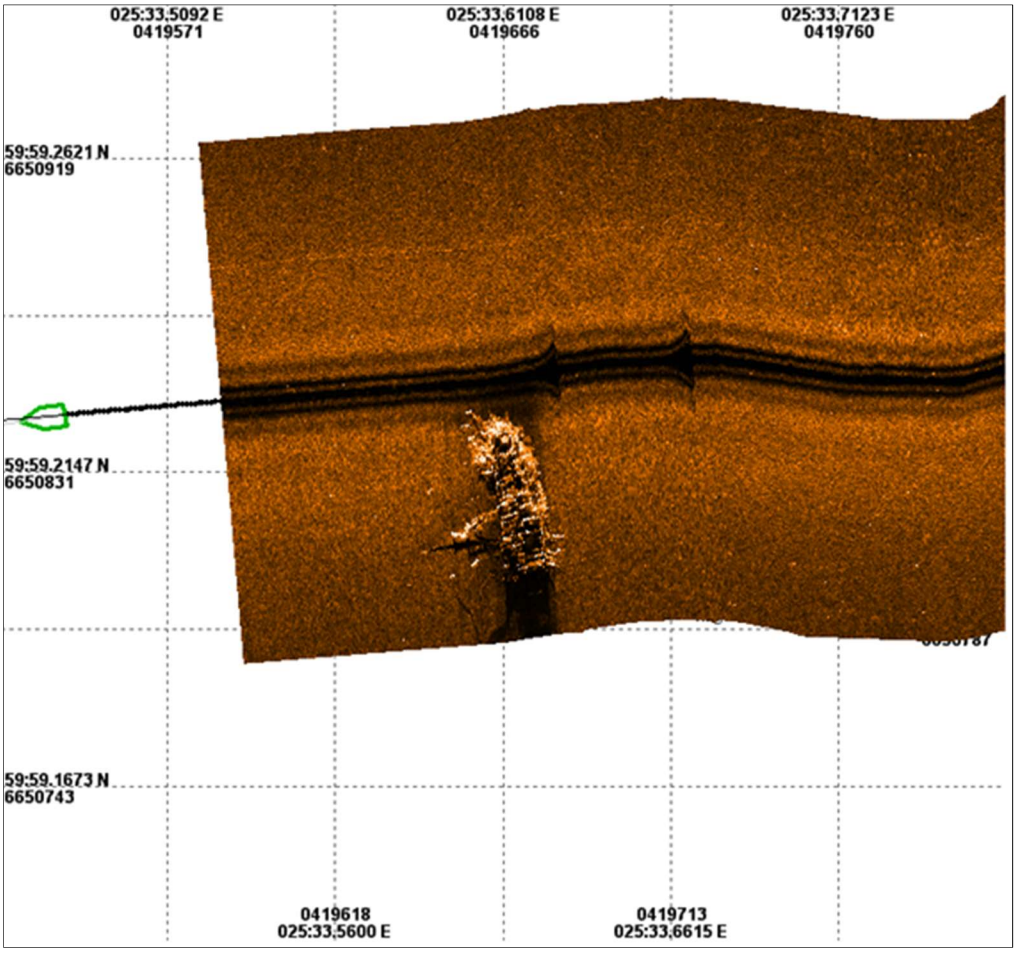

Fig. 11. Side scan sonar image of the wreck site. Image: Immi Wallin.

The side scan sonar data shows that the wreck's debris field is restricted near the wreckage. On the Starboard side of the wreck the visible structures outside the wreck itself are very close to the side of the wreck. On the port side of the wreck are the fallen main mast and mizzen (Fig. 12.). The overall wreckage area is approximately 50 m x 50 m (Fig. 13.). There were no anomalies visible in the side scan sonar data in 200 meter radius outside the wreckage area.

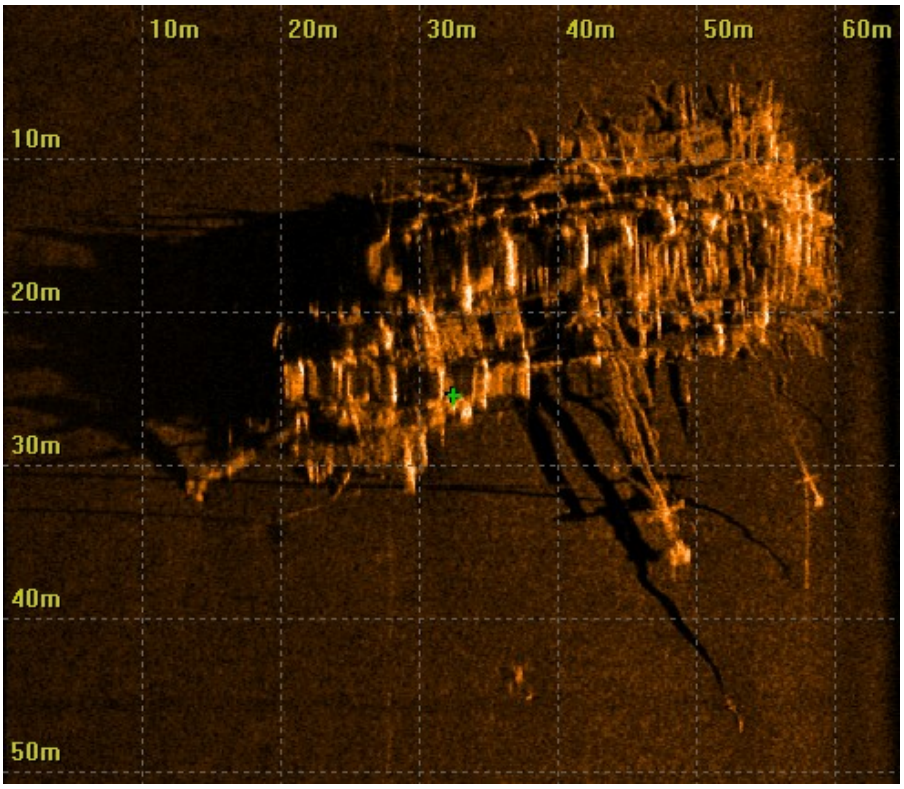

Fig. 12. Side scan sonar image where the main mast and mizzen are visible on the port side of the wreck and the fallen structures on the starboard side of the wreck. Image: Immi Wallin.

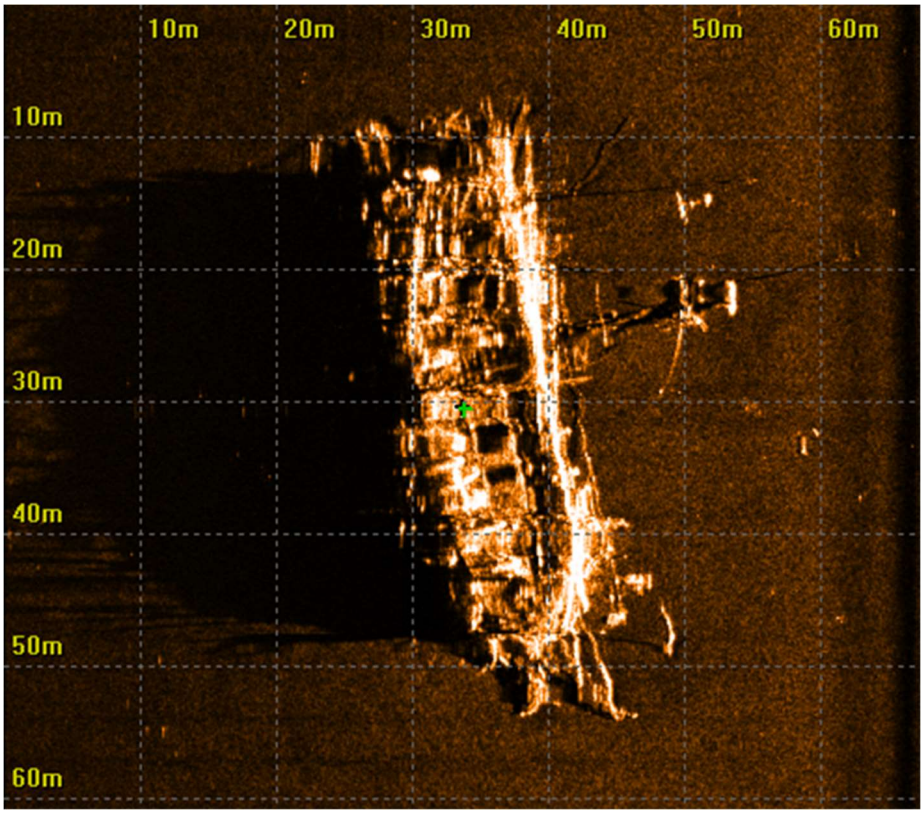

Fig. 13. The overall wreckage area is approximately 50 m x 50 m. Image: Immi Wallin.

Historical background

The Dutch war ship Huis te Warmelo was built in Medemblik by order of the Admiralty of West Frisia and the Northern Quarter, one of the five admiralties that organized and managed the Dutch naval fleet in the 17th and 18th century. The keel was laid in the autumn of 1708 and the ship was launched in the following year. The activities of the West Frisian admiralty in Medemblik were supervised by officials from Hoorn and Enkhuizen. The frigate Huis te Warmelo was one of five new men-of-war, that had been built by the Admiralty of West Frisia and the Northern Quarter in 1708. The new ships were built in two batches. The assignment for building the Huis te Warmelo, a ship of the second batch, was tendered on the 1st of October in Enkhuizen. Public tenders for building new warships were common practice in West Frisia. The contract to build the Huis te Warmelo was granted to Cornelis Blaauwevlag, an Enkhuizen-based shipbuilder for a bid of 29.500 guilders. The tender only included the construction of the hull, not the rigging, and a few weeks later the admiralty of Amsterdam approved the delivery of the masts for the new ship. The launch of the ship probably took place in the summer of 1709. The Blaauwevlag´s work was inspected on the 17th of September 1709. With the exception of some small imperfections the ship met the admiralty´s requirements (Swart 2005, 2016). The size of Dutch warships was constrained above all by the shallow waters off the Dutch coast and in the approaches to the republic´s harbours. This also dictated hull form: Dutch ships were flatter –bottomed, and thus had a shallower draught, than their contemporaries in other countries (Bender 2014, 36). The length of the Huis te Warmelo was 125 feet (35 meters), the width 35 ¼ feet (10 meters) and carried 40-44 guns (Swart 2016).
Huis te Warmelo is the name of an estate in the Dutch province of Overijssel, the residence of Joan Albert Gabriel Sloet – a member of the board of the West Frisian admiralty, representing Overijssel (ibid.).

Last voyage

For more than 300 years the Baltic Sea region exported massive quantities of cereals to the west. The Baltic trade called in Holland *moedernegotie* (mother of all trades). The nickname dates from the 17th century (Tielhof 2002).
In times of troubles the merchant ships had to be protected by warships. To minimize the risk being caught by the enemy, they mostly sailed in convoys, organized by Admiralties. During the Great Northern War (1700 – 1721) which made the Baltic particularly unsafe, for example, on average Dutch shipmasters made only one voyage to the Baltic annually, while normally their average was more likely to have been two voyages (Tielhof 2002, 214). The shipping season on the Baltic lasted from March to the end of October.
The British and Dutch joint expedition of which the Huis te Warmelo was part of 1715 had two purposes, an official one to convoy merchantmen beyond the Sound into the east Baltic, thus attempting to break the Swedish blockade, and a clandestine one to assist the last campaign against the Swedes blockade in the south Baltic (Aldridge 2009, 63). The

highest ranking officers of the combined fleet were the British admiral John Norris and rear-admiral Lucas de Veth of the Admiralty of Amsterdam.
On the 1st of June 1715, 12 Dutch men-of-war left the roads of Texel, and set sail for the Baltic Sea. The frigate Huis te Warmelo was among these ships and their mission was to steer a convoy of 200 Dutch merchant vessels through the war zone and safely back home (Swart 2016). Admiral John Norris sailed from the Nore in England on 18 May in command of 18 line-of-battle ships shepherding at first 60 merchantmen from London and the southern ports, 25 more joined from northern ports, Hull and Newcastle particularly, when he was off southern Norway. The Dutch convoy was already at the Sound when Norris arrived on 10 June (Grainger 2014, 83).
The joint fleet-with-convoy sailed on 17 June from Copenhagen. With a fair breeze the fleet passed Bornholm two days later and reached Danzig on the 24th. At Danzig the 13 ships bound for that port were dropped off, and the convoy went on north along the east Baltic coast detaching 24 ships for Königsberg, then 123 for Riga, together with 4 warships. 27 Dutch ships were left at Reval. The remainder of the convoy, 18 Dutch and 36 British ships, were for St Petersburg. These included the 10 ships that were to collect 1, 200 tons of hemp ordered for the Navy Board in London. The last stage from Reval to St. Petersburg was most difficult due to the shallow water and rock-strewn beyond the Island of Hogland. The convoy was escorted by 5 British warships as far as Hogland, then the 4 larger ships returned to the fleet at Reval. The British frigate Mermaid escorted the merchant ships to St. Petersburg. (Grainger 2014, 82-85). According the logbook of the Mermaid, the convoy was escorted by 2 Dutch and 3 British warships as far as Hogland (Swart 2016).
On the 5th of August four warships sailed to rendezvous at Gogland and anchored at the east side of the island on the 6th of August and waited for the for the Saint Petersburg ships to arrive. The Mermaid and the merchant ships reached Gogland on the 24th of August. The ships log show that a very strong northeast wind was blowing and that heavy rainfall caused bad visibility. Just after midnight things went terribly wrong for the Huis te Warmelo. About 40 nautical miles from Gogland the frigate hit a submerged rock and sank shortly afterwards. A distress call of three gunshots was heard, but not understood by the British warships. The men on the sinking ship had to rescue themselves. Only 75 of the 200 crew members survived and were picked up by British merchant vessels (Swart 2016).
The Huis te Warmelo was commanded by captain François de Groot from Alkmaar. Both of his lieutenants were from Medemblik, along with the chief clerk, the chief boatswain and the chief gunner. Half of the 200 crew members were either from Alkmaar or Medemblik (ibid.).

Field work

An archaeological survey was conducted in 2016 to confirm the wreck's identification and to document the wreck and its immediate surrounding by side scan sonar survey and videography.
The research vessels were berthed in Herttoniemi, Helsinki (Fig. 14). Distance to the wreck site is 23 NM and the cruise to the target took 2,5 hours with the RV Yoldia.
Both side scan sonar survey and the documentation by diving requires very good weather conditions in terms of wind.

Fig.14. Rv Yoldia at Herttoniemi harbour. Photo Marii Asmer.

Side scan sonar survey

The wreck site was documented by side scan sonar to find out the extent of the site. Side scan sonar (sss) data acquisition was conducted on 27th of May 2016. The difference with water temperatures in upper and lower water columns were small, so there was not much disturbance in the sss data because of the different water density.

The wreck site was surveyed using 400 kHz and 150 m swath over an area that was about 430 m from the wreck to North, 325 m to South, 160 m to East and 180 m to West. The data covers less than 1 km^2 to fulfil the sea bed survey permission conditions and is

therefore classified as public. The swath overlap was 100%. The towfish altitude was between 15 and 20 meters.

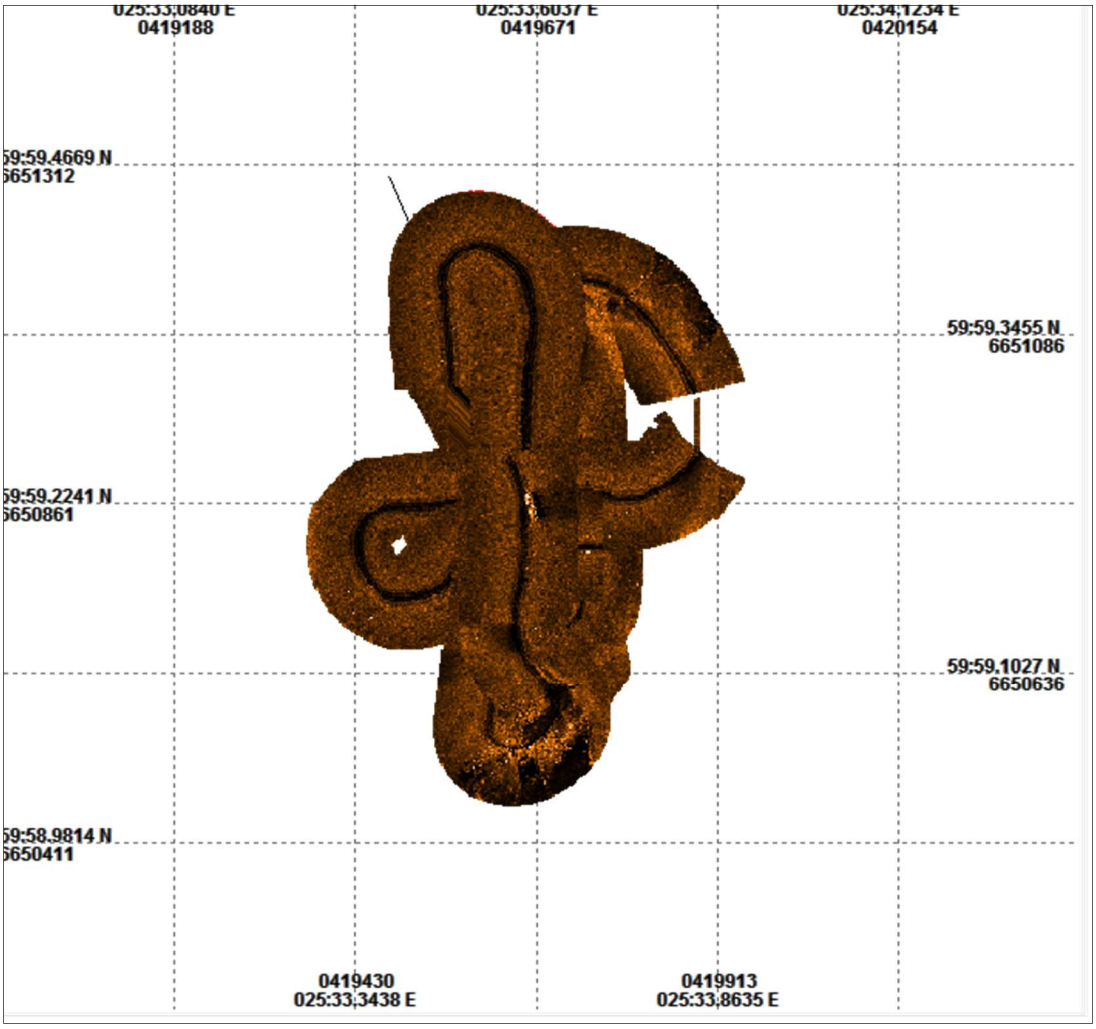

Fig. 15. Side scan sonar survey area. Image: Immi Wallin.

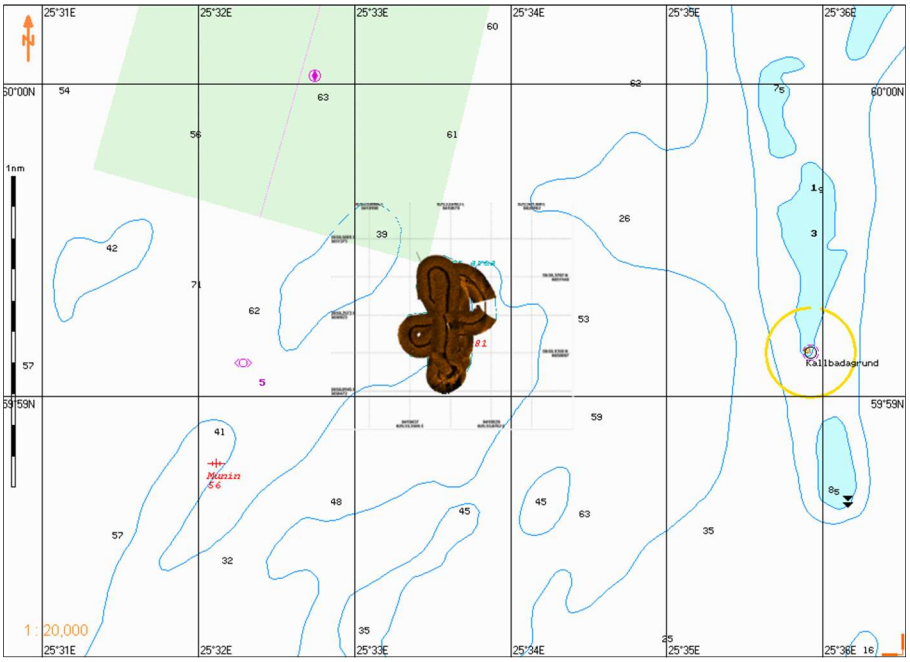

Fig. 16. Side scan sonar survey area plotted on sea chart. Map: Transas Navigator. Image: Immi Wallin.

Side scan sonar survey showed that visible anomalies were close to the wreck so that the wreckage area is about 50 x 50 meters. For the first time the fallen main mast and mizzen were detected.
A safe anchorage area could be defined for further visits to the wreck.

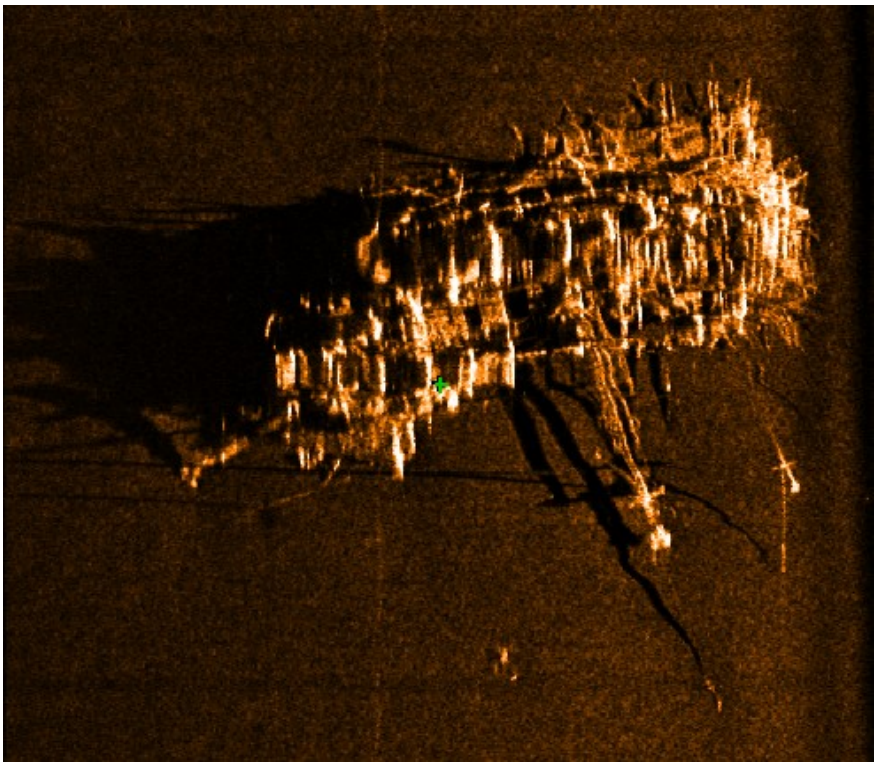
Fig. 17. Side scan sonar image of the wreck showing the main mast and mizzen fallen on port side of the wreck. The bow sprit is also clearly visible. Image: Immi Wallin.

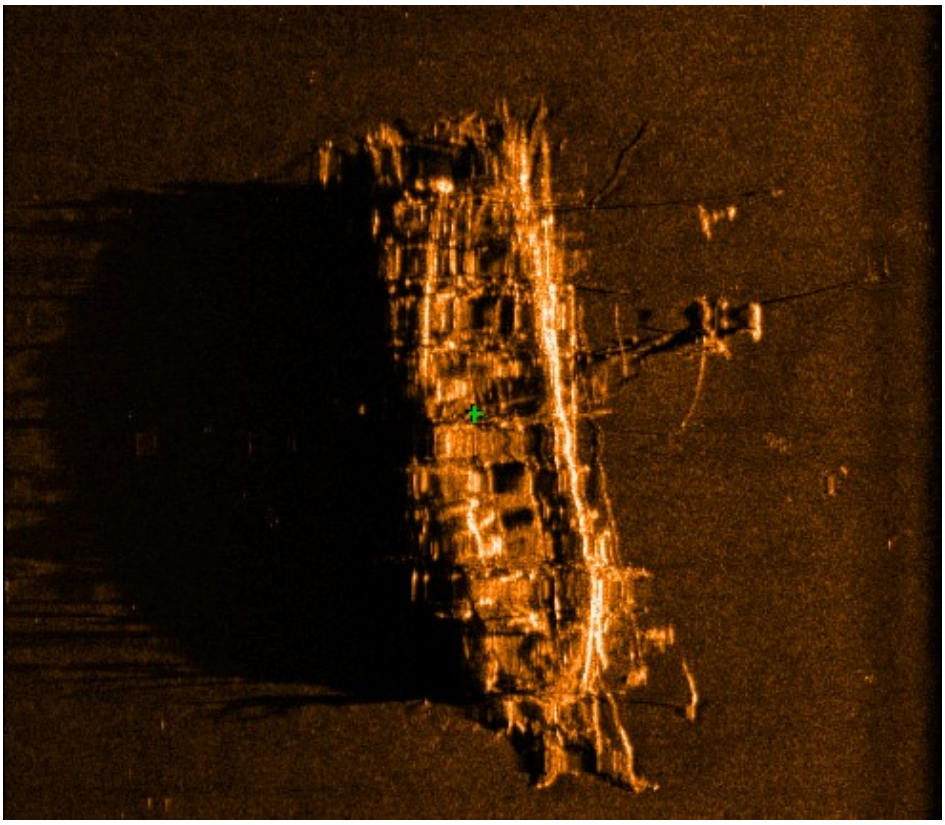

Fig. 18. Side scan sonar image of the wreck. The beakhead is clearly visible on the bottom in front of the bow. Image: Immi Wallin.

Documentation of the wreck by videography

Detailed documentation of the wreck site by videography was conducted to make 3D photogrammetry models of the whole wreck and parts of it. Video data was also used for perception of details.

Due to unfavourable weather conditions, we managed to make only 12 dives to the wreck site having 2-3 divers in a team. The bottom time on the wreck site was approximately 25 – 45 minutes per dive, giving the total dive time 1,5 – 2,5 hours.

The visibility at the site varied from 0,5-3 meters being often 2 meters. The water column from the bottom up to 2-5 meters above the bottom had fine white silt making it look like a cloud had covered the wreck. This caused major challenges to get good quality video data.

The dive teams included one camera man and 1-2 light divers carrying external video lights. Our target was to shoot video of the whole wreck and the bottom near the wreck including the bowsprit, knee of the head, figurehead, main mast, mizzen and remains of the aft castle on the bottom.

Fig. 19. View to the shot line buoy with Kalbådagrund lighthouse on the background. Photo: Maili Roio 29.06.2016.

29.06.2016 A diving shot line was outside the wreck in front of the bow on starboard side.
Visibility was 2-3 meters.
Dive 1: Kari Hyttinen (camera) and Pasi Lammi (light). Dive time: 2h 29 min
Dive 2: Ivan Borovikov (camera), Pekka Vaittinen (light), Cemo Timucin (light). Dive time: 1h 23 min
Dive 3: Kari Hyttinen (camera) and Pasi Lammi (light). Dive time: 2 h
Dive 4: Ivan Borovikov (camera), Pekka Vaittinen (light), Cemo Timucin (light). Dive time: 1h 30 min (Pekka Vaittinen dive time 5 min due to drysuit gas failure.)

1.7.2016 The shot line was outside the wreck on starboard side near the bow. Visibility 1-3 meters.
Dive 1: Ivan Borovikov (camera), Mikhail Ivanov (light) and Pasi Lammi (light). Dive time: 2h 20 min
Dive 2: Kari Hyttinen (camera) and Cemo Timucin (light). Dive time: 1h 30 min
Dive 3: Ivan Borovikov (camera), Mikhail Ivanov (light) and Pasi Lammi (light). Dive time: 2 h 14 min
Dive 4: Kari Hyttinen (camera) and Cemo Timucin (light). Dive time: 1h 21 min


Fig. 20. The first diving day. Photo: Maili Roio 29.06.2016.

2.7.2016 The shot line was outside the wreck on port side near the bow. Visibility 1-3 meters.
Dive 1: Ivan Borovikov (camera), Mikhail Ivanov (light) and Pasi Lammi (light). Dive time: 2 h 2 min (Ivan Borovikov 2 h 26 min due to added decompression stop at 6 meters).
Dive 2: Kari Hyttinen (camera) and Toni Nevalainen (light). Dive time: Kari 1h 18 min (exit with Mikhail and Pasi) Toni 1h 42 min (exit with Ivan).

20.8.2016 The shot line was outside the wreck in front of the bowsprit. Visibility 2-4 meters.
Dive 1: Kari Hyttinen (camera) and Immi Wallin (light and camera). Dive time 2 hours.

26.8.2016 The shot line was outside the wreck on port side 10 meters from the wreck and 10 meters from the bow line to stern. Visibility 0,5-2 meters.
Dive 1: Kari Hyttinen (camera) and Immi Wallin (light). Dive time 2 hours.


Fig. 21. Second dive team on surface before dive. Photo: Maili Roio 29.06.2016.

Fig. 22. Preparing for the dive on 20.08.2016. Photo: Wille Wallin.

Photogrammetry of wreck site

On each dive 20-30 mins of HD-quality video was taken and 2 screen captures per second extracted with FrameShots program (www.frame-shots.com).

The equipment used is listed in the section ”Technical equipment” These 2Mpix TIFF images were processed with Agisoft PhotoScan program (www.agisoft.com).

Due to relatively low visibility the resulting 3D model of the wreck is incomplete and additional dives/images are required to finalise the model.

The resulting 3D model has also some geometrical distortions and therefore it is not possible to get reliable measurements from the model at this stage.

However partial models could be made (Fig. 23-24).

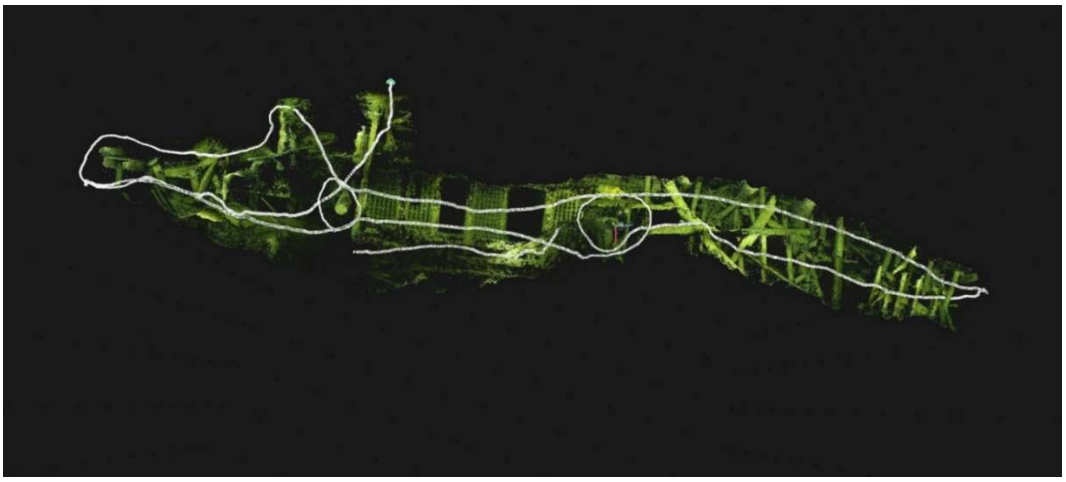

Fig. 23. Screen capture of partial 3D model showing the route of the camera for one dive. Image: Kari Hyttinen.

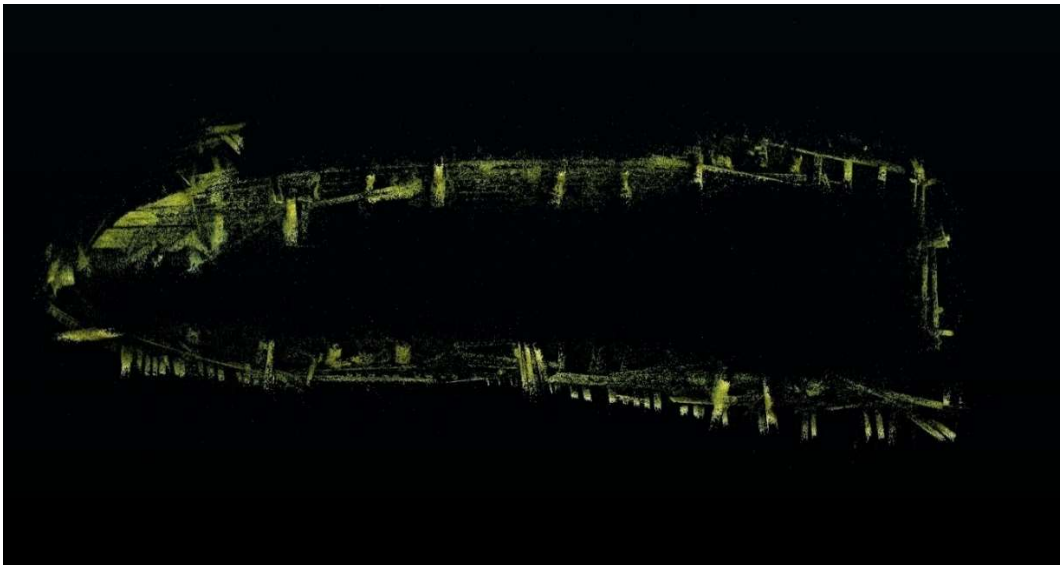

Fig. 24. Screen capture of partial 3D model. Image: Kari Hyttinen.

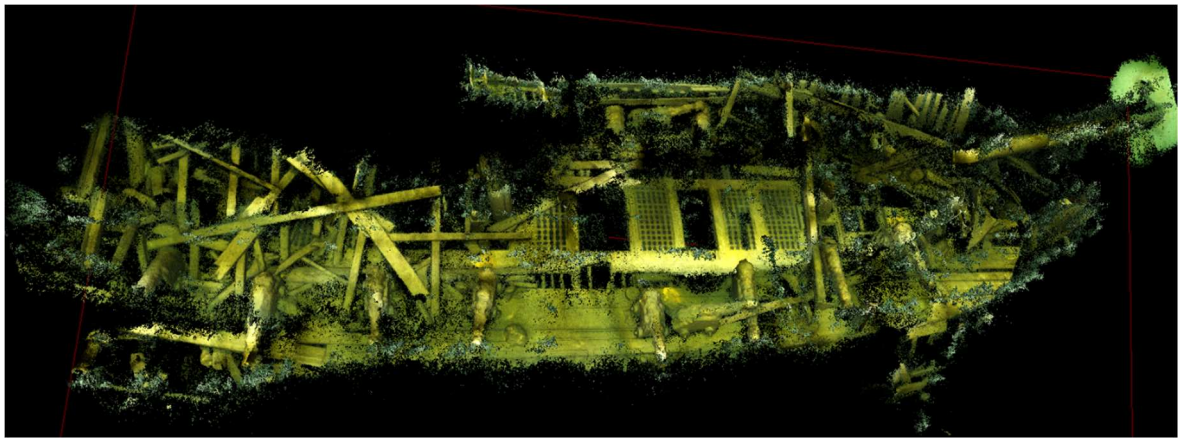

Fig. 25. Image of 3d model. Image: Immi Wallin.

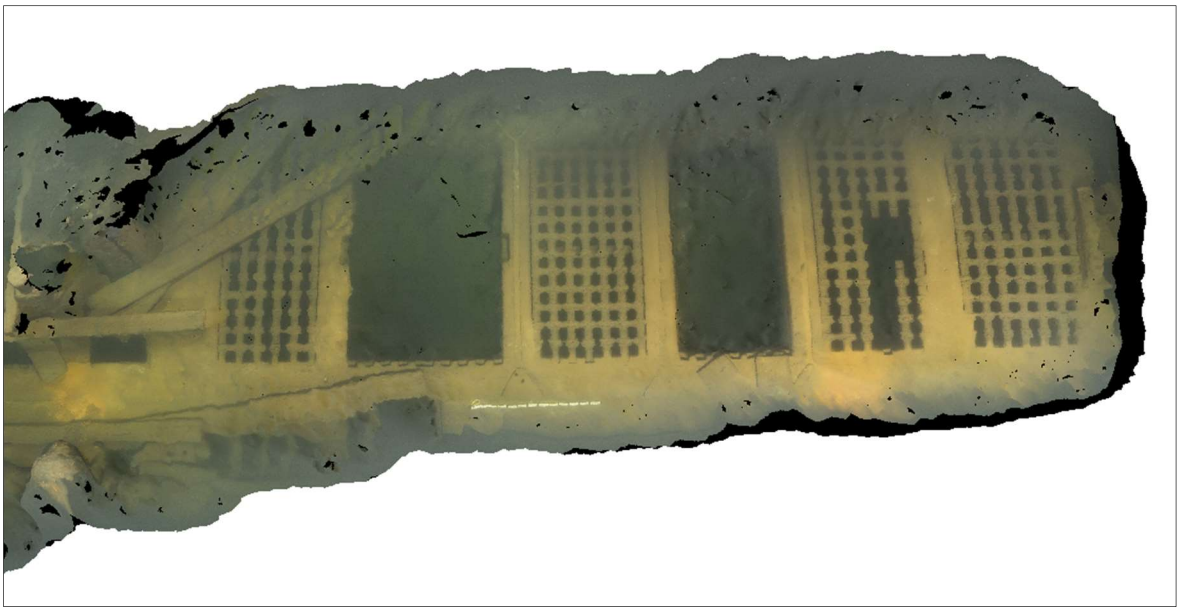

Fig. 26. Skylight gratings between fore and main masts and scale. Image: Kari Hyttinen.

Several details were extracted from the model as point clouds and in OBJ-format. These models can be used for visualisation and 3D printing.

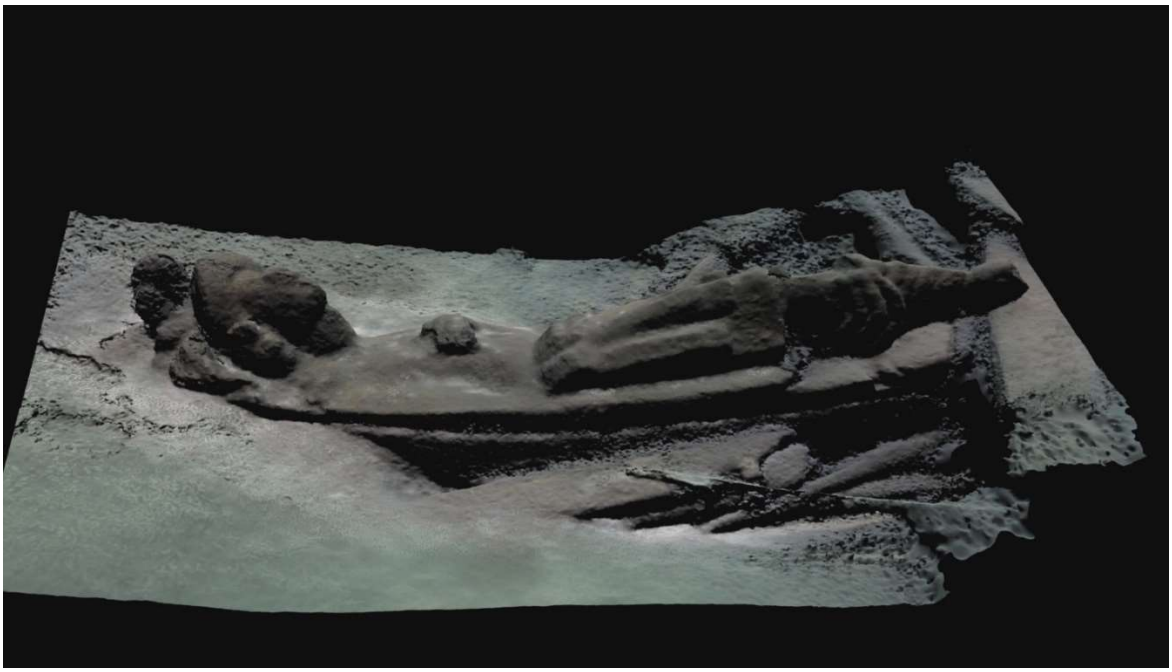

Fig. 27. Image of 3D model of stern decoration. Image: Kari Hyttinen.

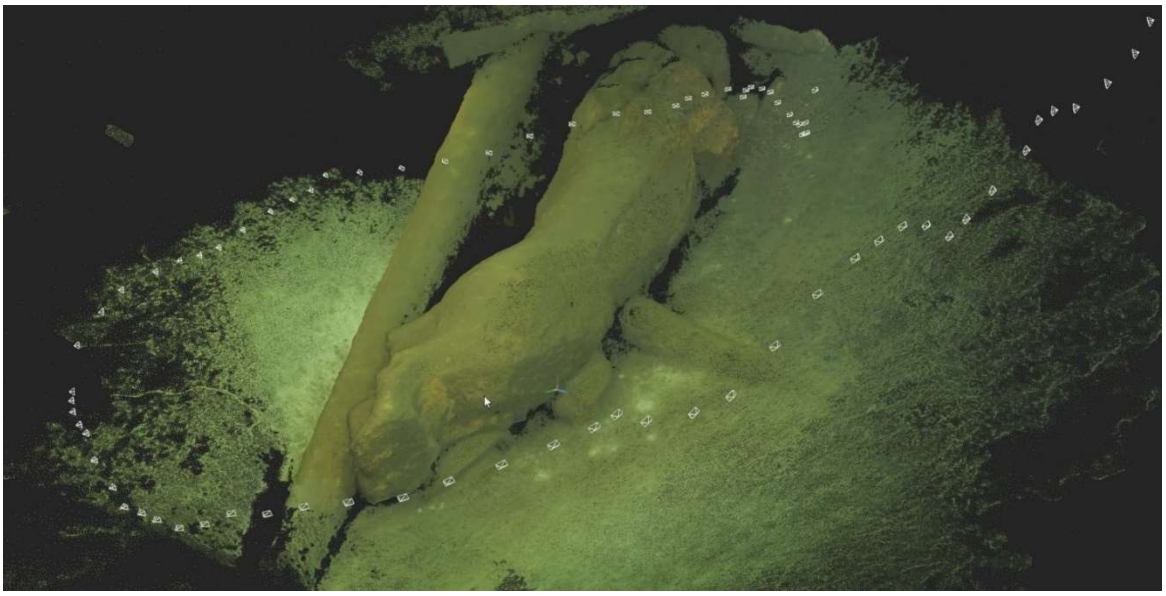

Fig. 28. Image of 3D model of figure head. Image: Kari Hyttinen.

Fig. 29. Image of 3D model of top of the fore mast. Image: Kari Hyttinen.

The animation of the model parts were made with CloudCompare (www.cloudcompare.org) and 3DS Max (www.autodesk.com).

Comparison of wreck site and historical data

Location of wreck

On an 18th century nautical chart in the collection of the Maritime Museum in Rotterdam were in the middle of the Gulf of Finland words “Here the North Holland man-of-war was lost 1715”. The only man-of-war that could fit this description is the frigate Huis te Warmelo.
The name of the shallow on the Dutch map is Nannings Rutzen (Fig. 30). The report from British man-of-war, Mermaid, that participated the same convoy as the Huis te Warmelo, is telling that about 40 NM from Gogland the Dutch frigate hit a submerged rock and sunk shortly afterwards (ADM 52/236). The name Nannings Rutzen is not known in other maps, but the location is the same as Kalbådagrund location. Distance from Gogland to Kalbådagrund is 40 NM.
There is only two known warships lost near of Kalbådagrund during the 18th Century.
The other one was Vyborg that belonged to Peter the Great’s Baltic Sea fleet. Vyborg, Riga and Esperans, under vice-admiral C. Cruys, got stuck on Kalbådagrund on 22nd of July 1713 while chasing three Swedish battleships Ösel, Estland and Verden under commodore Raab. The Riga and Esperans were got off, but the Vyborg had to be burned. The Vyborg had 50 cannons (Bridge 1899). The wreck of Vyborg is known on the Kalbådagrund shallow and some of her cannons have been raised in 1960’ties. Because the Vyborg was burned by Russians when they were force to leave her on the shallow, the wreck is deteriorated.
Peter the Great’s diary is mentioning the Dutch man-of-war loss. Dutch escort ship named Waramlou sunk after hitting the same shallow where Vyborg grounded in 1713 and that 70 men were rescued to other ships (Lukoshkov, Andrei, verbal information 2016).

At Dutch National Archives, a received letter concerning Russia from the 6th of September 1715 states that the Dutch man-of-war hit the same shallow as the Russian man-of-war two years earlier (Archives States General 7367).

Fig. 30. The location of the sunken man-of-war on the nautical chart about 1720 (S.0429(08)).

The location of the wreck corresponds with the historical data of the location where Huis te Warmelo hit the shallow when coming from Gogland and drifted to South-West with the wind from North-East. The wreck is located 1,1 NM from Kalbådagrund to the West. The bearing from the shallow to the wreck is 243-273 degrees depending where on the shallow the ship hit it. The logbook of British man-of-war Assistance, that participated the convoy, tells that the wind was from North-North-East and North-East (ADM 52/128).

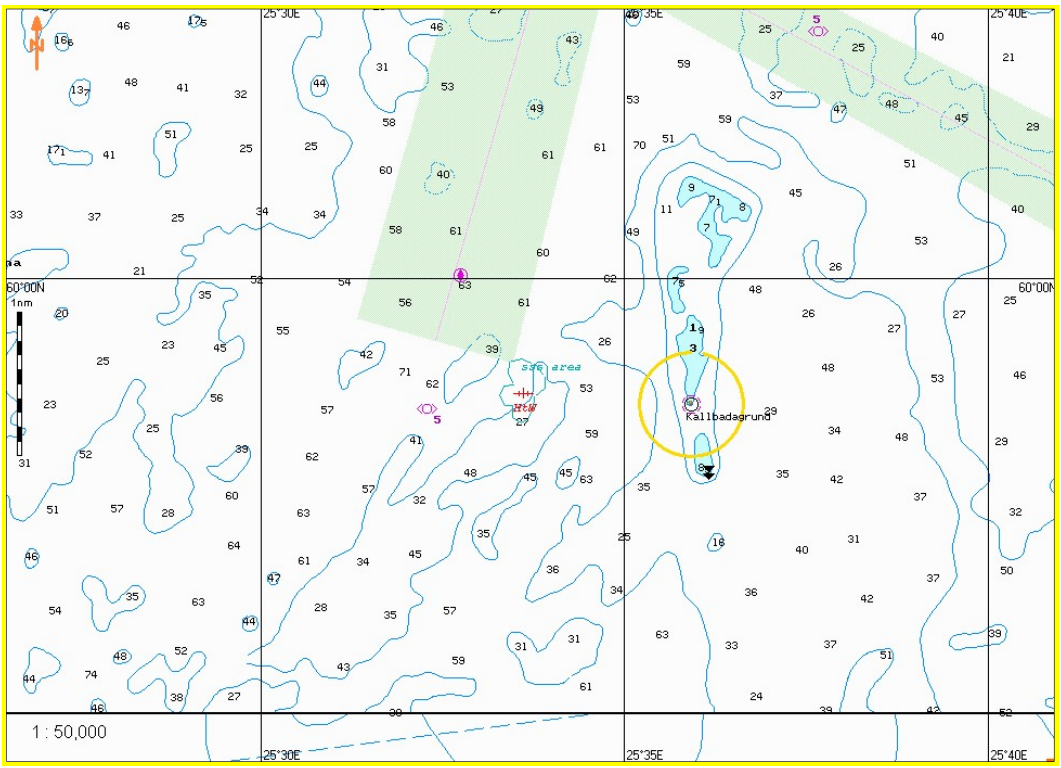

Fig. 31. The location of the wreck is 1,1 NM to West-South-West from the Kalbådagrund shallow. Map: Transas Navigator. Image: Immi Wallin.

Dimensions

The assignment to building the Huis te Warmelo was tendered on the 1st of October 1708 in Enkhuizen. The conditions and specifications of the 1708-tender have been preserved. The tender contains detailed information about the measurements of the ship. The tender only included the construction of the hull, not the rigging (Swart 2016, Admiralty Archives: 3256).

The main measurements were the length and the number of cannons. The unit foot was Amsterdam foot, that is 28.3133 cm.

Length from stem to stern 125 feet (35.4 m), width within her hull on the front third part 35 ¼ feet (10 m), height in the hold 15 feet (4.2 m).

Most of the dimensions are not visible on the wreck. For example, the dimensions of the keels. One clear structure, that is visible, is the wing transom. The tender specification gives the length for the wing transom 24.5 feet (6.94 m).

A complete 3D model of the wreck cannot be processed from the data we managed to gather. The measurements therefore cannot be taken from the existing 3D models. We made some manual measurements though, so at least some comparison with the wreck and the description in the tender can be done.

Length of the wreck from outer side of the stem to top of the outer side of the rudder 36.8 meters. We have not measured the thickness of the rudder and stem. The tape measure made some vertical bends because of the collapsed aft castle and rigging on the aft part

of the wreck. If we take out the rudder and the bends, the measurement is very near the length mentioned in the tender; 35,4 meters.
The wing transom was also measured with tape measure and the length is 7 meters. In the tender the length of the wing transom in 6.94 meters.

Fig. 32. Measuring of the wing transom. Video frame capture: Kari Hyttinen.

Fig. 33. Wing transom, stern post, rudder and tiller. Video frame capture: Kari Hyttinen.

Cannons

According to specifications for building the Huis te Warmelo the ship was carrying 40 to 44 guns.
There are 17 cannons on the upper deck visible and probably rest of the cannons among collapsed aft castle and other structures as well as on the lower gun deck. All observed cannons are made of iron.

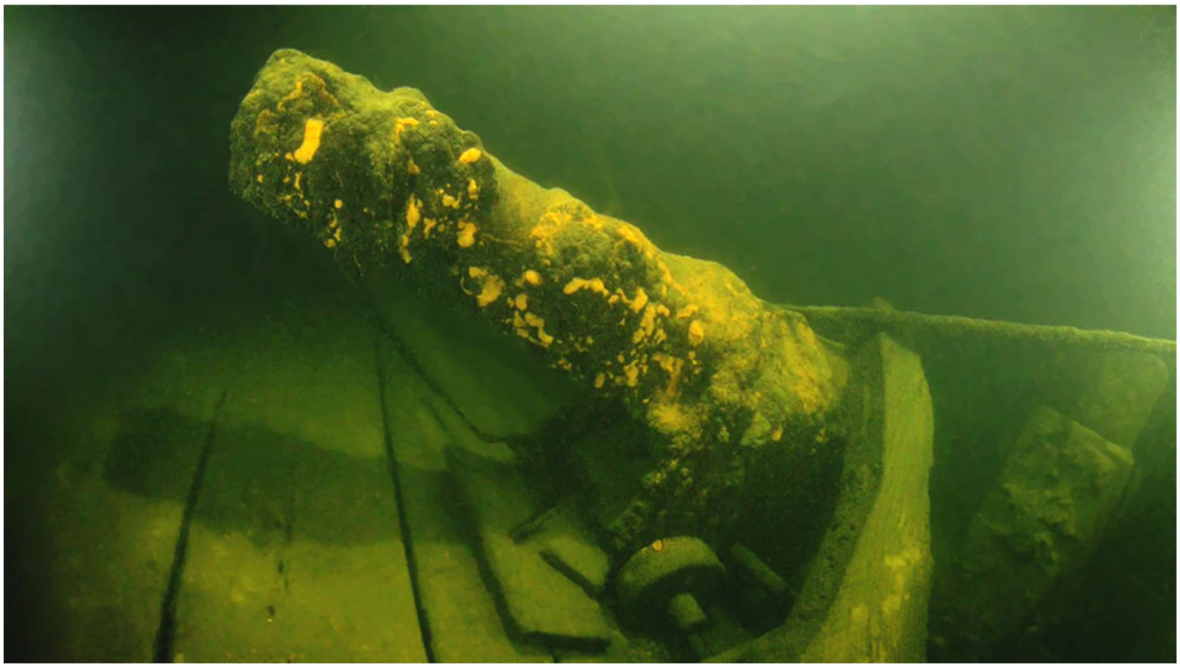

Fig. 34. Cannon on the starboard side near the fore mast. Video frame capture: Kari Hyttinen.

Fig. 35. Cannons on the starboard side. Video frame capture: Kari Hyttinen.

Fig. 36. The bow chase cannon. Video frame capture: Kari Hyttinen.

The cannon carriages are very likely Dutch type of carriages because the structure of the bottom and sides are made out of one piece (Nico Brinck e-mail to Michiel Bartels, 19.01.2016).

Fig. 37. The cannon carriage. Video frame capture: Kari Hyttinen.

Capstan

According to specifications for building the Huis te Warmelo - large English capstan [spil, kaapstander] with 10 half holes, an upper English capstan with 8 half holes (Admiralty Archives 3256).

Fig. 38. The upper part of the capstan behind the foremast with 8 holes. Video frame capture: Kari Hyttinen.

Timber heads

The timber heads are mostly octagonal. The octagonal timberheads seem to be peculiar to the Dutch (Laughton 2013, 256).

Fig. 39. Jeerbitts behind the main mast. Video frame capture: Kari Hyttinen.

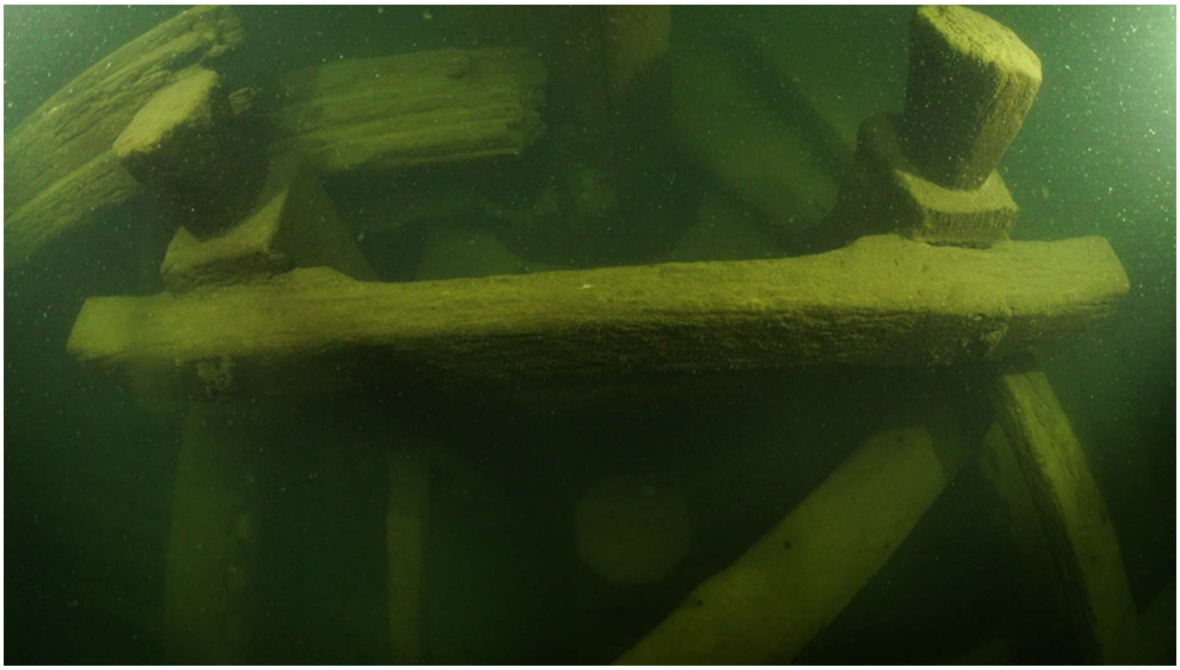

Fig. 40. Jeerbitts behind the main mast. Video frame capture: Kari Hyttinen.

Anchors

A ship carried several anchors, for example the bower, which was the largest; the sheet anchor, somewhat smaller, the streamer, smaller again; and the kedge, the smallest (Hoving 2012, 169).
There are five anchors with two arms and wooden stocks at least in the wreck site: two on the reeling on port side (Fig. 41, 42) one on the deck on port side (Fig. 42, 43), one on the bottom on starboard side (Fig. 45) and one inside the wreck (Fig. 44).

Fig. 41. Anchors on the reeling on port side. Video frame capture: Kari Hyttinen.

Fig. 42. Anchors on the reeling and on the deck on port side. Photo: Janne Suhonen.

Fig. 43. Anchor on the deck on port side. Video frame capture: Kari Hyttinen.

Fig. 44. Anchor inside the wreck. Video frame capture: Immi Wallin.

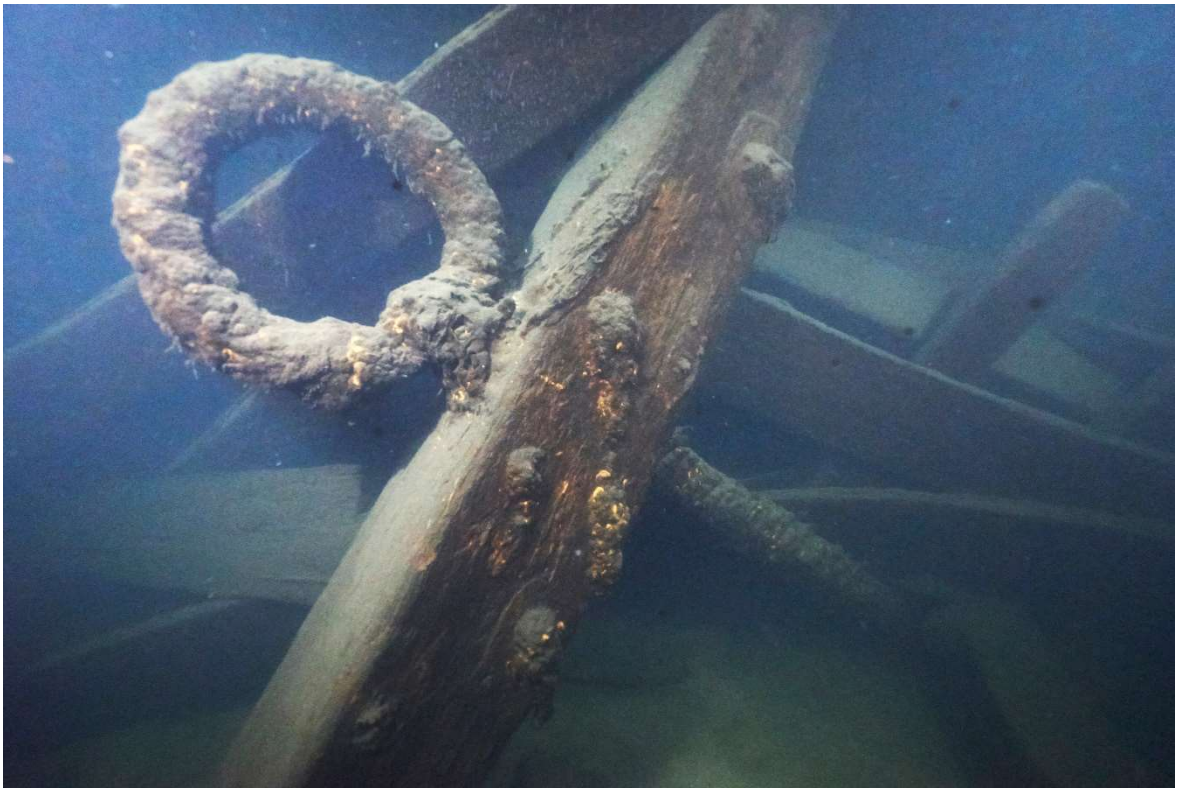

Fig. 45. Anchor on the starboard board. Photo: Janne Suhonen.

Pumps

Fig. 46. Intact pump with the handle behind the main mast. Video frame capture: Immi Wallin.

The pumps were made of elm. They were bored out accurately through the heartwood, then tarred and served with canvas and rope to prevent leakages due to drying out. On the steering stand there were two pumps near the mizzenmast and one near the main mast (Hoving 2012, 153-154).

Ship decorations

Figure head and beakhead

The figure head is a lion, that is located on the sea bottom in front of the bow partly under the beakhead. The figure head is in good condition and almost whole.

The Dutch figure head 17th century seems to have always been the national lion, issuant from beneath the head rails, or between the cheeks, and beginning his upward progress which was eventually to be checked by his contact with the spiral of the main rail. In their own ships the Dutch used no other figure head until about 1720, but with the alteration in the shape of the head – the position of the lion became somewhat more upright. In ships built for their own use the Dutch did not adopt the platform for the figure, because there was no need for it (Laughton 2013, 69).

Fig. 47. Figure head. Video frame capture: Kari Hyttinen.

Fig. 48. Figure head. Video frame capture: Kari Hyttinen.

Fig. 49. Figure head. Photo Janne Suhonen.

Fig. 50. The decorated beakhead is lying on the bottom in front of the bow. The lion rested on the lower spur of the beakhead. Vide frame capture: Ivan Borovikov.

Stern decorations

The aft castell has collapsed behind the stern and most of it and decorations are inside the sediments (Fig. 52, 53). On the bottom behind the stern is visible one stern statue (Fig. 51).

Fig. 51. Stern statue. Video frame capture: Ivan Borovikov.

Fig. 52. Details of decorations. Video frame capture: Ivan Borovikov.

Fig. 53. Details of decorations and a dish. Video frame capture: Ivan Borovikov.

Fig. 54. The detail from drawing of Zantvoort (S002). Teylers museum in Haarlem. Oorlogschip “Zantvoort” in afbouwfase in de Grashaven te Hoorn. ….Rietschoof, Jan Claesz (1625-1719).

The Zantvoort was built in same year and by same admiralty than Huis te Warmelo. Most probably the stern decoration is similar (Swart 2017).

The lower gun deck

The lower gun deck has the cannons in place and lot of artefacts are visible *in situ*. This includes stone wares, boxes, plates etc.

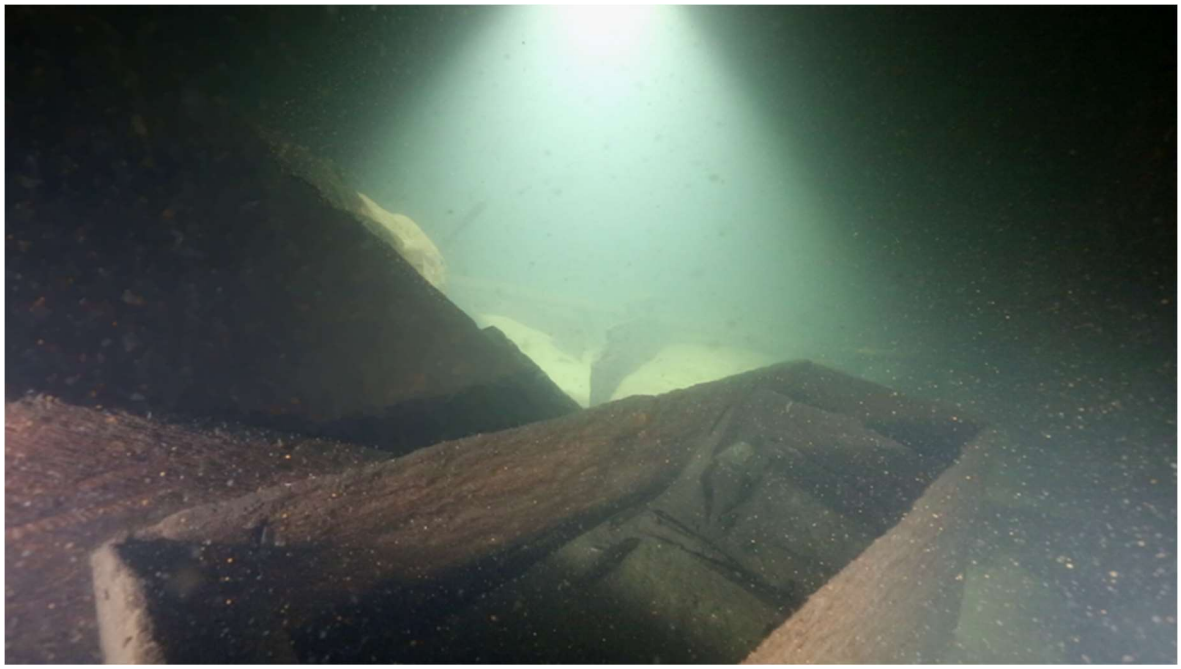

Fig. 55. Box on the lower gun deck. Video frame capture: Ivan Borovikov.

Fig. 56. Boxes, stone ware and other artefacts on the lower gun deck. Video frame capture: Ivan Borovikov.

Conclusion

In conclusion, can assume that the 18th century shipwreck found at Kalbådagrund is the wreck of Dutch man-of-war Huis te Warmelo.

1) Location of the wreck.
   The location of the wreck corresponds with the historical data of the location where Huis te Warmelo hit the shallow when coming from Gogland and drifted to South-West with the wind from North-East. The wreck is located 1,1 NM from Kalbådagrund to the West.
2) Type of ship.
   Huis te Warmelo was a frigate. The type of shipwreck was known before the identification.
3) Date of wreckage
   The artefactual material from the Huis te Warmelo wreck allows to establish possible time of wreckage. Based on Frechen stoneware jug the shipwreck is dated to 1675-1725. Huis te Warmelo sank in 1715.
4) Dimension
   According to archival material the length from stem to stern was 35.4 m and the length of the wing transom is 6,94 meters. Length of the wreck from outer side of the stem to top of the outer side of the rudder 36.8 meters. The measurement is very near the length mentioned in the tender; 35,4 meters. The wing transom was also measured with tape measure and the length is 7 meters.
5) Cannons
   According to specifications for building the Huis te Warmelo the ship was carrying 40 to 44 guns. There are 17 cannons on the upper deck visible and probably rest of the cannons among collapsed aftcastle and other structures as well as on the lower gun deck. The cannon carriages are very likely Dutch type of carriages because the structure of the bottom and sides are made out of one piece
6) Structures of the ships
   There are many concurrences in archival material: the capstan, timber heads and ship decorations.

The wreck, that has register number 2381 in the Finnish National Board of Antiquities Registry of Ancient Monuments and located 1 nautical mile West of Kalbådagrund, is the wreck of the North Holland Admiralty warship, Huis te Warmelo.

Recommendation for future research

The wreck is partly buried in the seabed, which has provided excellent conditions for preservation. The visible structures are well preserved too. Therefore, most important is to use non-destructive methods for research.

The main task is to continue with 3D documentation and collect the high quality data: recording the entire shipwreck site, artefacts and interior of the wreck. Collected material will be useful for the wreck monitoring in the future.

The second task is to study the artefacts buried in the seabed using sub bottom profiler and the nature of the seabed and taking samples from the seabed.

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