Maritime Arcaheological Society
of Finland

Excavation Report
Hamnholmarna (MVID#1516)

Maritime Archaeological Society of Finland report against Finnish Heritage Agency's research permit **MV/01110/2024** regarding the Kemiönsaari, Hamnholmarna (MVID#1516) intrusive test excavation.

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Contents

Hamnholmarna (MVID#1516) Excavation Report

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Introduction

The Hamnholmarna wreck (MV ID #1516), also known as “Holma Hamnholmen” or Hamnholms glopped” is situated in Kemiönsaari commune, between the Kasnäs peninsula and Hiittinen archipelago at Holma island group – hence its distinctive name Holma Hamnholmen. The direct translation of Hamnholmarna or Hamnholmen is “Harbour Island(s)”. The wreck lies in the vicinity of a major sailing route, but “inside” of rocks so, that seafaring does not constitute a threat to the wrecksite, albeit fishing does (nets and damage to the wreck).

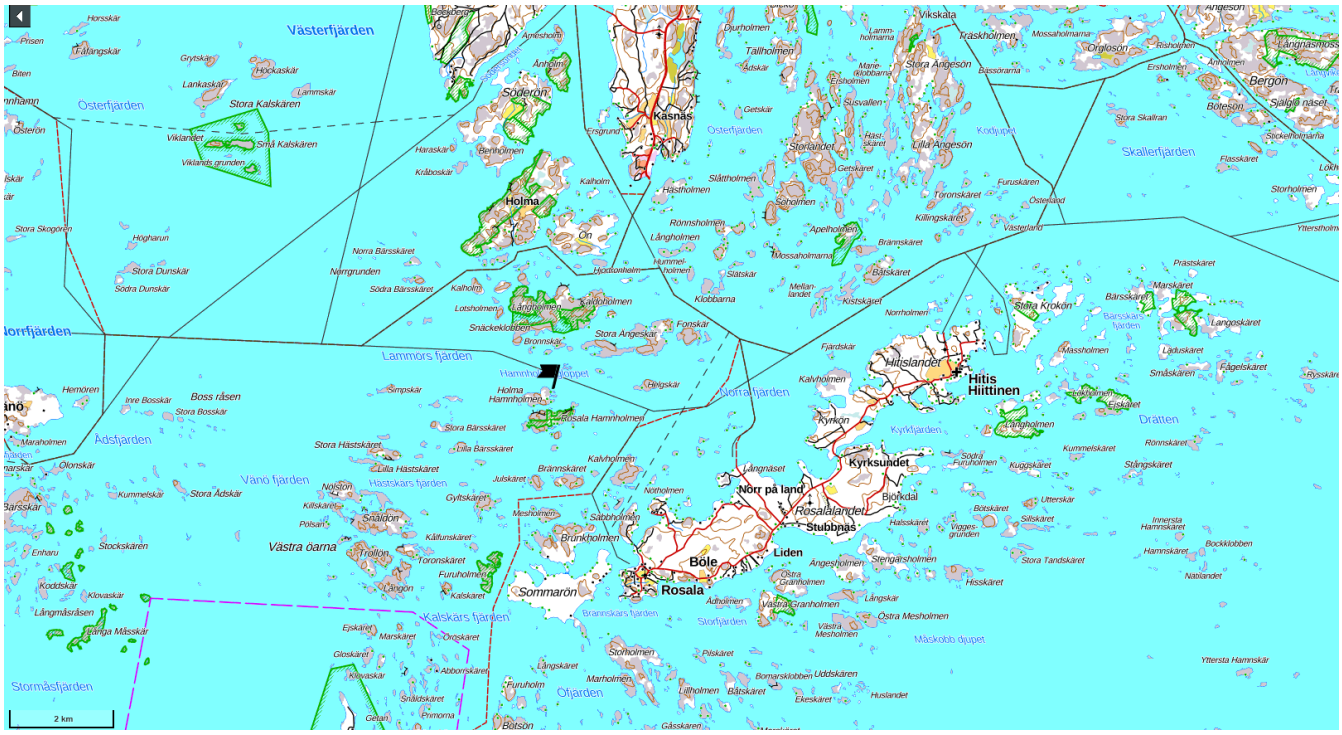


Image 1. Area map of the Hamnholmarna wrecksite (black flag).

The wrecksite was initially 3D photogrammetric modelled in 2019. The Maritime Archaeological Society of Finland (MAS.Fi) revisited the site in 2020 to take dating samples which was unsuccessful, but the diving inventory allowed the general dimensions of the wreck and its features to be studied in more depth. In 2021 the Finnish Heritage Agency gave permission to sample the wreck and a radiocarbon dating sample was taken from the raised stern post. The provisional dating to potentially the 13th century (see below) generated considerable interest as to the potential research value of the site.

In July 2023 MAS.Fi revisited the site during its annual field camp. Since the wreck was largely covered by silt and had no cultural items visible to corroborate the dating sample evidence it was felt that the site could be excavated to confirm this provisional age. This could allow the full form and construction techniques of the wreck to be uncovered to see it matched or complemented boat forms from previous periods or nations. Access to its core timbers would potentially allow dendrochronological sampling to determine more accurate dating of the site and potentially the provenance of the timber and to some degree interpretation of the travel direction of the vessel, whether local or abroad.

Uncovering cultural finds within the wreck could corroborate all these interpretations both to its cultural origin as well as its age through typological comparisons. Through the winter to spring of 2023-24 funding sources were sought within Finland, which were only partially successful and an application for a limited excavation made to the Finnish Heritage Agency, which was granted (see below). A limited excavation of the wreck occurred in September 2024.

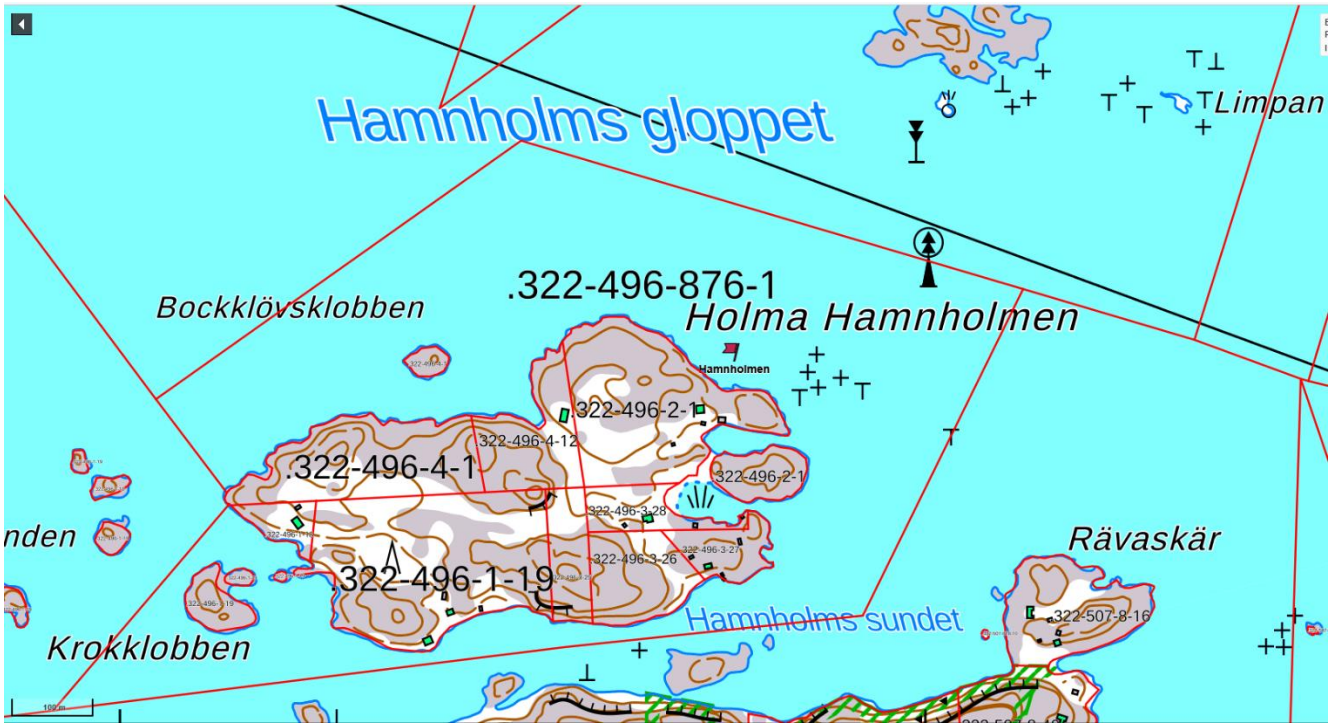


Image 2. Detailed map of the Hamnholmarna wrecksite (red flag).

Wreck details (pre-excavation)

Coordinates – 59°53.040' N 22°23.030' E

Dimensions – This modest size, oaken, vessel measured roughly 20m length, 5m wide with an unknown height and draught as it sits under a layer of silt, and at an underwater depth of around 10m.

Features – The vessel is concave and longitudinal. At one end a timber rises backwards at a 45-degree angle to a height of around 1 metre (on the left of the model below). This end seems to taper sharply to a point, which has been interpreted as a possible stern and stern post, while the other end is wider and perhaps more likely to be the bow. However, it is possible that this may be reinterpreted once future excavating occurs near the ends of the vessel, especially as there is much debris near the 'bow' end to move to see clearly.

On the north side of the hull (the upper side in the model and possibly the port side) frames can clearly be seen emerging out of the sediment with an intact layer of planks attached on the outside. Initial inspection on the outside of the hull where the plank layer extends down into the sediment seem to indicate a curvature towards the centre of the vessel and the beginnings of overlapping planks, which could imply a clinker style construction method.

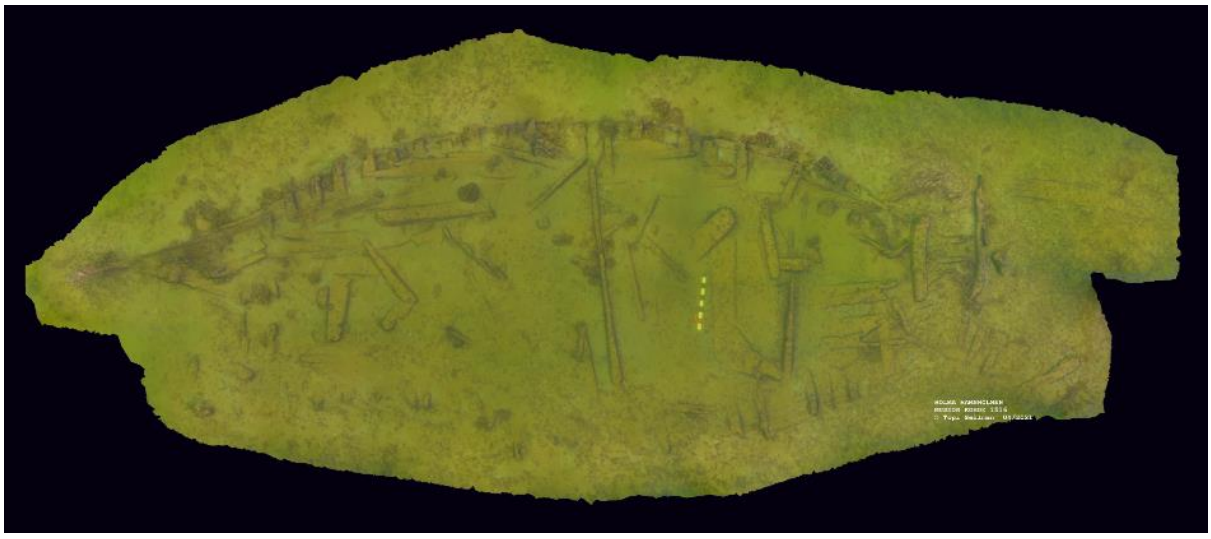


Image 3. Hamnholmarna wreck from the bird's eye view prior to intrusive study.

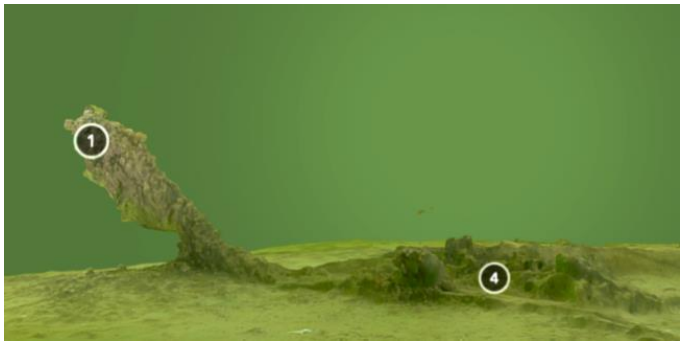


Image 4. View of the probable stern post from which the C14 sample was taken. In 2024 this stern post has sadly now collapsed into the wreck. Notice how submerged the wreck is into the silt. (https://sketchfab.com/3d-models/hamnholmen-holma-81001db98bb5440aa9fb9888e946477a)

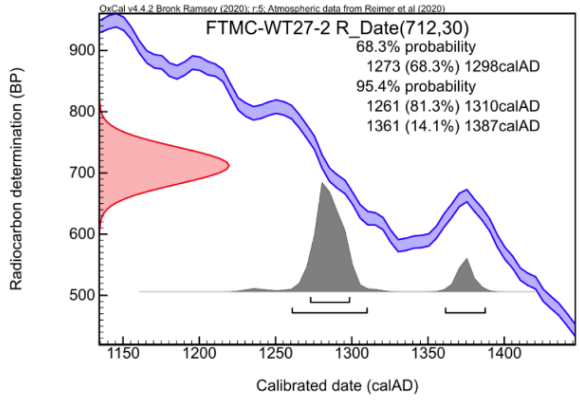
Image 5. Side and elevated view of the possible port side of the hull. Planks seem to start to overlap, but a form of double hull is evident (Same MAS.Fi weblink as above)

This could be indicative of a fully clinker style vessel. However, the turned and elevated view above seems to show a form of double hull and at the very least does not resemble the type of single hull clinker vessels characteristic of earlier or stereotypic 'Viking' vessels. It may indicate a form of technological innovation, which would make sense if this vessel were more Medieval than Iron Age. In addition, just because it may have clinker-type features in its upper frames it could still have features more characteristic of 'cog-like' vessels, which existed in the Gulf of Finland in the Medieval period, features such as a combination of clinker upper overlapping planking but edge to edge planking at a lower level. The side elevated view above, if one were to imagine the curved angle of the outer hull extending toward the keel, also gives the impression that this is not a vessel with a deep draught. All these questions can only be addressed with more exposure of the hull structure through the planned excavation.

On the other side of the vessel (lower side of the model below) the frames seem to be lower in height and more covered in silt, indicating either more erosion on that side or a collapse outwards, or that the whole vessel lies relatively intact but, on a tilt, down towards the lower side. On that side it is covered more with silt that rises up a small slope. The topography in general does not seem to offer obvious clues as to why it sank.

Geographic/cultural context – The boat was wrecked off Hamnholmen island, which is in the Kemiönsaari archipelago, an important area for tracing ancient maritime voyage and trade routes through the area. To the south-east lies Rosala, a well-known Viking settlement and close to the east lies Hiittinen where there is evidence of medieval moorings. Researching this wreck has the potential to provide data not only about the vessel itself but speak to the importance of those long-used routes, such as whether they were constant in frequency or changed through time, whether they were more unidirectional, and so on.

Dating – A knife cut sample was taken from the oaken stern post in 2021 by M. Luoto. The radiocarbon 14 age (C14) was interpreted as having a calibrated date of 1260 AD from its highest probability score, and with an uncalibrated date of 1238 AD (see below). However, that early date cannot be seen as firm and accurate proof of its age, only a rough indicator. That knife cut specimen could have been taken from the inner or outer rings of the original tree, turned ship timber. As oak trees can grow to many centuries that could mean an accuracy difference of several hundred years between taking it from the inner rings (the oldest) to the outer rings (the newest and youngest). This therefore required that we gain more accurate tree ring data by taking full dendrochronological sampling, which is most accurate when it has the last ring or sapwood/bark to work with, indicating the actual or rough felling date. If a sample, or better samples, of an industry-standard of over 50 rings is not available then using C14 samples from separate rings on a small or failed sample using the modern 'wiggle' technique can also refine the accuracy. The dating strategy for the excavation project was therefore to take dendrochronological samples from core structural timbers that were less likely to be repairs and therefore bias results towards a later dating. The 2nd C14 dating (left) just came in, confirming the 13th century.



Radiocarbon date 712±30BP (red), part of the calibration curve (blue) and the calibrated probability density function (grey) calculated in OxCal.

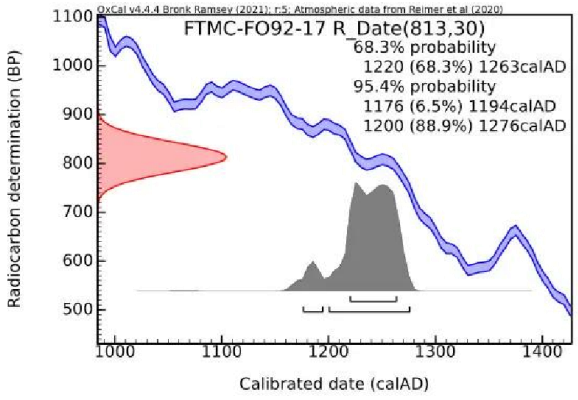


Fig. 17. Radiocarbon date 813±30BP (red), part of the calibration curve (blue) and the calibrated probability density function (grey) calculated in OxCal.

Image 6. C14 Dating Graphs from Vilna University AMS-laboratory

National Cultural Database – Due to its provisional dating and features the wreck was acknowledged as a 'muinaisjäännös', an historic relic, and assigned the code MVID #1516, recognising its historic age and its status as a nationally protected cultural item. https://www.kyppi.fi/palveluikkuna/mjreki/read/asp/r_kohde_det.aspx?KOHDE_ID=1516

Preparations for the excavation

Research permissions – These were granted by the Finnish Heritage Agency in the late spring of 2024. Permission had also been gained by the relevant 'landowner' to conduct the excavation. Concerns were raised in the application discussion phase as to the potential destruction of finds by the process of excavation. Conventional excavational planning usually requires a logical systematic process for handling finds safely and a large budget for their long-term conservation, storage and possible display. Extensive financing was sought from various appropriate funding sources but were unsuccessful. Hence, an alternative strategy was proposed.

The excavation was to have a limited scope, making a narrow trial trench across the site, with the main objective to find core timbers for dating purposes, and in probability reducing the number of artefacts discovered. Only finds of an exceptional nature that could directly identify the wreck, its age, its region of origin or those of a high cultural value (such as precious metals) would be raised, with the onsite maritime archaeologist responsible for making the initial determination. They would be photographed in situ, kept underwater on site safely in containers and only raised after discussion with the Finnish Heritage Agency Underwater unit, who could assist in deciding what objects were of national cultural significance.

MAS.Fi committed to covering some 10,000 euros of the initial conservation costs. However, if they were of high cultural value, as described before, intense negotiation would be required with the Finnish Heritage Agency and the Conservation services what responsibility the State should take over conserving the finds, with MAS.Fi taking responsibility for conservation if the artefacts did not warrant such a level of significance. It was not an ideal situation at all. MAS.Fi took the strategy position that if several items of such value were discovered the team would halt the excavation, raise those few items and protect the exposed areas with geotextile. The aim would be to return the following season with a much larger conservation budget, hopefully supplied by funding sources inspired by the heightened significance of the artefacts raised.

Policies and procedures – All team members had been made aware of Finland's cultural heritage protection policies through the NAS training programme. The maritime archaeologist and team leaders took time to introduce and explain Finland's archaeological fieldwork regulations, particularly as they

applied to conditions underwater and at sea. https://stmuseovirastoprod.blob.core.windows.net/museovirasto/Kulttuuriymparisto/arkeologisten_kenttatoiden_laatuohje_2020.pdf

Preparing the Team – Considerable planning was involved in assembling all the personnel. Several online meetings were held where team members were informed what was expected of them, and for them to ask their own questions, so all were as prepared as they could be. Appropriate roles were given to the team as per their skills e.g. Ship Captains, Assistant Skippers, Project Manager, Archaeologist, Safety Officer, Gas technician and their assistant, boat drivers to recover divers, general crew roles, even the cooks. Everyone was given a role they were comfortable with, but were also expected to help out in general.

Training - Members of the team had gained some experience setting up and using the water dredge underwater in previous years in Porkkala, that very summer in 2024 in Hiittinen, and in detail before the dives. The principles and potential scenarios were discussed with the team at length, such as the importance of excellent buoyancy to reduce haphazard damage to the site and extra silt being disturbed, and particularly careful monitoring of the dredge nozzle so it doesn't suck up cultural items.

Excavation Methodology

Site preparation - Positioning the main support vessel over the site to allow stable and direct connection of the water pump on the boat to the equipment below. Team briefings would occur every morning and evening. Feedback would be encouraged so all team members feel valued. The site would be fully photogrammetrically recorded as a baseline. Divers would make orientation dives to understand the site before working on it, since once the excavating process starts disturbed silt can obscuring vision and orientation drastically. Assembly & deployment of the dredge was carefully built with all the team aware how the system would work.

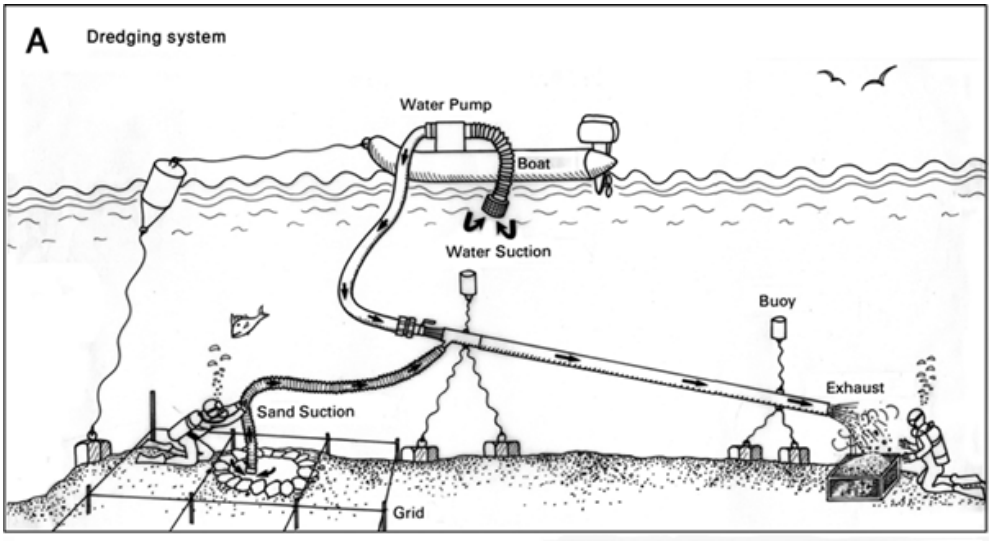


Image 7. Basic water dredge setup, but with metal rods as a rough 1m wide trench (Unknown artist)

Overall dive objective - The excavation was planned to occur in a 1m wide trench that spanned across the middle of the wreck. This was the widest span of the vessel and probably deepest section of sediment. It was hoped that excavating across the wreck in the centre could expose core timbers for dating and if at all possible, the mast step. Mast steps occur in different shapes, sizes and positions. They provide clues to the size and position of the mast. Where they sit in the boat, either a little further forward, more central or a little further back, can provide clues as to who the vessel sailed and useful comparisons to other vessels in the archaeological record.

Building a site grid - Heavy, 2m long, steel rods were laid down 1m apart across the wreck's centre as an orientation guide for the divers. As the silt was quite thick in the centre of the wreck the steel rods resting on the wreck seemed a preferable method for making a grid of sorts. The option of stringing cord across the wreck using nails for attachment to timbers was discarded at the planning stage because while the solid timbers on the upper northern side of the wreck there seemed none that were solid and stable on the southern side where they submerged into the sand. There was the risk of diver entanglement or a loose fin kicking a cord and pulling a frame out and besides banging in nails would be a destructive act. The rods were marked at 10cm, 0.5m and 1m intervals with bright tape to assist with measuring relative distances.

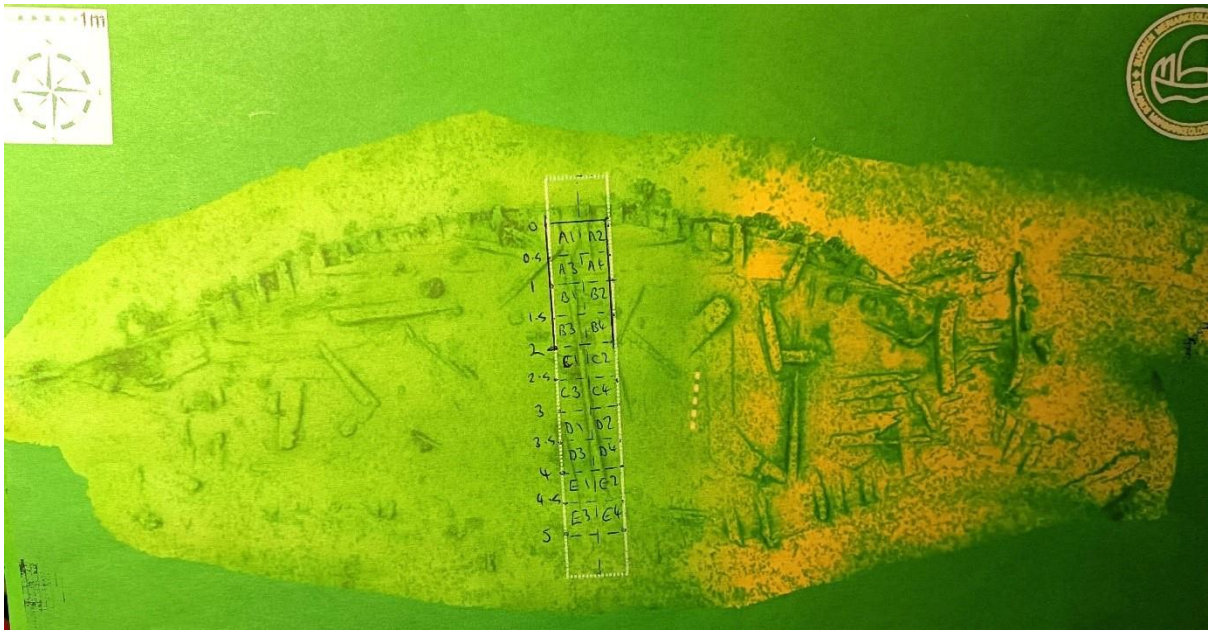


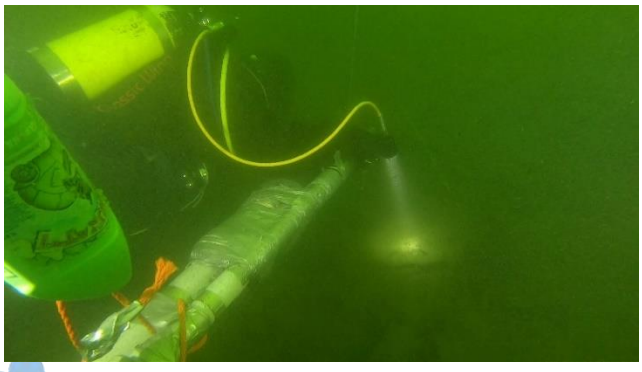
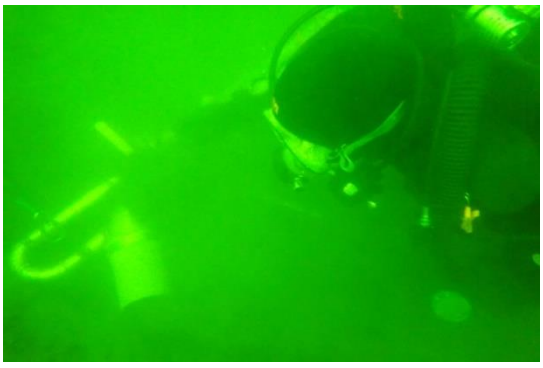
Image 8. Plan view image used to orientate divers to the grid area they should be working in.

The excavation plan was to sequentially work through a grid of 0.5m x 0.5m squares as seen above, starting in the A grid and through to E. Divers would be encouraged to position the dredge head facing into a grid square from outside the trench perimeter so that they do not accidentally lay onto top of a

previously cleared grid square and unfortunately pull material back into a cleared grid. The dredge exhaust would be aligned the opposite direction to any prevailing current, so the expelled silt is not carried back onto the cleared area. Therefore, they could start on either side of the trench and clear A2 for instance instead of A1 if it was preferential to start from that side. The divers were expected to closely monitor what they dredged so artefacts were not sucked up the dredge, both by keeping the head not too close to the sediment and hand fanning material towards it, but also adjusting the power of the dredge so material is sucked up a little more quickly when it is purely silt, and much more slowly when clearing sensitive areas around structure or where artefacts start to appear.

After the first day it was clear that divers could make those distinctions and decisions more appropriately. Divers were expected to dredge carefully but not too exactly through within each 0.5m x 0.5m square. Neatness and square sides would be nice for the photogrammetry, but it was realised soon that the silt would simply spill and poured in where it could. Within each square they were to excavate down in roughly 10cm spits, slowly at first but, once they got the hang of it, to speed up, especially if the silt was uniform and contained no finds at all. The second diver had a measuring tape if they wished to gauge the rough depth. One diver would excavate for 20 or so minutes moving the dredge nozzle over the area to produce a level reduction. If they got down to structure, they were to move onto the next small square nearby, whichever was easiest to move the nozzle head to. The other diver recorded the process with video footage, particularly any finds or features in situ that appeared, and transplanted any finds into plastic trays that had been marked with corresponding grid numbers.

The initial phase was to remove the top silt above the wreck, working from A1 across horizontally to E4. If divers encountered structure in their section, as divers did in A1 which was close to the frames, they should move down to start clearing silt in the next square. Once the first 10cm or so layer across the whole width of the wreck was completed the process should start again with the layer under A1 being labelled A1.1, A2.1, A3.1, A4.1 and so on.

Images 9 & 10. Excavation equipment and dredging the sediment in low visibility conditions.

Divers were also instructed to stop dredging if they encountered what seemed to be a different layer in the wreck, and to record the changes and give feedback to the archaeologist. These new layers could be characterized as not resembling the loose top silt, but something of a different texture, colour or filled with different minerals or finds. It was also applied to material inside hollows in the structure which could potentially be contexts within the vessel and needed to be separately handled and checked by the archaeologist later. It was noticed that under the loose grey silt there was a thick white viscous material in places, which was probably decayed natural material rather than decayed cultural material but was treated differently just in case. There was no opportunity to sample this, but Mr Briscky of FHA felt it was a form of natural material that had been sealed under the silt and decayed due to being sealed in an anoxic environment.

Artefacts - If artefacts were found these were to be deposited in the plastic trays provided that matched the grid number, the divers were working in. These boxes were to stay on the bottom for the archaeologist to later peruse and decide if any of them constituted a significant find. All artefacts were photographed underwater with a scale. The photographs of those that were significant were to be shown later to Finnish Heritage Agency (FHA) members whether they were to be raised and kept. They would be taken carefully to the surface in appropriate containers and given conservation treatment on the surface and later taken to the Helsinki conservation labs of that was agreed with the FHA. Those of less significance were to be photographed underwater with a scale and then covered over on site with silt and within geotextile material and their exact position recorded.

After 20 or so minutes the divers would swop over. If the dive pair had finished the square near the end of the 2m steel rod they were to simply move it down 2 metres to the southern end of the wreck to continue the next square. At the end of the dive, they would check the end of the dredge exhaust. A net-bag had been set up over that to catch any large debris or finds mistakenly sucked up. Upon arriving at the surface, the dive pair would report to the archaeologist (or dive master) and to the next pair what grid square they had worked in and whether to continue in the same or move to another one. Their progress would be marked on a grid plan which squares had been worked on or completed to what rough depth in the wreck. Divers would also write comprehensive reports while dives were fresh in their minds

Photogrammetry - recording of the site was recorded at the beginning of the day before the silt was disturbed and at the end of the day if the sediment had had time to settle and the visibility good. The plan at the end of the first day was to view the footage of the site at and construct a basic model of the excavated area. This would allow an understanding of the progress made and help to brief divers for the next day. This was done but as no significant progress was made on the first day there was little time to review, so the main review came after the end of the excavation.

Pre-Planned excavation stages - The end of the first stage would occur when all the silt had been removed from above the structure within the trench. A second stage was mentally planned if time allowed and would certainly occur if the excavation was to continue next year. It involved removing the sediment on the outside of the wreck on the northern side some 30cm deep or so to understand the outer hull construction technique and help interpret if this was a fully clinker or possibly a cog-like vessel. A hypothetical third stage was to excavate within the wreck decks if they and any internal sediment layers. A viscous white clay-like detritus was found within the deck planking in some places which could be sampled for laboratory study. It is quite possible as stated before that this was simple organic decay, but needed to be carefully removed in case it contained artefacts or even some sort of organic cargo. Any samples or finds taken from these discrete, enclosed spaces or areas that seemed to have a separate context would be given their own site code

Sampling - Different types of samples could be taken from the site, ranging from timber pieces for dendrochronology, organic material like timber, bone, organic cargoes for radiocarbon dating or brick/ceramics for thermoluminescence. Sediment samples will be included from inner spaces and layers as they may contain evidence traces of cargoes, whether organic or in mineral form, or from items that were personal or part of the boat's functioning, or traces of biomaterial present on the boat, such as animal/human remains, seeds, flora and fauna. All of these can contain vital clues to the vessel's function or origins. For all types of sampling a method of retrieval was devised and kept on board, including plastic tubes for sediment sampling.

Surface treatment of finds - As previously stated any objects raised would have to be of the highest significance. On the surface these would be sensitively handled and recorded again with a scale and a Digital SLR. and given appropriate finds' codes, which would conform to those used by the Finnish Heritage Agency to ensure national conformity of records. As per usual conservation practices, they would be stored in water filled containers and placed in the ship's hold in cool, secure conditions, until they can be removed to the conservator's laboratory. Samples taken will be recorded and safely packed for delivery to the appropriate laboratory.

End of the fieldwork - At the end of the trial excavation the site would be photogrammetrically recorded in detail, especially the excavated areas. These areas would then be covered with marine grade geotextile, which would be properly weighed down to avoid movement. These geotextiles would allow water to partially flow through but stop any substantial movement. This would preserve the progress made and in hopeful anticipation of a later return to the site the following year.

Dating methodology - the plan was to clear the silt from key core timbers to take dendrochronological samples. Dominguez et al (2021) advocates gaining a minimum of 8 specimens of 50 or more rings from different core timbers. The optimal number of specimens taken on any site to be taken to get that 8 successful samples might be considerably higher considering the substantial failure rate of sampling in these conditions. The dendrochronological drill would be the main sampling tool as it incurs only minimal damage to the timber. Samples would be taken from core keel timbers but also from frames, as recent research discussed in conferences has highlighted that fast growing (and younger) timbers were often selected for frame timbers and slower growing (and older) timbers for the main lower hull structure.

Variation between different timbers in the boat would allow some interpretation of timber management strategies. If core timbers were discovered in the 1m square grid the electric powered drill would be screwed to the timber to be sampled and a specimen gained. The places where samples would be taken would be recorded to aid firmly in later interpretations. Previous experience has shown this can take as little as 10 minutes. The thin cylindrical core samples would be transferred to a plastic tube and placed in a cool fridge until they can be transferred after the fieldtrip to the laboratory of Tuomas Aakala, the designated dendrochronologist. Radiocarbon specimens would be taken in certain places to aid interpretation, particularly if the schedule time on site is running short. Wiggle matching techniques for radiocarbon samples taken from tree ring samples would also provide good data if the number of tree rings in a dendrochronological sample were not sufficient in number to match to regional sequence.

Results

Status of the wreck – From its modelling in 2019 to 2024 the wreck seemed to have changed very little, except sadly that the probable stern post had collapsed into the wreck, whether from decay or being caught by something (see model below). If it was snared by something the fact that the wreck is largely submerged in silt stood the wreck in good stead to survive a similar fate.

Progress - Due to planning constraints and weather conditions the fieldwork was limited to 2 days. On the first day as expected it took some time to position the dive boat in the most preferential position over the wreck that would keep the back of the boat, the water pump, the hoses and the dredge head all in reasonable alignment to avoid kinking and entanglements in the boat's prop. The start of the second day was a little quicker as the issues were more familiar. However, it curtailed the amount of progress considerably.

Divers managed to excavate the top 10cm or more from the whole 1m wide strip from A1 to E4. As expected, since the silt was quite moveable and flowed into excavated areas it was impossible to leave cleanly defined neat squares, but the team made satisfactory progress under the conditions. The system of using grid squares seem to work quite well with new dive pairs moving onto new squares after previous squares had been dug down, and where they were not sure they picked virgin areas to excavate within the trench lines.

Communication within the dive team seemed to work well with the whole first set of squares reduced. The metal bars provided a useful guide to where divers should start to work, and when one area was excavated the divers could move them down to the next section. The bars became dislodged a few times but generally stayed in position as best as could be expected. In the circumstances with the silt shifting, they seemed a reasonable solution. It is expected that if future excavation occurs on the vessel and more structure is uncovered then data points could be attached more securely to the timbers themselves to form a much clearer and stable grid. The plastic finds boxes that were built for this fieldwork were adapted as the two days progressed and will be an asset for future fieldwork.

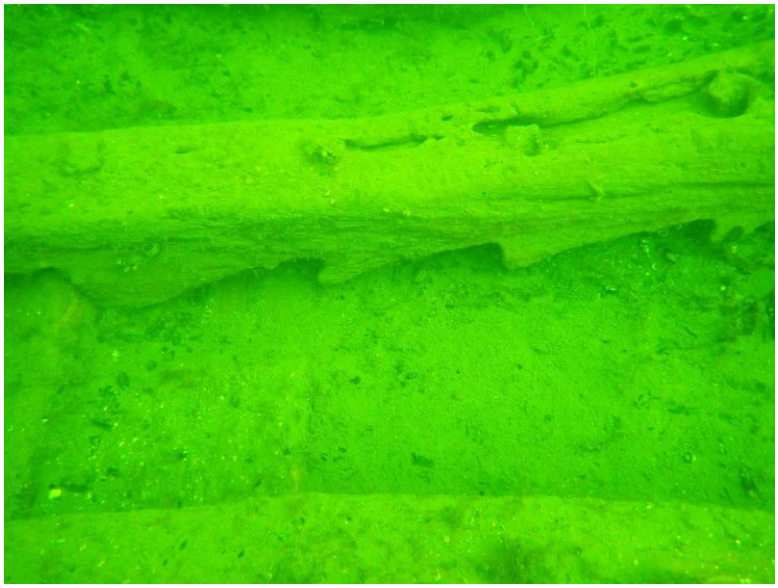


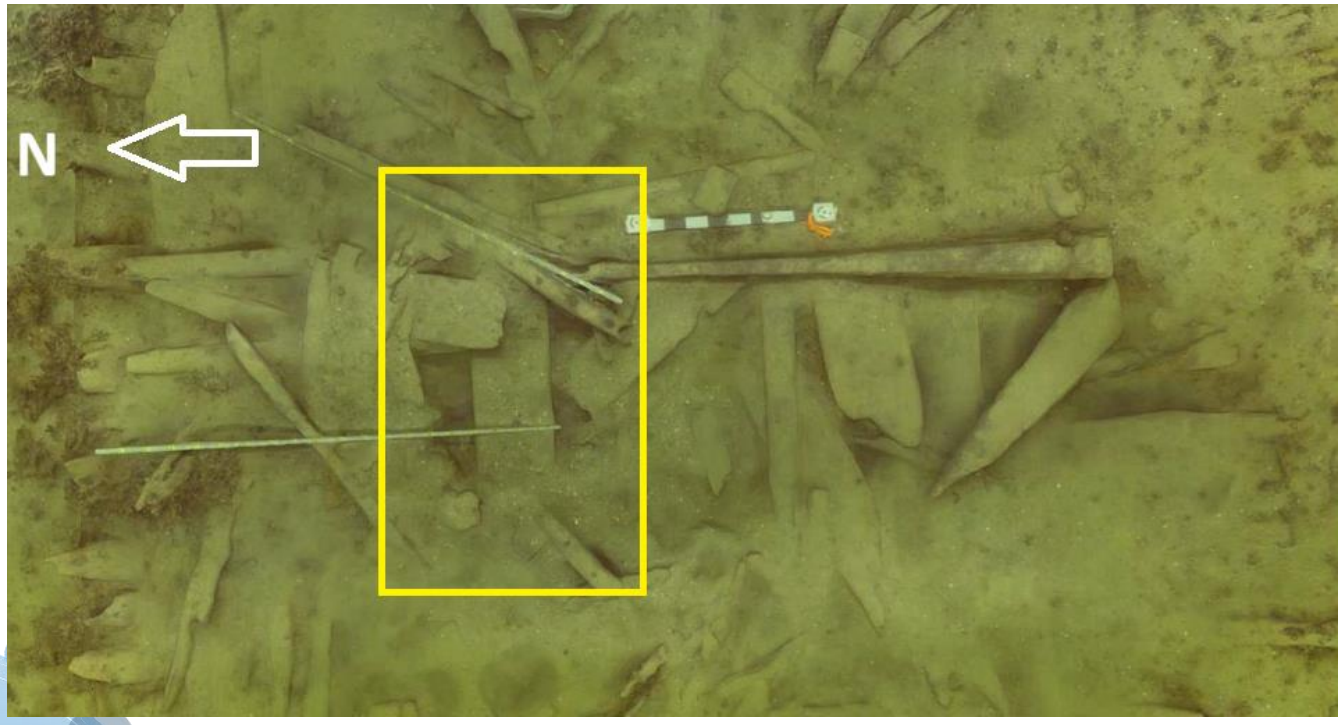
Image 11. Inner frame with clinker notches visible

The dives of the first day exposed the structure quite well on the northern side where inner frames could start to be seen attached to the inner hull where the silt had been quite shallow. However, there remained a lot deeper section of silt in the middle sections from roughly B2 to C4. A decision was made to change the strategy considering the lack of time. The central sections on just one side would be taken down deeper, so the more easterly side of the trench, only 40-50cm wide, was excavated between B2 and C4 to look specifically for the keelson, keel and mast step and larger timbers. The main priority of the excavation, after all, was to find core timbers for dating and which might give clues to the construction of the wreck. Finding this material was key to providing momentum and funding for following dive seasons. Excavating the outer hull and other objectives would have to wait.

Discovery of core timbers – After changing the strategy some larger timbers began to appear in the centre of the trench on the eastern side in the grid area between C2 and C4 and very much in the centreline of the vessel. One very stout timber in the 50 cm wide trench was discovered running east to west down the centre of the vessel. It measured some 35 – 40 cm wide and over 15 - 20cm and seemed to be made of dense oak. Its position and orientation seem to indicate that this was the keelson. It was unclear how it directly related to the timbers which it sat upon, but it had no side frames connecting into it as would occur with the keel, so seemed more likely to be a keelson, sitting atop the keel. The size of the keelson indicates a stout vessel.

Images 12 (right). Photogrammetric image of the trench lying north to south, with horizontal keelson highlighted. Full 3D-model link at the end of the report.

Image 13 (below). Magnification of excavated trench



In line with the project core aims the dendrochronology drill invented by MAS.Fi was used to take 3 samples from this timber. This underwater drill is powered by battery and uses a hollow drill bit to penetrate the dense wood. The drill is usually installed into a stout rig which is screwed into the timber to make sure the drill bit does not oscillate and therefore get caught. Unfortunately, the first sample (its position shown in the photograph below as directed in the permission statement) was taken using a hand grip of the drill and the bit became caught. This was an unfortunate yet a valuable lesson, particularly when dealing with dense timber. The next 2 employed the full rig. The specimens were transferred to plastic tubes and stored on board in the fridge. They sadly seem to contain very few rings and a large amount of mush. The specimens are at present being sent off to the laboratory for C14 analysis.

The 'dendro drill' was employed as historically it has caused less damage to the timber and produced specimens within sometimes 10 minutes. However, it is worth considering that if the drill proves to be largely ineffective against some dense timbers, even when the rig is firmly attached, and the dating of the timbers is a crucial part of the project, having gone through so much preparation, funding and effort to get there, then the team should bring along a saw, or better underwater chainsaw, to make sure a specimen is achieved that is more likely to produce rings.

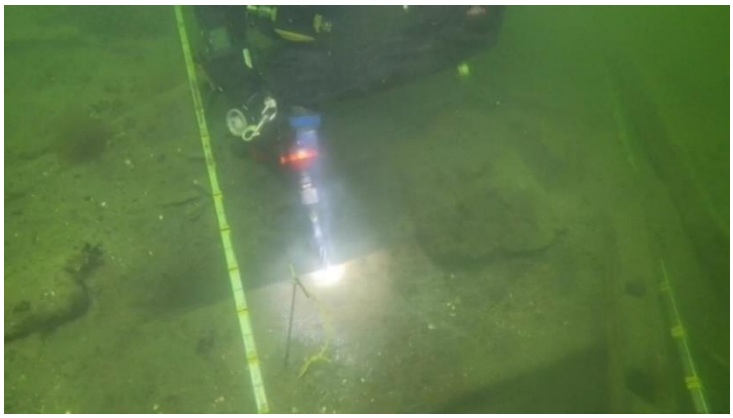
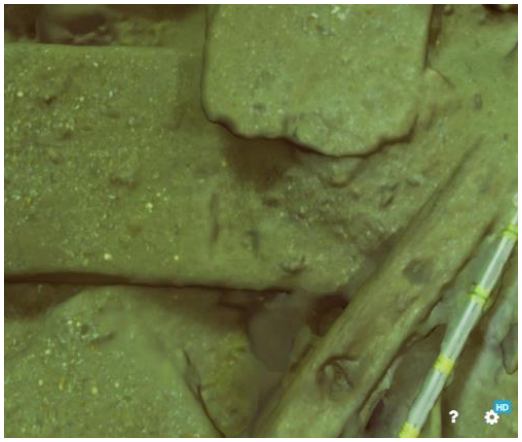
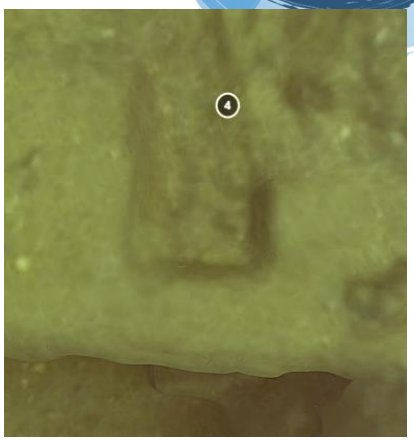


Image 14. Taking the first dendro sample with the drill

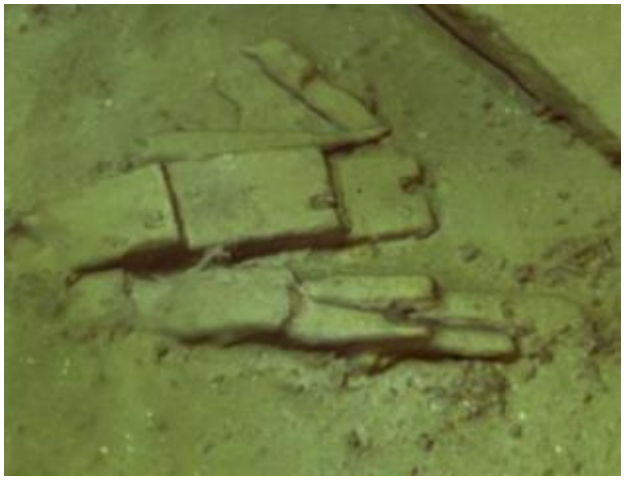
A possible mast shoe was partially visible and undamaged, extending into the keelson. It shows a slot that could provide support for a timber, the base of a possible mast or for another timber. Viewing the photogrammetric image almost suggests the squarish slot is the bottom edge of a larger, perhaps even cross-shaped slot, which is hidden under the timber coming from the north side (starboard). A possible lateral support, typical of cogs, was discovered at the possible mast shoe (see images 16 & 17). The shape and size of the slot could give functional and stylistic insight into the construction techniques used in the vessel but was only partially visible at this point. It was left alone with no time then to investigate further, combined with a desire to protect it for the moment, until MAS.Fi gets the opportunity to excavate further.

Other features – Several timbers were seen that had clinker features. The first image below shows what looks to be loose interior clinker-shaped supportive frames that would have slotted into planks in the inner surface of the rising hull. The second shows probable outer clinker-style planking on the southern portside frames partially submerged into the silt.





Images 16 & 17: Possible mast step



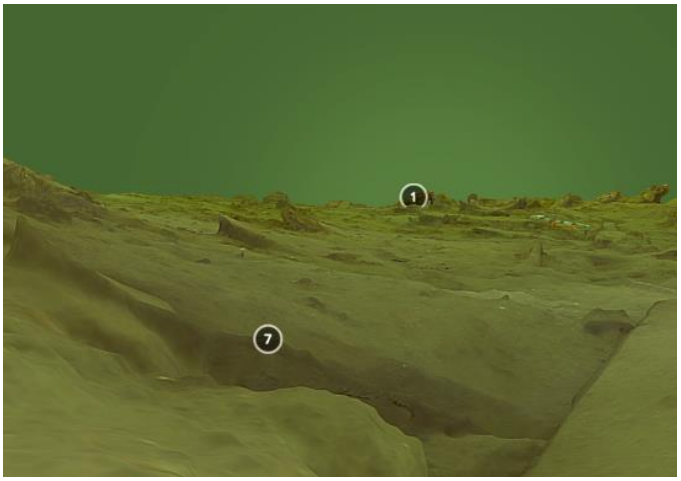


Image 18 & 19. Clinker-shaped frames and outer planking

Finds – Unfortunately, no finds of any identifiable nature were discovered, certainly nothing of significance. It was clear that the excavation had not pierced through to any section within the wreck that might hold artefacts. Some areas had been sealed off by the white organic decay layer that seemed to be natural rather than the result of cultural matter decaying. This type of decayed matter had not been cleared away and therefore anything underneath that was might have been sealed in would be still intact. Any artefacts that may have been on the surface had clearly weathered away or been washed away. Therefore, nothing needed to be raised or conserved.

Skills acquisition benefits from the excavation – Valuable lessons were learnt for the team about how to use the equipment effectively, how to manage diving while excavating and perhaps as important how the environmental conditions, underwater currents, the silt, the depth and other things affect the process. Very few underwater excavations have occurred in Finland and only just recently, so this experience could be invaluable not just for MAS.Fi projects, but potentially to offer manpower to Finnish Heritage Agency projects.

Protecting the site – At the end of this short period of fieldwork the entire wreck was fully 3D photogrammetrically recorded and modelled (see below). The central ditch was covered with geotextile and weighed down with stones to prevent movement by any underwater currents. Some small loose fragments of timber had been excavated from the trench were placed in a plastic container and stored near the central trench. These had not been connected to the structure and had no identifiable features.

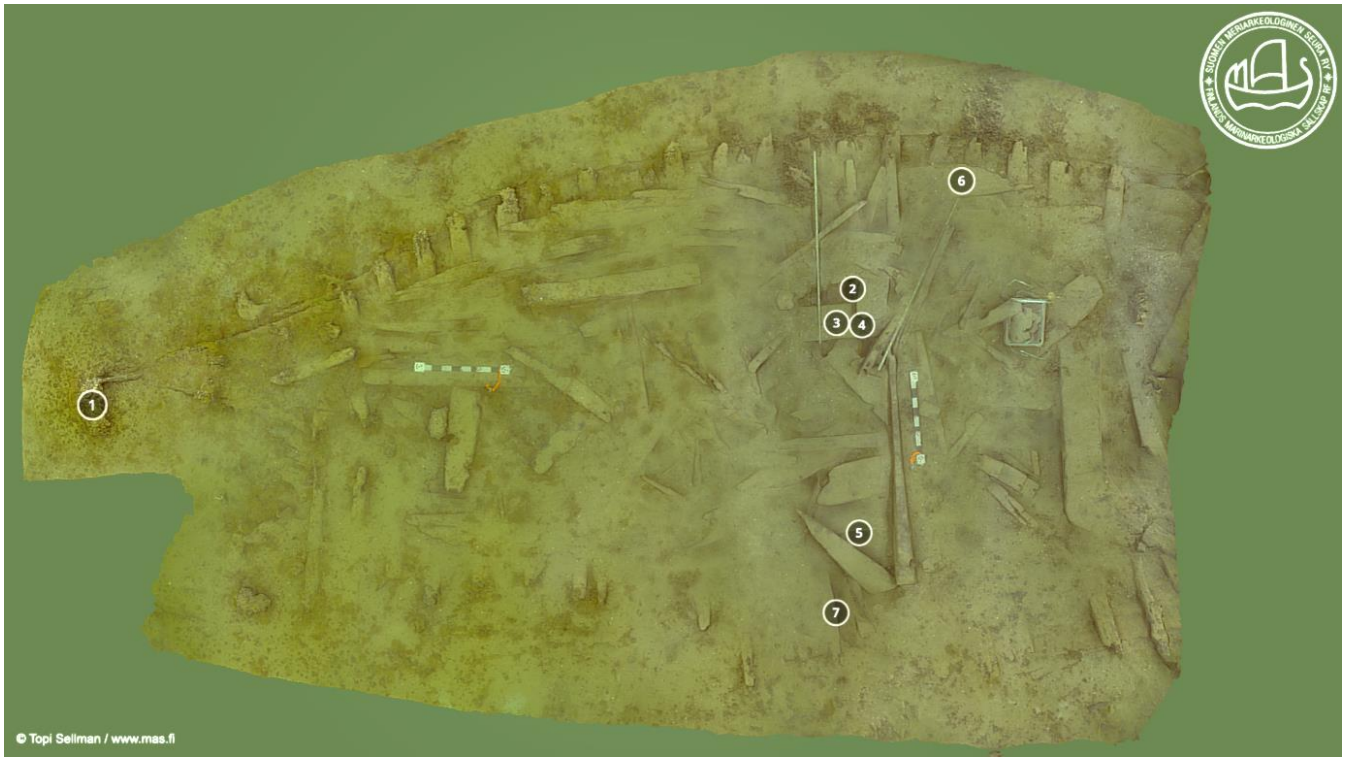


Image 20: "Aerial view" image from the 3D model of the wrecksite

Notes – 1. Sternpost broken 2023-2024
2. 'Björnar' i.e. mast step supports
3. Keelson
4. Mast step?
5. Clinker-build timber?
6. A deck level
7. Stepped-looking frames

Summary

The excavation achieved a degree of success by discovering an important core timber, which is probably the keelson. It is hoped that the organic samples sent recently for radiocarbon dating provide some comparison to the original provisional early medieval dates and simply by virtue of having radiocarbon dates shed more light on the wreck's age. However, until dendrochronological samples are taken a much greater level of certainty cannot be attested to. Therefore, MAS.Fi plans to revisit the site in the summer of 2025 and take these samples.

The mast step will be carefully unearthed and examined. The trench will be more intensively excavated with the aim to fully interpret the central hull structure, both vertically through whatever decks it may or may not have, but also then be able to look horizontally towards the stern and bow within the vessel's structure. A combination of accurate dating, a sense of its provenance gained from the next dendro samples, and an understanding of the construction details of the vessel, would have the potential to provide much more meaningful insight into its place in nautical technological development models and the maritime history of both the Gulf of Finland and perhaps the wider Baltic.

Espoo 30. 5. 2025, on behalf of the Maritime Archaeological Society of Finland,

David Cleasby, Leading Maritime Archaeologist | Markku Luoto, Chairman

PS. There is a Finnish language version of this report being created 08/2025. This and the Finnish language reports – as well as all the other reports on the same wrecksite – can be found at www.mas.fi and at mas.jej.fi.