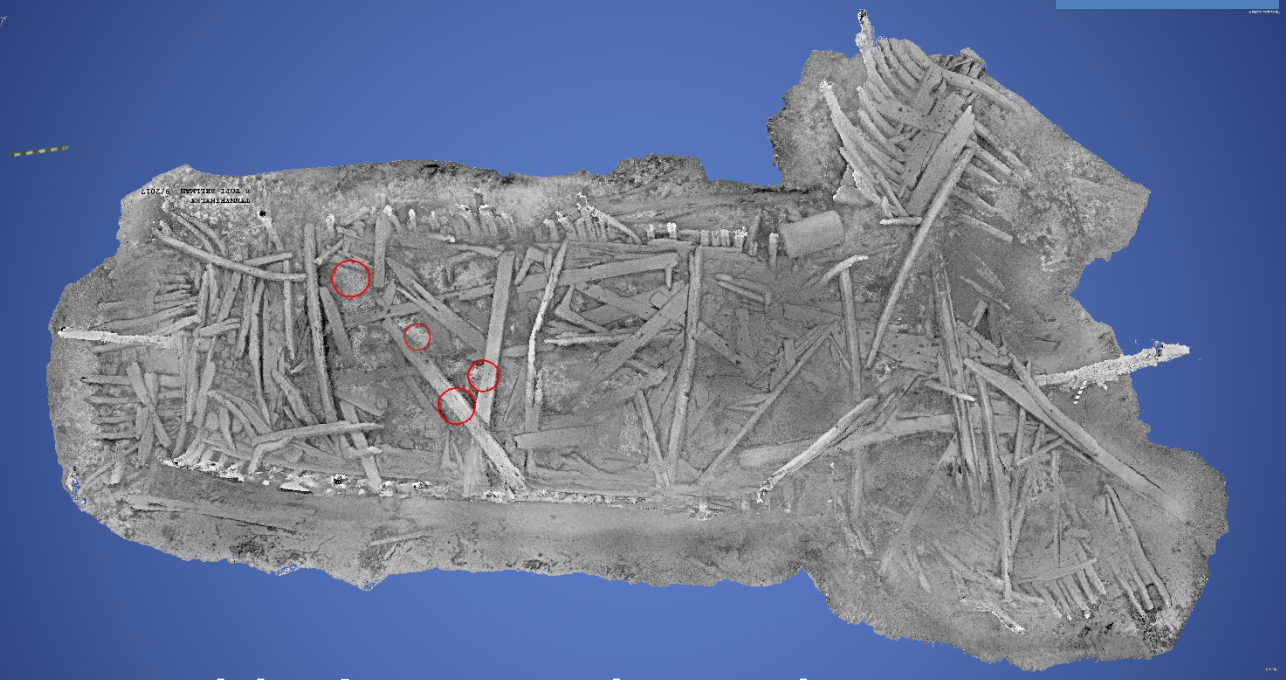
2020



Porkkala Wreck Park annual report 2020

Annual report of maritime archaeological fieldwork on the underwater cultural heritage sites at Porkkala Wreck Park, Kirkkonummi, Finland

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Maritime Archaeological Society of Finland mas.fi
Porkkala Wreck Park wreckpark.eu

ABSTRACT

The Maritime Archaeological Society of Finland (MAS, mas.fi) established the Porkkala Wreck Park (wreckpark.eu) 2018 and has continued the development and maintenance of it thereafter. Coinciding with the related activities, MAS has also performed basic maritime archaeological field work within the Porkkala area underwater cultural heritage sites – namely shipwrecks.

The field work concentrates around basic documentation of the wrecksites by video-based photogrammetry and collecting material samples for C14, dendrochronological (dendro) and thermoluminescence dating. Considerable effort has been put into sampling method development, in order to reduce its impact on the wrecks and to make it more efficient in terms of number of dives needed to collect a sample.

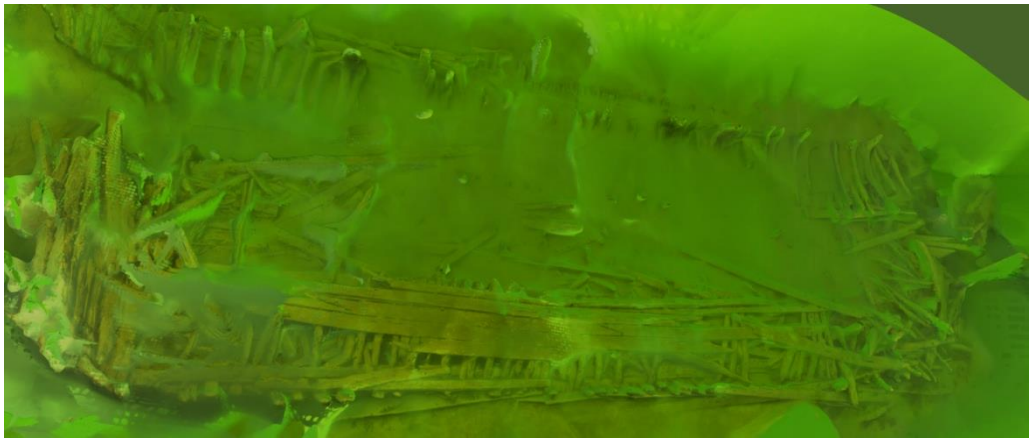
The field work tasks of the year 2020, supervised by professional maritime archaeologist David Cleasby Msc, have been influenced by the SKR/H.Hendunen fund's grant of 34.000€ for the dating of the Porkkala Wreck Park area wrecks, as MAS now aims to date and 3D-model the majority of the known wrecksites of the Porkkala area. Hence this report is only an annual report of the field work done and some of its preliminary results. The actual scientific "final" report is due after the 2022 season – Covid-19 permitting.

The 2020field work concentrated into the annual field work camp on the first week of July, albeit a fair number of sampling expeditions (3) and videoing trips (18) were done throughout the open water season. All field work tasks are carried out by MAS volunteers (32) from various diving clubs (15), who are committing their time and equipment for the effort without any compensation. Weisell-trust supported MAS field work with 8.000€ in 2020.

The 2020 scientific results include 20 collected dating samples, of which 14 new C14 datings were made, as well as three successful dendro datings. All samples were also analysed for the wood type, including the samples taken 2019. Five new wrecksites at Porkkala and another six elsewhere in the Gulf of Finland were photogrammetrically 3D-modelled.

Other results include methodological development resulting the achieved bore sample rate of one sample per "normal dive" i.e. 15-30 minutes work, of which most time was typically spent assembling the drilling rig. The area surveys conducted during the field work camp also confirmed one "ghost wreck" in the FHA's archives which does not exist in the real world.

Related documents:
Porkkala Wreck Park annual reports 2018, 2019
MAS Toimintakertomus 2018, 2019, 2020



Picture 1. *Screen shot from the low resolution 3D model of the Pampskatan wreck at Sketchfab.com. Photogrammetry enables fast creation of a generic overview of even larger wrecksites.*

CONTENTS

BACKGROUND

The Maritime Archaeological Society of Finland (MAS, www.mas.fi) stepped up its field work activities in 2018 by establishing the Porkkala Wreck Park (www.wreckpark.eu). The Wreck Park and related activities aim at protecting, researching and publishing the historical wrecks in the Porkkala area for both: divers and the general public. For the divers, park wrecks are equipped with mooring and/or marker buoys, information boards and guidelines which maintenance requires annual cleaning and replacement of lost/damaged items. For the general public a website with 3D models of the wrecks and their story has been published. Likewise, its maintenance and publishing of new wrecks requires annual updates. MAS has continued the upkeeping and development of both thereafter.

For these tasks, FHA has supported the MAS with 10.000€ grant in 2019 and Weisell-trust with 8.000€ grant in 2020. Rest of the annual costs (25-35%) are covered by participation costs of the MAS volunteers and by MAS itself. It is estimated, that the annual MAS volunteer work is worth between 150.000-200.000€ if performed by commercial divers.

Coinciding with the Wreck Park maintenance & development tasks, MAS is performing scientific, maritime archaeological field work by doing UHD video surveys of the wrecksites and creating 3D models of them with the help of photogrammetry. To date, MAS and its volunteers have already modelled more than 60 wrecksites in the Gulf of Finland, most of which are in the Porkkala area.

Another scientific approach is the C14, dendro and thermoluminescence based dating of the wrecks. For this purpose, MAS has developed under water drilling techniques and equipment to enable bore based sampling thereby diminishing the sampling impact on the wreck timbers. The Finnish Culture Fund (SKR) and therein the Harry Hendunen fund has granted MAS 34.000€ for the dating related tasks&costs to be used between 2019-2021 (and 2022 as requested, due to Covid-19).

Due to the reasons stated above, MAS field work activities in 2020 were heavily concentrated at and around the Porkkala Wreck Park as well as for acquiring C14, dendro, thermoluminescence and/or other material sample based datings of the wrecks. Having said that, MAS is also the sole national representative of NAS maritime archaeology syllabus for divers in Finland. Hence, the educational and training aspects are equally important for the continuum of MAS and volunteer based under water citizen science as such. Thus, the MAS field work camp as well as other expeditions are open for all members and wannabees.

Picture 2. *The MAS fleet at Porkkala during the 2020 field work camp. Diving support vessels (DSV) from left: H_2O's DEKO-II, Sukeltajat ry's Maija, MAS flagship Stella, Estella-2, Nousu's Vuoksi + various support boats and dinghys. This is probably the largest maritime archaeological fleet ever assembled in the Nordics.*

2020 TIMELINE

The MAS field work activities can essentially be divided into before and after the camp efforts. The Wreck Park expeditions before the camp were aimed at the maintenance of the Wreck Park and/or developing and testing the equipment to be used during the camp. Likewise, the park expeditions after the camp were organized to complement the uncompleted tasks during the camp, often halted by the storm like weather conditions. Below in table 1 is a short overview roster of the camp and various expeditions by MAS in 2020.

PVM	PAIKKA	TEHTÄVÄ
19.4.2020	Tykkikylki & Tynnyrihylky	Kiinnityspoijujen asennus
3.5.2020	Edmundin ja Torrörenin hylky	Merkkipoijun asennus, inventointia.
8.5.2020	Rysäkiven hylky	Kiinnityspoijun asennus
19.5.2020	Rysäkiven hylky	Varsinaisen kiinnityspoijun asennus
25.5.2020	Mygganin hylky	Fotogrammetriakuvaus
2.6.2020	Susisaari1 hylky	Kairausnäytteen ottaminen
3.6.2020	Susisaari 1 hylky	Kairausnäytteen ottaminen hylystä
7.6.2020	Linjatauluhylyn syvä osa, Pärongrundetin hylky	Fotogrammetriakuvaus
12.6.2020	Tykkikylki hylky	Kairausnäytteen ottaminen
27.6.- 5.7.2020	**Porkkala Meriarkeologialeiri** (Pampskatanin, Utterböten, Salmön jne. hylyt)	Fotogrammetriakuvaus, kairausnäytteiden ottamien, ohjausköysien uusiminen, iventointi
4.8.2020	Linjatauluhylyn syvä osa	Kairausreiän etsintä, opasköyden kiristys
12.8.2020	Rysäkiven hylky	Fotogrammetriakuvaus
20.8.2020	Edmundin hylky	Kiinnityspoijun valmistelua
27-29.8.2020	**Saaristomeren tutkimusmatka** (Borstö, Metskär, Hamnholmarna)	UHD ja fotogrammetriakuvaus
31.8.2020	Svarthällenin hylky	Inventointia, kiinnityspoijun valmistelua
7.9.2020	Juktenskobben hylky	Inventointia, kiinnityspoijun valmistelua
14.9.2020	Harunan hylky	Fotogrammetriakuvaus
28.9.2020	Linjatauluhylyn syvä osa	Fotogrammetriakuvaus
8.10.2020	Svarthällenin hylky	Inventointia, kiinnityspoijun valmistelua
10.10.2020	Edmund hylky	Kiinnityspoijun valmistelu
11.10.2020	Limisaumahylky	Kairausnäytteen ottaminen hylystä
17.-18.10.2020	**Porkkalan tutkimusmatka** (Tykkikylki, Uunihylky, Rönnskärin tykkihylky)	Kairausnäytteen ottaminen hylystä
20.10.2020	Svarthällenin hylky	Inventointia, kiinnityspoijun valmistelua
23.10.2020	Linjatauluhylyt, Rönnskärin tykkihylky	Poijun korjaaminen, kairausnäytteen ottaminen
24.10.2020	Utterböten hylky, Varmbådanin uunihylky	Kairausnäytteen ottaminen hylystä
31.10.2020	Engelsmanskobbenin ja Utterböten hylyt	Kairausnäytteen ottaminen hylystä
9.11.2020	Varmbådanin uunihylky, Linjatauluhylyt	Fotogrammetriakuvaus & kairausnäytteen ottaminen
19.11.2020	Soldatholmenin hylky, Porsön hylky	Fotogrammetriakuvaus & C14 vuolunäytteen otto
26.11.2020	Rysäkiven hylky, Syskonen hylky	Fotogrammetriakuvaus
29.11.2020	Linjatauluhylyt, Tynnyrihylky, Tykkikylki	Kiinnityspoijujen poistaminen, fotogrammetriakuvaus
12.12.2020	Jenny-hylky, Skallotholmenin hylky	Fotogrammetriakuvaus & C14 vuolunäytteen otto
19.12.2020	Tynnyrihylky, Limisaumahylky	Fotogrammetriakuvaus

Table 1. *Timeline roster of MAS field work activities in 2020. The ones outside the Wreck Park in gray.*

As can be seen from the table 1, about a third (12) expedition days were spent outside Porkkala area (32), of which the Saaristomeri-expedition was the most noteworthy, producing new findings from the famous Borstö wreck. Most trips to the Porkkala Wreck Park were done on daily basis leaving from Espoo as it's only a 45 to 90 minutes away, depending on the boat.

Opening times and visits in the Porkkala Wreck Park in 2020

The two original mooring buoys at Stora Träskön bay were installed 19.4.2020 and removed 29.11.2020, which in essence means, that the park was open more than seven months during the year 2020. The opening period can be characterized as exceptionally long. It was made possible by the mild weather conditions in the spring and fall of 2020. There was no guest book or other means to report physical visits to the park wrecks, but MAS member observations and reports from local dive clubs indicate, that the diving in the park has not significantly diminished due to Covid19. Every club reported frequent visits to the Wreck Park as far as from Salo and Kotka. Almost every weekend during the high season (May-September) dive boats have been reportedly seen in the park.

The virtual park i.e. website www.wreckpark.eu has likewise had a similar number of individual visitors (~13 600) as the year before. The website is naturally open year around.

2020 ORGANISATION & EXECUTION

The full roster of participants has been moved into the appendix 1 for privacy reasons. The field work activities were organized by Markku Luoto, the chairman of MAS. The responsible Archaeologists were Msc David Cleasby, Prof. Kristin Ilves and Dr. Minna Koivikko depending on occasion. The wood type and dendro analyses were done by Msc. Tuomas Aakala and the C14 dating services were provided by International Chemical Analysis Inc. (ICA). The FHA research permit for 2020 was signed of by Mrs. Helena Taskinen and Mrs. Maija Matikka. The captains of the vessels of which the diving was done and thereby responsible for all the actions on board their vessels were:

- DSV Stella, the flagship of MAS, Mr. Vesa Saarinen, vice chairman of MAS.
- DSV Deko2, dive club H_2O, Mr. Juha
- DSV Maija, dive club sukeltajat ry, Mr. Panu Hänninen
- DSV Vuoksi, dive club Nousu ry, Mr. Markku Luoto
- MV Estelle 2, Mr Hannu Rokka
- MV Faster, Mr. Topi Sellman.

Additionally, some other members of the participating dive clubs may have been as captains of their respective vessels during the individual trips to the Porkkala Wreck Park. Also, during the media & visitor day at the field work camp, many unrecorded visitors and media personnel visited the camp vessels.

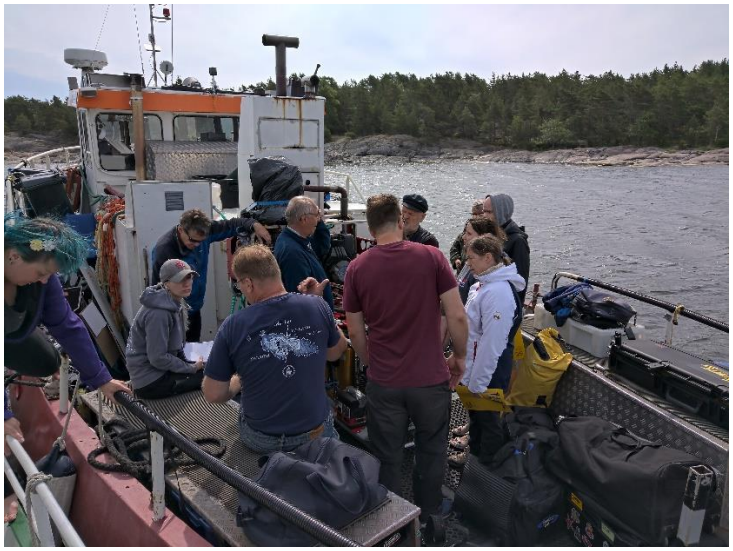
Picture 3. *The MAS fleet at the Porkkala harbour during the field work camp.*

Volunteers

Altogether 43 individual MAS volunteers participated in the various field work activities organized by MAS throughout the 2020 season. Thus, there is about 30% increase in participation compared to the previous year. 35 individual volunteers participated the activities at Porkkala field work camp, where the vast majority of the MAS diving activity took place. This further underlines the importance of the field work camp as an essential part of the annual MAS program.

The volunteers represented 18 different dive clubs: Nousu, Calypso, H2O, Taursu, RRDC, OxyDC, RiUrSu, Nautic Club, PSK Kupla, Sukeltajat ry, Plutot, Ylen sukeltajat, Urheilusukeltajat ry, Teredo Navalis, Partiosukeltajat, Jkylän sukeltajat, PADI, SS Simppu.

Volunteer divers represented a large variety of experience & expertise from somewhat unexperienced beginners with only tens of dives in their logs to seasoned dive instructors and experts with thousands of dives over the decades. On average, participants had some hundreds of dives and P2/AOWD+ expertise. Age distribution was also from 17 to 64 years of age, median being around 40 years old.



Picture 4. *MAS volunteers on board DSV Deko-2.*

Most participants were naturally Finns, but some international flavour was brought in by our British maritime archaeologist David Cleasby and by double citizenship members from Somalia, Germany, Lithuania, and Belgium. Some foreign participants e.g. from MAS Sweden had to cancel their participation due to Covid-19 restrictions.

Diving

Due to the Finnish sea law, all diving activities in MAS events have been organized under the vessel's captain's orders & responsibility, albeit all volunteer divers are only themselves responsible for their diving activities. All tasks are considered voluntary "talkootyö"-tasks, which the volunteers "talkoolaiset" have carried out without any compensation excluding the food & lodging "talkoo ateriat & majoitus". These are important to state separately, to explicitly deny any application of regulations for professional diving or work safety into MAS activities.

All other expeditions have been single ship journeys, sometimes with accompanying auxiliary boat or dinghy, but the Porkkala field work camp, where five accommodating ships and several auxiliary boats participated. Partly due to official Covid-19 recommendations, the camp participants were divided into diving & ship crews around the galleys, in order to delegate task management, enable simultaneous diving activities and the brake the participants into smaller "galley bubbles". Volunteers accommodated into Deko2 and Stella would form one galley bubble and the ones in Maija, Vuoksi and Estelle2 made up another bubble.

Altogether 29 individual volunteers performed at least one dive during the camp, resulting 262 dives during the camp. This is some 15% less than the year before and that was due to the harsh weather conditions limiting diving on two days during the camp. Additionally, 176 dives were done on the various expeditions to the researched wrecks at Porkkala Wreck Park before and after the field work camp.

COSTS & FUNDING

The total budget and realisation for MAS field work activities can be found on society's annual report. The field work camp's budget was about 13 000€ of which 8000€ (62%) was funded by Weisell trust, about 3000€ was funded by participation fees, 1000€ by MAS board grant and about 1000€ by SKR/H.Hendunen fund. The latter also funded 100% of the sample dating costs about 10 000€ so far. No public sector funding was applied for – nor received 2020.

METHODOLOGY DEVELOPMENT

The further development of bore-sample based dating sampling method continued in 2020. The proprietary drill bit (32mm) specifically constructed for MAS in 2019, was changed into commercially available "Birmensdorf" type of (12mm) drill bit. Also, the proprietary drilling "jig" was changed into commercial column drilling jig. These changes resulted dramatically shorter drilling times (from 45-90 or even up to 180 minutes in 2019 to 10-30 minutes in 2020) per sample, thus enabling the MAS voluntary divers to collect one sample per dive on the average. A separate scientific article about the underwater bore-sample based dating is being prepared by MAS and Tuomas Aakala, to be submitted into International Journal of Nautical Archaeology.

TASKS & RESULTS

Most of the underwater field work tasks, involving MAS volunteer divers, were related to wrecksite inventories and/or maintaining and developing the park infrastructure, like guidelines or information signs for the Porkkala Wreck Park. However, this annual report concentrates on the maritime archaeological field work aspect in response to the FHA research permit MV/121/05.04.01.02/2020. Due to the reasons expressed before, the research related tasks were primarily videoing the wrecks for photogrammetric 3D-models and taking bore samples from the wood for dating the various wrecksites. Thus, primary results are successful 3D models and datings. The 3D models are being published on the MAS Sketchfab account at https://sketchfab.com/mas-fi and later on at mas.fi and wreckpark.eu as the wreck specific web pages are created.

Sampling Overview

As stated before, the 4th generation of the bore-sample drilling system (as in pictures 5 & 6) proved dramatically more efficient than the previous versions. Especially after the field work camp, the work routines were refined to the level, that almost every dive with the drill produced a collected sample. However, it proved very difficult to determine the orientation of annual rings in the wood and/or the biological condition of the wood, as the logs may rotten from the inside as well. Hence, majority of the samples were not usable for dendro dating, but only C14 and wood type analyses, as can be seen from the table 2.

***Picture 5 & 6**. MAS volunteer diver using the 4th generation drilling device to collect a bore sample of wood.*

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
20	18.10.2020	Varmbådanin uunihylky	tammi	20	1183				
21	18.10.2020	Varmbådanin uunihylky	tammi	79	1183	Tid21G	C14.AD.1490-1660 (<1640)	Den.AD.1390-1468	Pohjois-Saksa
2	21.10.2020	Varmbådanin uunihylky	tammi	36	1183				
9	4.7.2020	Träskön tynnyrihylky	tammi	17	1185				
4	5.7.2020	Träskön tynnyrihylky	tammi	13	1185				
7	5.7.2020	Träskön tynnyrihylky	tammi	32	1185				
25	4.7.2020	Träskön tynnyrihylky	tammi	82	1185	Tid25F	C14.AD.1460-1640 (<1600)		
16	24.10.2020	Linjatauluhylky syvä	tammi	20	1187	Tid16B	C14.AD.1800-1930 (<1860)		
3	29.6.2020	Linjatauluhylky syvä	tammi	2	1187				
17	24.10.2020	Ryssbrantarna matala	tammi	15	1220	Tid17C	C14.AD.1720-1820 (<1780)		
8	30.6.2020	Pamskatan hylky	tammi	5	1225	Tid8A	C14.AD.1630-1810 (<1720)		
23	18.10.2020	Utterböten hylky	tammi	52	1230				
1	2020	Utterböten hylky	tammi	81	1230	Tid1H	C14.AD.1480-1650 (<1630)	Den.AD.1249-1329	Puola
11	3.7.2019	Rönnskärin tykkihylky / peräsin	lehtikuusi	127	1995	#5E	C14.AD.1490-1670 (<1660)	Den.AD. <1584	Venäjä?
13	24.10.2020	Rönnskärin tykkihylky	lehtikuusi	15	1995				
18	24.10.2020	Rönnskärin tykkihylky / kylki	mänty	37	1995	Tid18D	C14.AD.1420-1500 (<1520)		
15	31.10.2020	Engelskobben 2	tammi	7	1000039773				
14	31.10.2020	Engelskobben 2	tammi	18	1000039773	Tid14I	C14.AD.1460-1640 (<1600)		
12	4.7.2019	Träskön limisaumahylky / irtokaari A1	tammi	45	1000039839	#4D	C14.AD.1300-1370 (<1380)		
6	5.7.2019	Träskön limisaumahylky / irtokaari B2	tammi	33	1000039839	#3C,#1A	C14.AD.1440-1530 (<1570)		
5	6.7.2019	Träskön limisaumahylky / sikoköli	tammi	51	1000039839	#2B	C14.AD.1460-1640 (<1610)		
10	2020	Träskön limisaumahylky	tammi	17	1000039839				
24	12.6.2020	Träskö segelkobben tykkikylki	mänty	21	1188				
19	17.10.2020	Träskö segelkobben tykkikylki	mänty	7	1188				
22	18.10.2020	Träskö segelkobben tykkikylki	mänty	56	1188	Tid22E	C14.AD.1660-1820 (<1790)		
26	9.11.2020	Remmarudden	tammi?	0	1191	Mid104D	C14.AD.1610-1680 (<1690)		

***Table 2**. Overview of all successfully acquired samples in 2019-2020*

Wrecksites Dived

Below is a generic overview of the Porkkala area wrecksites inspected by MAS in 2018-2020. Only the wrecksites from which sample(s) were successfully collected are presented in more detail in their respective subchapters. Even though the last years dating results are presented in their respective subchapters for the sake of compatibility, the more detailed information of the sampled items can only be found in 2019 annual report. No new coordinates are included in this report, as if such were determined, they were reported to FHA separately. Using only MV nro -references keeps the spatial and identification information unanimous when new coordinates will be determined. Correcting the locations of wrecksites and finds will be one of the 2021 & 2022 tasks. Wrecks (printed with gray below) with no new findings or no samples taken are ***not*** elaborated in a separate chapter.

1. Träskön tynnyrihylky, MV nro 1185
    - Dozens of park maintenance dives, new photogrammetry model, 4 samples collected

2. Träskön Segelkobben/Tykkikylki, MV nro 1188
    - Dozens of park maintenance dives, 3 samples collected, example video of drilling

3. Rönnskärin tykkihylky, MV nro 1195
    - Several of park development dives, additional photogrammetry model, 2 samples collected

4. Linjatauluhylky, MV nro 1187 ja Ryssbrantarna MV nro 1220
    - Dozens of park maintenance dives, new photogrammetry model, 2+1 samples collected

5. Träskön Limisaumahylky, MV nro 1000039839
    - Dozens of park maintenance dives, new photogrammetry model, 1 sample collected

6. Kuparihylky, MV nro 1214
    - Several park planning dives, additional photogrammetry model videos, no samples

7. Utterbottenin hylky, MV nro 1230
    - Several park planning dives, 2 samples collected

8. Truttkobbarnan hylky, MV nro 1210
    - Several inventory dives, no new finds

9. Långörenin hylky 2, MV nro 1228
    - Several inventory dives, no new finds

10. New wreck site (an anchor and part of mast), unregistered, N 59°57,204’ | E 24°22,791’ (WGS84)
    - Several inventory dives, no new finds

11. Potentially new wreck site (an anchor), unregistered, N 59°57,465’ | E 24°22,383’ (WGS84)
    - Several inventory dives, no new finds

12. The Kaljaasi Edmund wreck, MV nro 2382
    - Several park planning dives, additional photogrammetry model videos, no samples

13. Pampskatan 1 hylky, MV nro 1225
    - A few park planning dives, new photogrammetry model, 1 sample

14. Salmen 1 hylkymerkintä MV nro 1192
    - Several inventory dives, wreck confirmed nonexistent

15. Varmbådanin uunihylky, MV nro 1183
    - Several park planning dives, new photogrammetry model, 3 samples collected

16. Engelskobben 2 hylky, MV nro 14039773
    - Several park planning dives, new photogrammetry model, 2 samples collected

17. Remmarudden, Träskön länsipuolen matala, MV nro 1191
    - A few park planning dives, video for 3D-model, 1 whittling sample collected

18. Torrörenin hylky, MV nro 1221
    - A few inventory dives, some Video documentation, no samples collected

19. Pärongrundetin hylky, MV nro 1200
    - A few park planning dives, new 3D-model, no samples collected

20. Svarthällenin hylky, MV nro 1222
    - A few park planning dives, some video for 3D-model, no samples collected

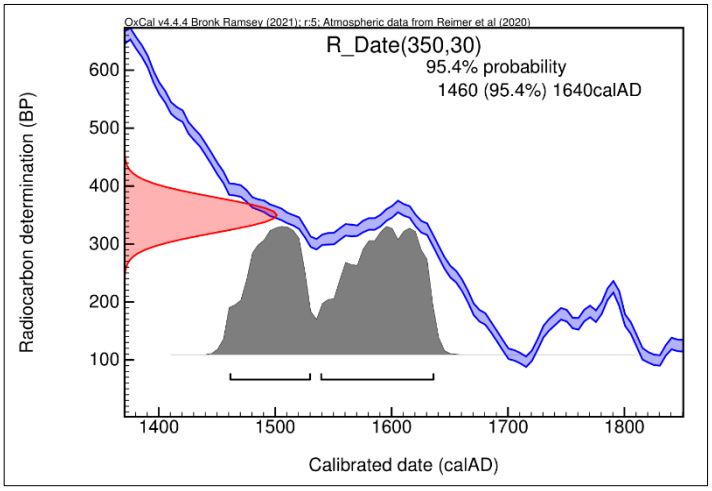
21. Juktenskobbenin hylky, MV nro 2302
    - A few park planning dives, additional video for 3D-model, no samples collected

22. Harunan hylky, MV nro 1198
    - A few park planning dives, new 3D-model, no samples collected

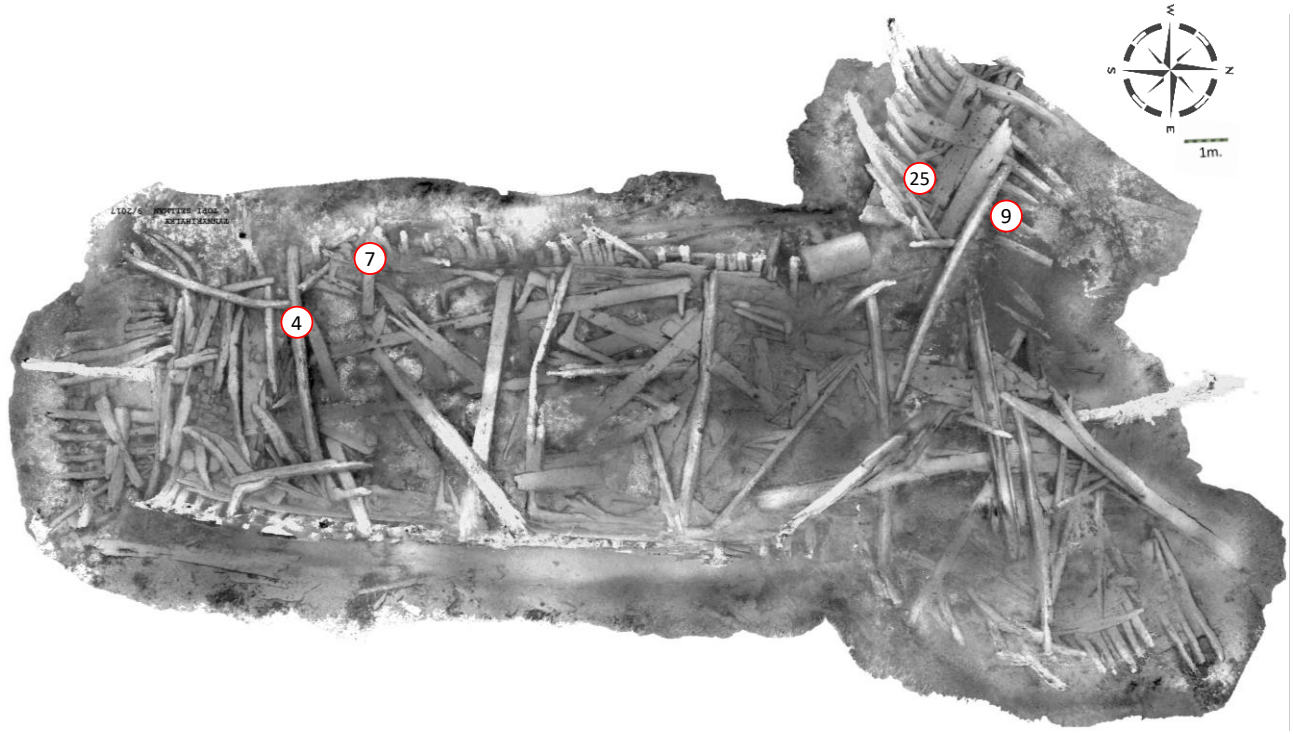
Träskön Tynnyrihylky, MV nro 1185

Dozens of dives were done at Tynnyrihylky during the season, most of them related to the maintenance of the park infrastructure. As for the scientific field work tasks, a new 3D-model was created based on new video material and four bore-samples were collected during the field work camp.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
9	4.7.2020	Träskön tynnyrihylky	tammi	17	1185				
4	5.7.2020	Träskön tynnyrihylky	tammi	13	1185				
7	5.7.2020	Träskön tynnyrihylky	tammi	32	1185				
25	4.7.2020	Träskön tynnyrihylky	tammi	82	1185	Tid25F	C14.AD.1460-1640 (<1600)		



The sample #25 (Tid25F) contains 82 annual rings, which often is the minimum for Dendro dating. Unfortunately, the pattern didn't match any known reference sequence, so no dating was acquired via this method. However, the sample was dated with C14 analysis to determine the generic age of the wreck. As a result, the standard C14 model would date the timber to ~ AD 1600, but since calibrations typically set the dating earlier than in standard model, it is probably safe to say, that we're talking about 16th century wreck – possibly even early 16th century.

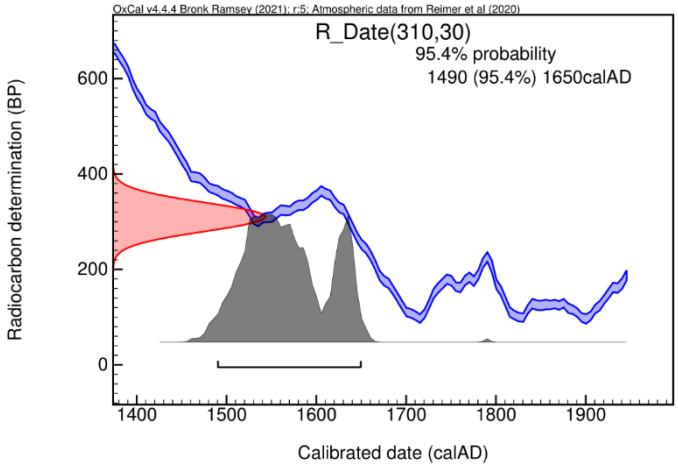


Above is an overview of the Tynnyrihylky with sampling spots marked. Naturally, more sampling is needed on Tynnyrihylky wreck – especially on the less exposed timbers as many of the other ones are very soft and badly rotten. More samples will be collected in 2021. A more detailed description of the wreck can be found in 2018 annual report.

Varmbådanin Uunihylky MV nro 1183

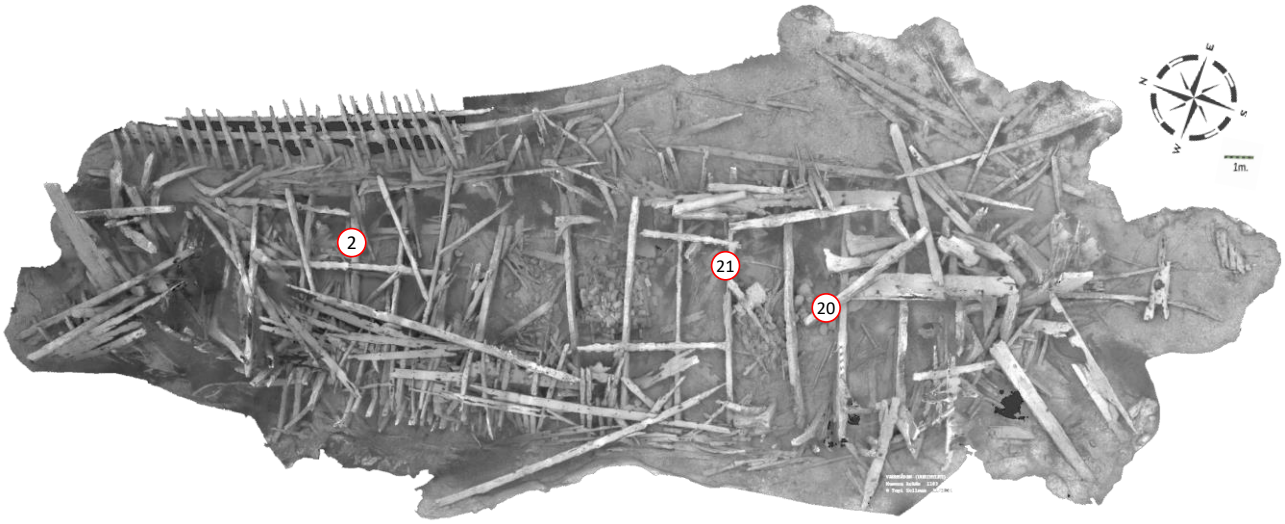
The “Uunihylky” was extensively dived during the season, as it is planned to be included into the Porkkala Wreck Park in 2021. A new photogrammetric 3D-model was created, and three bore-samples were collected, of which the #21 (Tid21G) produced almost 80 annual rings and was dendro dated to have grown at least between 1390-1468.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
20	18.10.2020	Varmbådanin uunihylky	tammi	20	1183				
21	18.10.2020	Varmbådanin uunihylky	tammi	79	1183	Tid21G	C14.AD.1490-1660 (<1640)	Den.AD.1390-1468	Pohjois-Saksa
2	21.10.2020	Varmbådanin uunihylky	tammi	36	1183				



The denro date is well supported by the calibrated C14 dating of the same sample, as the areal maximum points to the turn of the 15th and 16th century.

Naturally, more datings are needed to determine the earliest possible construction date of the vessel, but the successful dating and placement to northern Germany hints, that there are good chances for dating any samples with sufficient number of annual rings.

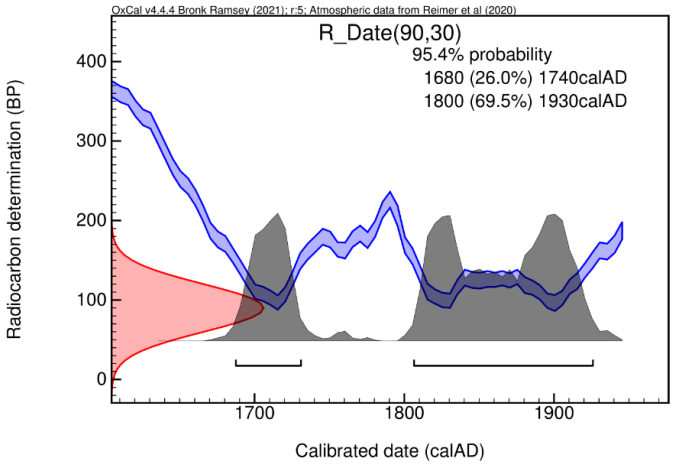


Above is an overview of the Uunihylky with sampling spots marked. More samples will be collected 2021. As mentioned, the wreck will be included into Porkkala Wreck Park 2021 and thereafter a detailed description will be added. It is assumed that the wreck is that of a man-of-war as remnants of gunports have been distinguished on the port side of the wreck. It’s namesake “owen wreck” is derived from the remains of a large galley in the midships. The wreck has been researched superficially decades ago, during which a Swedish coin dating back to 1636 has been found from the wreck.

Linjatauluhylky (syväosa) MV nro 1187

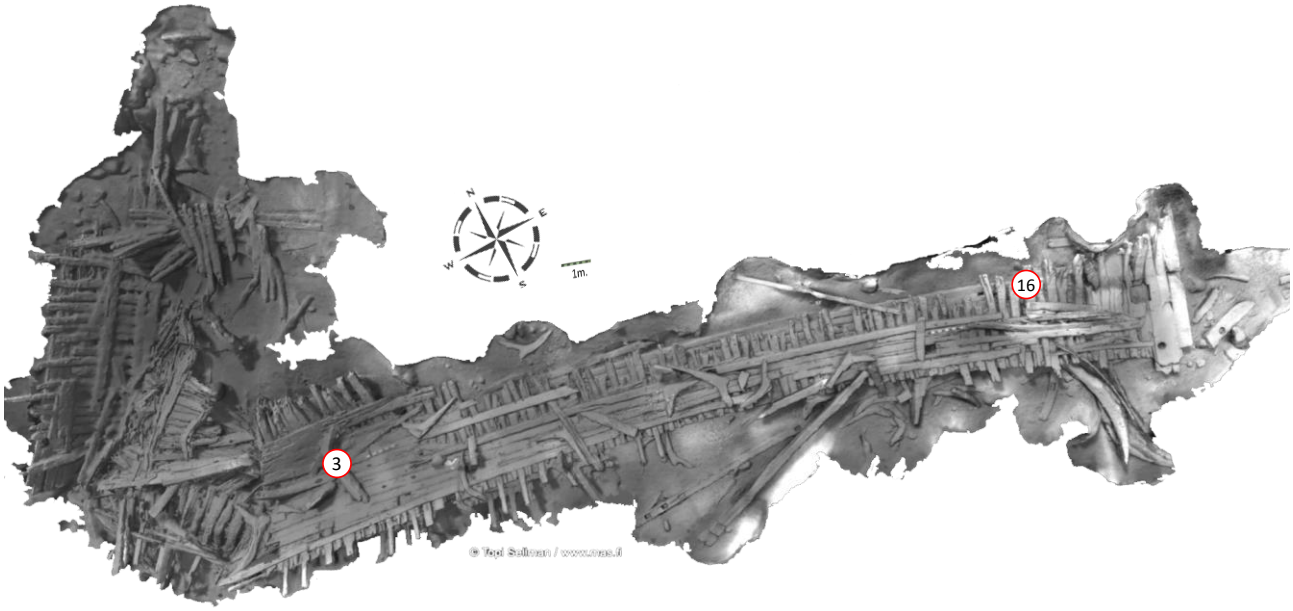
The “deeper part of Linjatauluhylky” was extensively dived during the season, as it was included into the Porkkala Wreck Park in 2020. A new photogrammetric 3D-model was created, and two bore-samples were collected. Unfortunately, neither provided enough annual rings for dendro dating.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	Max% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
16	24.10.2020	Linjatauluhylky syvä	tammi	20	1187	Tid16B	C14.AD.1800-1930 (<1860)		
3	29.6.2020	Linjatauluhylky syvä	tammi	2	1187				



A C14 dating was acquired from the sample 16 (Tid16B), which puts it quite firmly into the mid or earlier part of 19th century. The standard C14 model sets the date at 1860, thereby excluding the areal maximum of about 1900. There is a small chance, however, that the wood would be 100 years older.

This dating is interesting to compare with the shallow part “Ryssbrantarna” and with the “Remmarudden” which have been previously tied together as wrecksites of a single vessel.

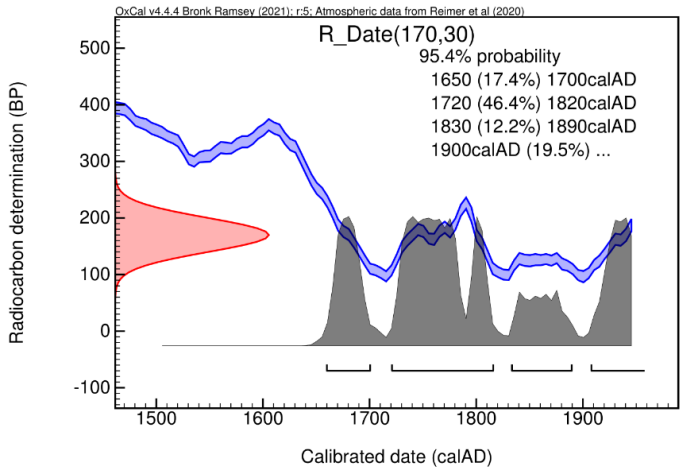


Above is an overview of the Linjatauluhylky with sampling spots marked. More samples will be collected 2021 while aiming at a successful dendro dating. This wrecksite has been previously linked with cannons and ammunition etc. wreckage at Remmarudden wrecksite. However, no gunports or structures related specifically to warships have been found. Instead, several cargo ports have been distinguished and on the bow side, there’s even a lid of one. It is a good question whether the shallower part (Ryssbrantarna) are related to this wreckage or not.

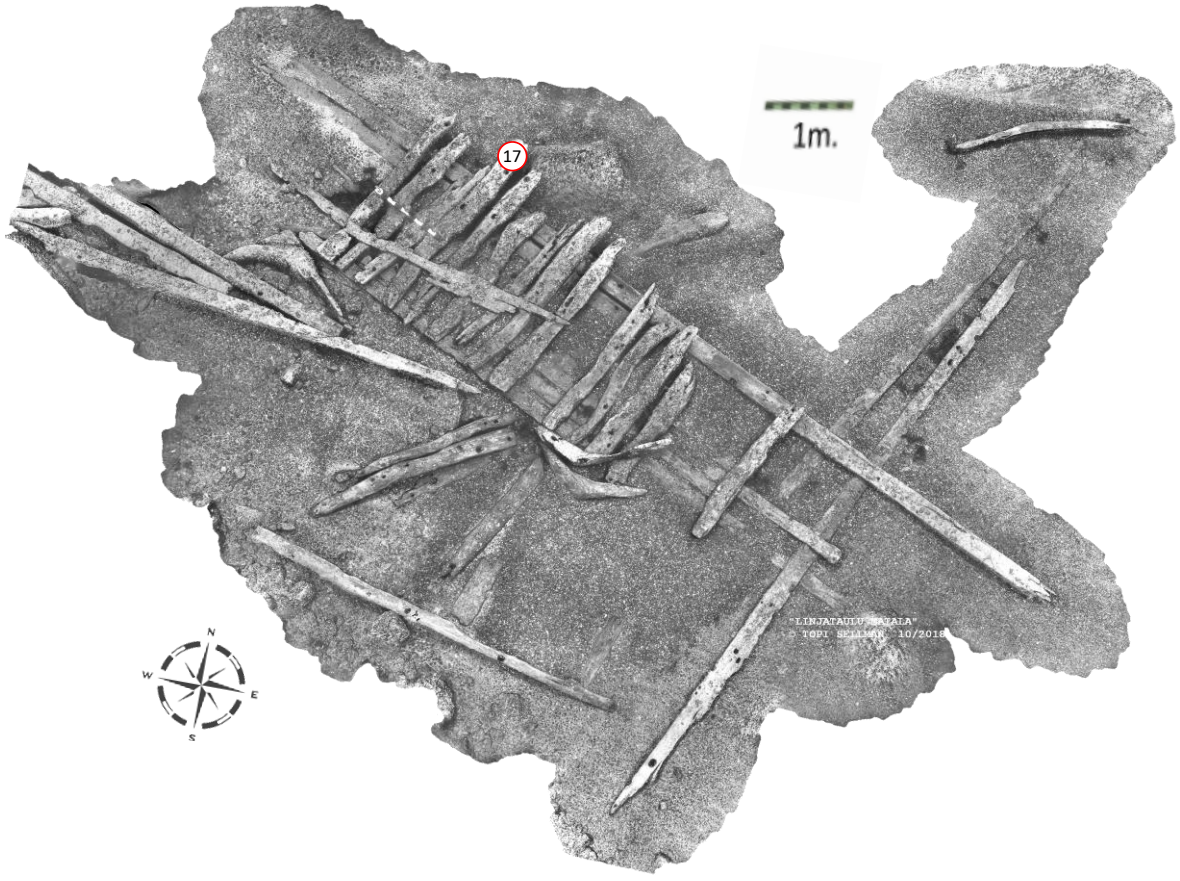
Linjatauluhylky (matalaosa) Ryssbrantarna MV nro 1220

The “Ryssbrantarnan hylky”, better known as the “shallower part of Linjatauluhylky” was extensively dived during the season, as it was included into the Porkkala Wreck Park in 2020. A new photogrammetric 3D-model was created, and one bore-sample was collected. Unfortunately, it didn’t provide enough annual rings for a dendro dating.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	max% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
17	24.10.2020	Ryssbrantarna matala	tammi	15	1220	Tid17C	C14.AD.1720-1820 (<1780)		



The C14 dating however, puts the timbers quite surely into the 18th century. The standard C14 model sets it to 1780 and the areal maximum to the middle of the 18th century. Even though the dating may seem to suggest that this shallower part may be a century older than the deeper one, it should be taken into consideration, that it was a single sampled timber and it’s common to get hundreds of years variation in timber dates, especially on oak, depending on which part of the tree the timber was made or from which side of the sample the specimen was taken.

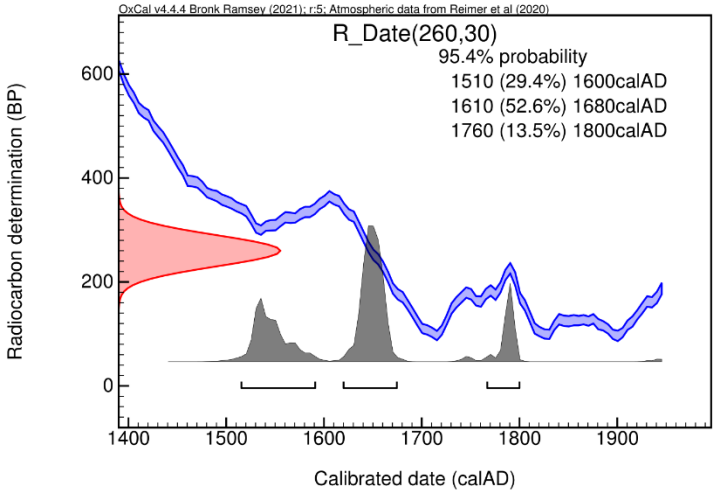


Above is an overview of the Ryssbrantarnan hylky with sampling spots marked. More samples will be collected 2021 while aiming at a successful dendro dating.

Remmarudden eli Stora Träskön länsipuolen matalan hylky MV nro

Remmarudden gets its name from the shallows on the west side of the Träskön island, where a sea mark has stood for centuries. On the shallows, various wreckage has been found like cannons, cannonballs etc. as well as several pieces of planking. The site was not dived during the camp due to strong winds, but in November a single dive was done, and a single whittling sample was collected from a semi buried, but quite wide plank. The wood stayed dark while whittling, hence it is likely to be oak.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
26	9.11.2020	Remmarudden	Tammi?	0	1191	Mid104D	C14.AD.1610-1680 (<1690)		



The C14 dating is quite clearly in the mid 17th century as the standard model date is 1690 and the calibrated areal maximum is about 1650.

So, at least the sampled piece of wood is considerably older than either of the Linjatauluhylyt, often associated with this site. Naturally, it is possible, that there is wreckage from several shipwrecks on these same shallows. Hence more dating samples are needed.

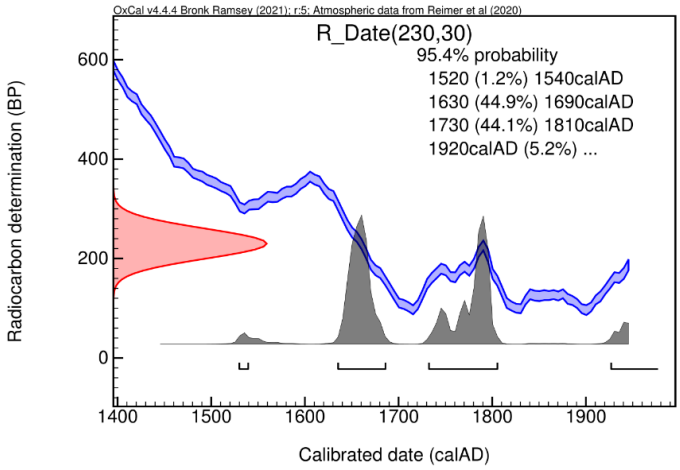
The Remmarudden wrecksite has been extensively studied in the 1990's by H2O, thus research history and new details or findings will be presented in the Wreck Park project's final report.

The sample 26 (Mid104D) was taken as a tiny whittling sample only, thus no dendrochronology or wood type analyses have been carried out yet. The about 55cm width of the sampled plank seems to correlate with its dating to mid 17th century.

Pampskatan 1 hylky MV nro 1225

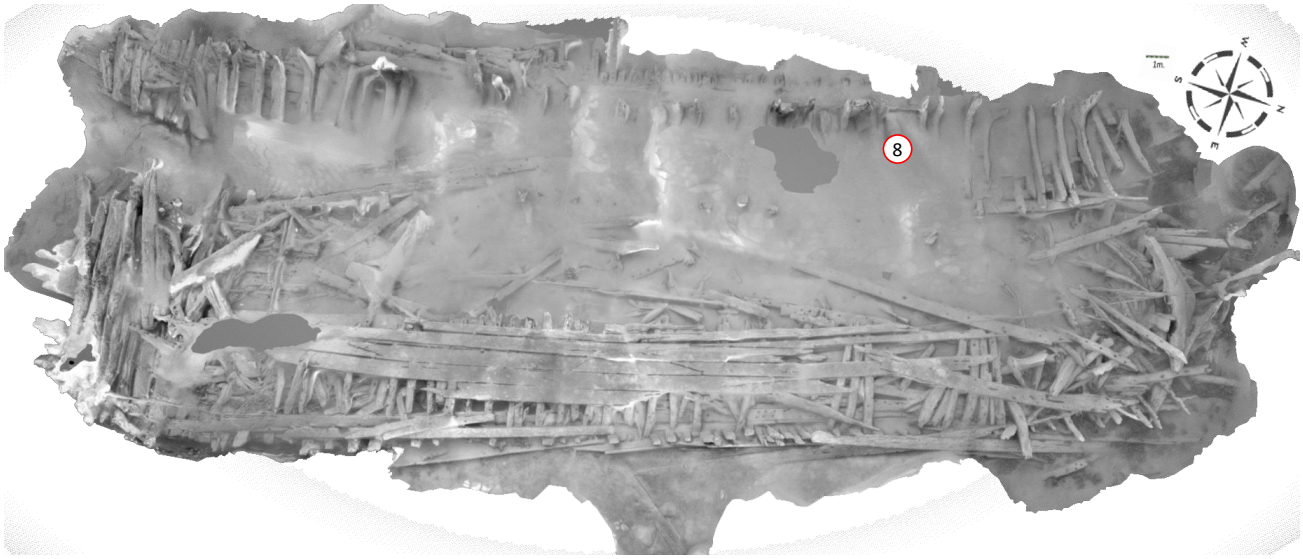
The “Pampskatan 1 hylky” was dived only once, since it was not part of the MAS 2020 field work plan, but on a very stormy day during the camp, it’s very protected location made it an ideal, albeit poor visibility, alternative site. One sample with only 5 annual rings was collected, but it was enough for wood type & C14 analyses. Also, some 30-50 meters from the wreck, a new anomaly was detected but due to the very poor visibility, it was not surveyed. This will be attempted 2021.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	Max% cal C14 date (std.C14 dat	Dendrolustot	Dendroalue
8	30.6.2020	Pamskatan hylky	tammi	5	1225	Tid8A	C14.AD.1630-1810 (<1720)		



The C14 dating from the sample sets the wood into the latter part of 17th century, as the standard model-based age would hit the year 1720, thereby ruling out the other peak of late 19th century. This makes the areal maximum of about 1670 as the most likely estimate. However, as the timber is oak, it is also possible, that the wreck is an 18th century ship.

The Pampskatan wreck has been extensively studied in the 1990’s by H2O, thus research history and new details or findings will be presented in the Wreck Park project’s final report.

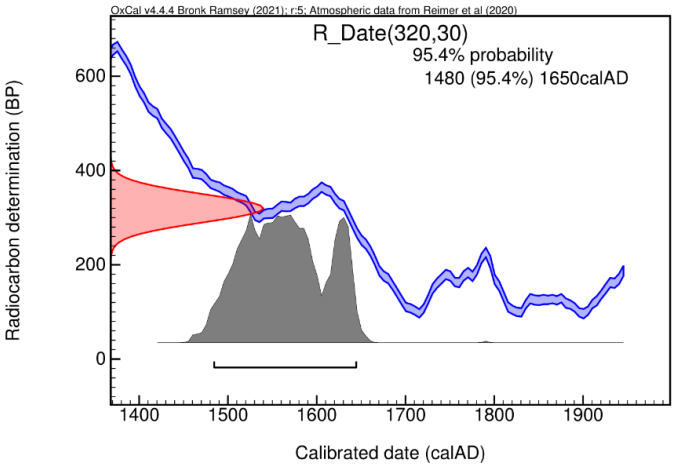


Above is an overview of the Pampskatan hylky with sampling spot marked. More samples will be collected 2021 while aiming at a successful dendro dating. From the overview it can be seen, that the ship has been at least two decked and that the upper deck has been reinforced to carry something heavy – like guns. Curiously, there are also some long frames sticking out of the upper deck’s side, which could indicate either a third deck or some kind of deck house.

Utterböten hylky MV nro 1230

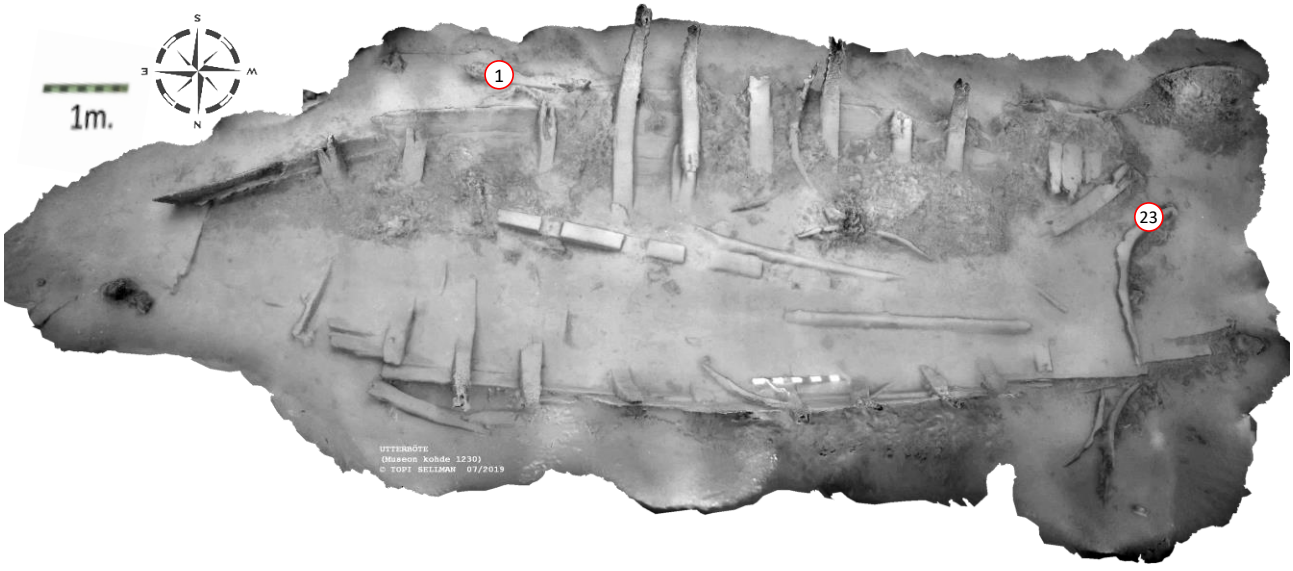
The Utterböte wreck was dived already during the camp, but the extremely strong current prohibited any sampling then. However, later in October two successful samples were collected of which both, a dendro and C14 datings were done. The annual rings show, that the tree where the wood was cut from had grown in current Poland's Baltic coast area until at least 1329.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	max% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
23	18.10.2020	Utterböten hylky	tammi	52	1230				
1	2020	Utterböten hylky	tammi	81	1230	Tid1H	C14.AD.1480-1650 (<1630)	Den.AD.1249-1329	Puola



The C14 dating is somewhat off beat with the dendro dating, as it puts the earliest possible date more than 100 years later than the denro date. This anomaly needs to be researched further and more samples taken.

One explanation could be, that since the sample was taken from the very surface of the wood, could the algae and other biological life forms have transported more carbon into the wood cells being analysed?



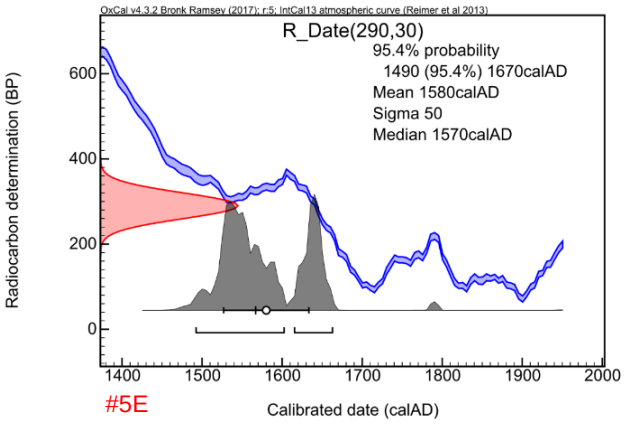
Above is an overview of the Utterböten hylky with sampling spots marked. More samples will be collected 2021 while aiming at another successful dendro dating. The wreck is clinker built and given its potentially medieval dating, thus very interesting. Hopefully the additional dating confirms its age and if proven medieval, an excavation can be organized.

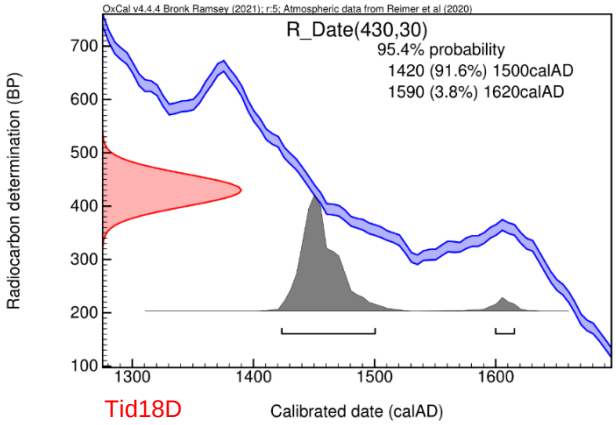
Other details of Utterböte wrecksite have been given in 2019 annual report.

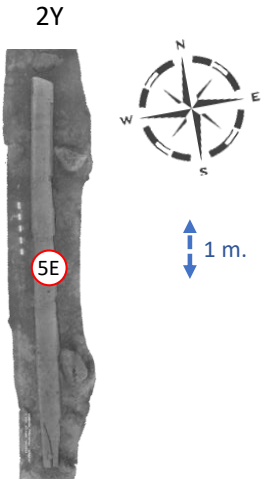
Rönnskärin tykkihylky MV nro 1995

The Rönnskärin tykkihylky area was dived several times. The wrecksite consists of several items like cannons and anchors, a rudder and hull parts. The ruder was sampled (#5E) already 2019, but no dendro was attempted then. During 2020 two additional samples (ID 13 & 18) were collected, which proved that the wreck is made of Siberian spruce and Finnish pine. The dendro (#5E) was unsuccessful. A possible explanation is that the reference information on Siberian spruce only goes to 1594, so samples with earlier sequences do not match. On the other hand, this can be seen at least partial support for the 16th century C14 dating.

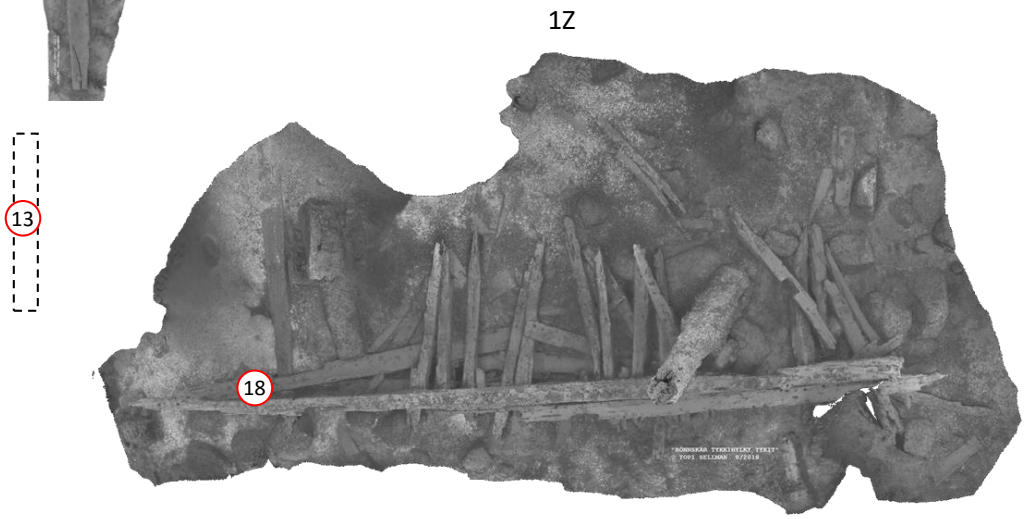
ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	max% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
11	3.7.2019	Rönnskärin tykkihylky / peräsin	lehtikuusi	127	1995	#5E	C14.AD.1490-1670 (<1660)	Den.AD. <1584	Venäjä?
13	24.10.2020	Rönnskärin tykkihylky	lehtikuusi	15	1995				
18	24.10.2020	Rönnskärin tykkihylky / kylki	mänty	37	1995	Tid18D	C14.AD.1420-1500 (<1520)		







The pine sample from the hull (Tid18D) is C14 dated to 15th century, as the standard model puts it to 1520 and the calibrated areal maximum to 1450. The Siberian spruce sample from the rudder is C14 dated to 16th century. Albeit the standard model would put it as late as 1660, the vast majority of the calibrated areal maximum goes to 16th century giving 1570 as the median and 1580 as the mean. This, about 100-120 year difference to the pine dating is curious. Pine is typically far younger when used in ships, as compared to oak. Naturally more samples are needed, but could the difference be explained by renewed rudder?

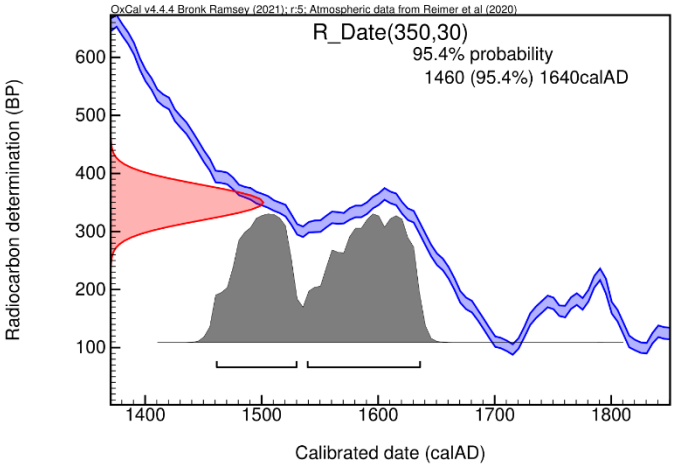


Above is a partial overview of the Rönnskärin tykkihylky wrecksite from which the samples were collected.

Engelskobben 2 hylky MV nro 1000039773

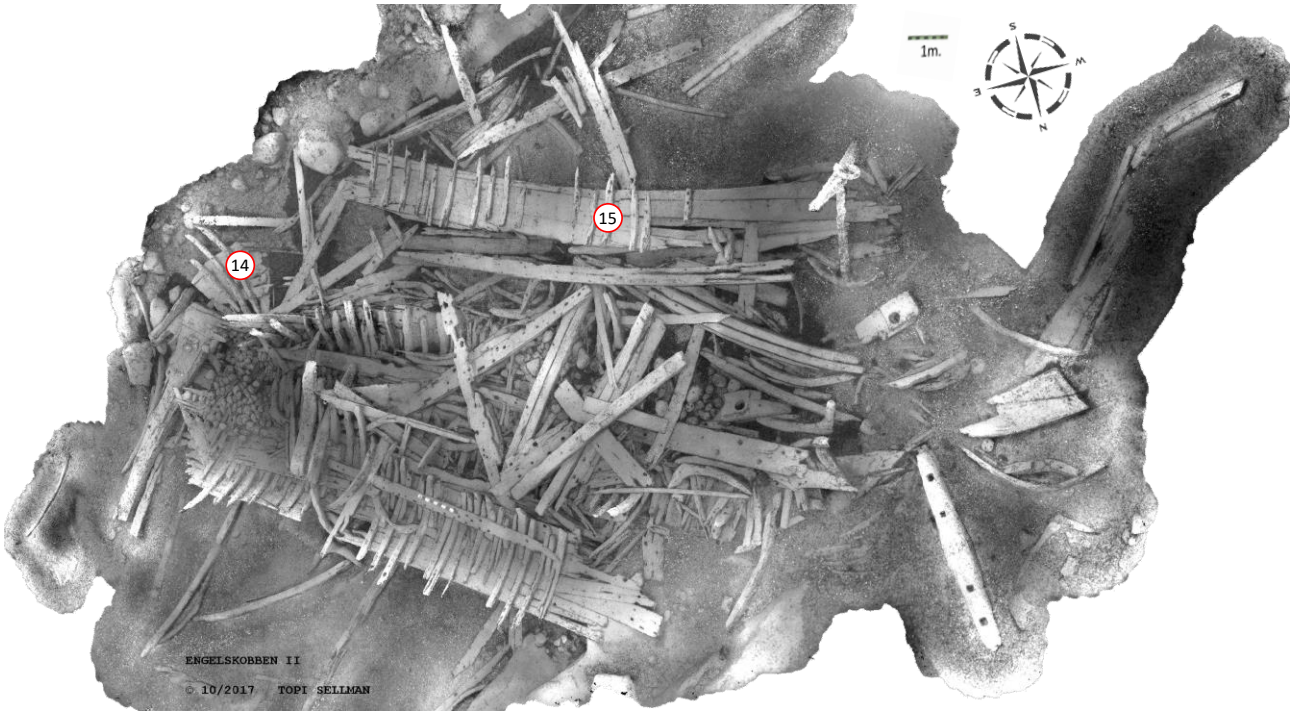
The Engelskobben 2 hylky was dived several times during the season as it is planned to be included in Porkkala Wreck Park during 2021. A new photogrammetric 3D model was recorded during the camp & season, as well as two bore-samples were collected. Unfortunately, both were so badly rotten from the inside, that they only contained a few annual rings, thus not enabling dendro dating.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 date	Dendrolustot	Dendroalue
15	31.10.2020	Engelskobben 2	tammi	7	1000039773				
14	31.10.2020	Engelskobben 2	tammi	18	1000039773	Tid14I	C14.AD.1460-1640 (<1600)		



The C14 dating presented here is being challenged as it is identical with that of Tynnyrihylky. We suspect that the C14 lab has either mixed or contaminated the samples. A new sample will be analysed in 2021.

Further analyses and descriptions of the wreck are attempted once the dating, woodtype and possibly origin information is acquired as the wrecksite itself has no distinctive features.

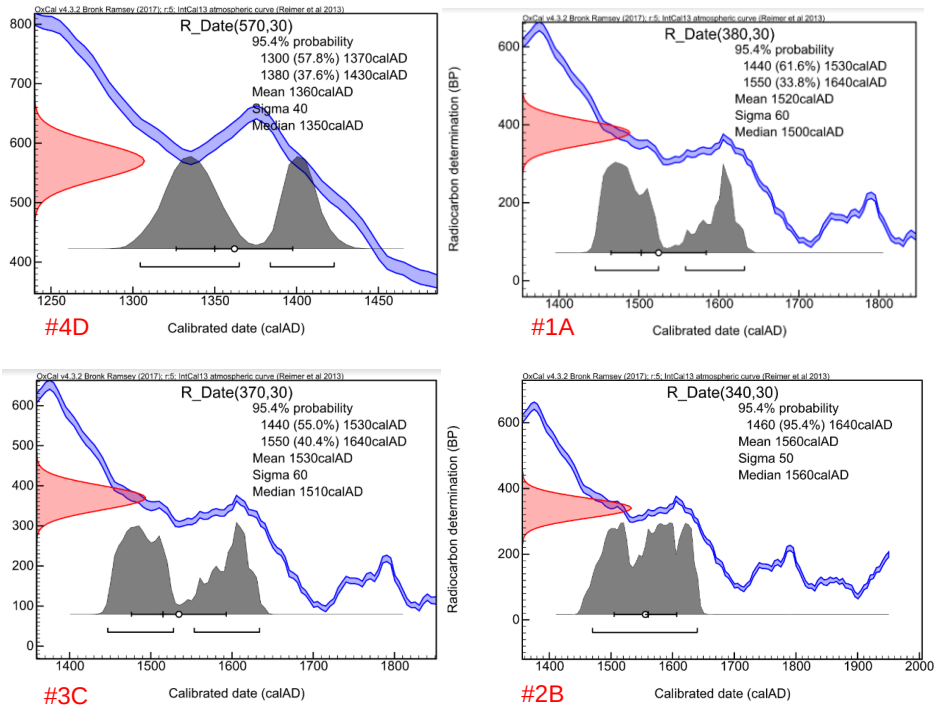


Above is a general overview of the Engelskobben 2 wrecksite with sampling points. More samples will be acquired 2021 in order to collect a succesful dendro sample.

Träskön Limisaumahylky MV nro 1000039839

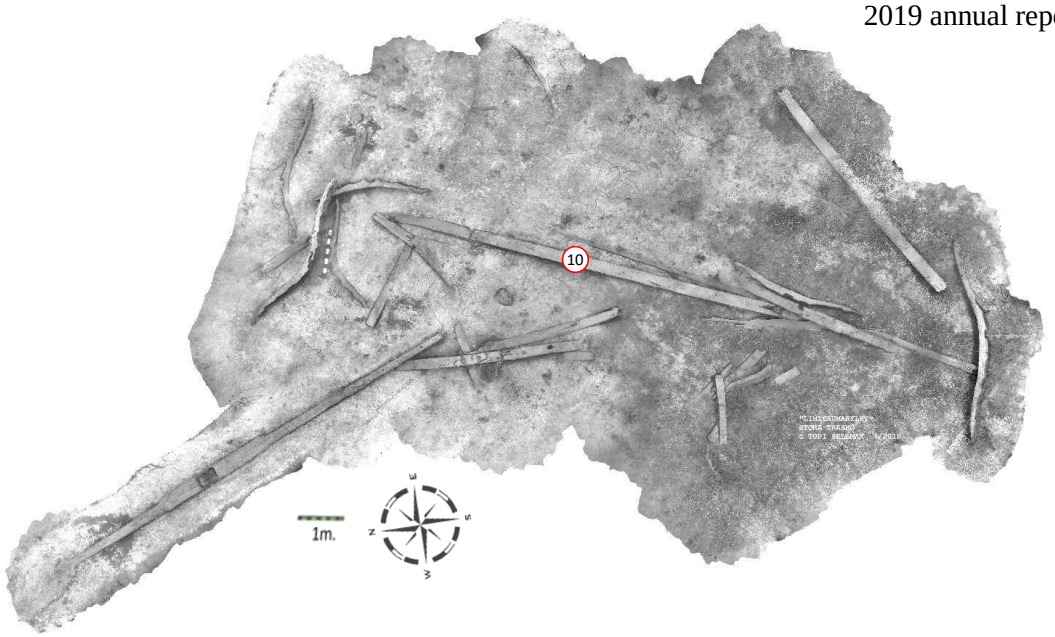
The Limisaumahylky wrecksite was dived many times for inventory and park planning purposes. However, as the wrecksite is spatially very dispersed, no claim of full coverage can be made yet. This will be attempted 2021 with the help of UWIS. Additional photogrammetry material was collected, as well as one new sample from the keel, which unfortunately was sideways to annual rings, thus denying us a dendro dating.

ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	hax% cal C14 date (std.C14 dat	Dendrolustot	Dendroalue
12	4.7.2019	Träskön limisaumahylky / irtokaari A1	tammi	45	1000039839	#4D	C14.AD.1300-1370 (<1380)		
6	5.7.2019	Träskön limisaumahylky / irtokaari B2	tammi	33	1000039839	#3C,#1A	C14.AD.1440-1530 (<1570)		
5	6.7.2019	Träskön limisaumahylky / sikoköli	tammi	51	1000039839	#2B	C14.AD.1460-1640 (<1610)		
10	2020	Träskön limisaumahylky	tammi	17	1000039839				



The 2019 collected samples (#1A, #2B, #3C, #4D) place the timbers to the turn of the 15th and 16th century excluding the #4D which goes to 14th century. Wood type being oak, it is possible, that all sampled items are from a single vessel but not necessarily. Additional samples will be collected in 2021 while aiming at successful dendro datings.

Other details of Limisaumahylky wrecksite have been given in 2018 and 2019 annual reports.

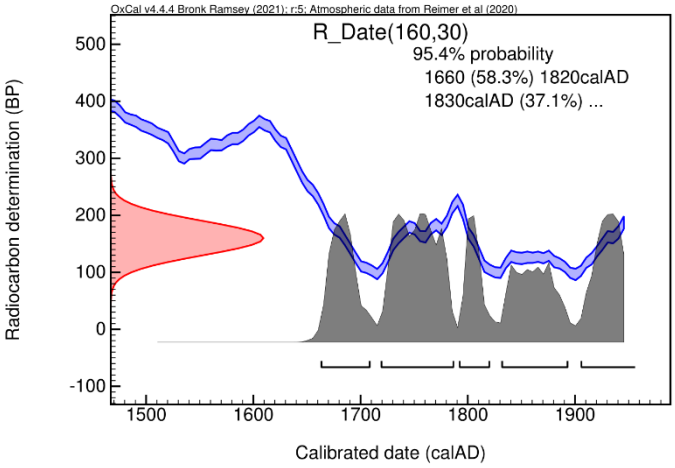


Above is an overview of the Limisaumahylky main site with 2020 sampling point on the keel.

Träskön Segelkobbenin Tykkikylki hylky MV nro 1188

The Tykkikylki hylky has likewise been dived extensively for maintaining the park infrastructure and collectig three samples. Even though sample 22 (Tid22E) had 56 annual rings, its sequencing did not match the pine references, hence more samples with more annual rings are needed.

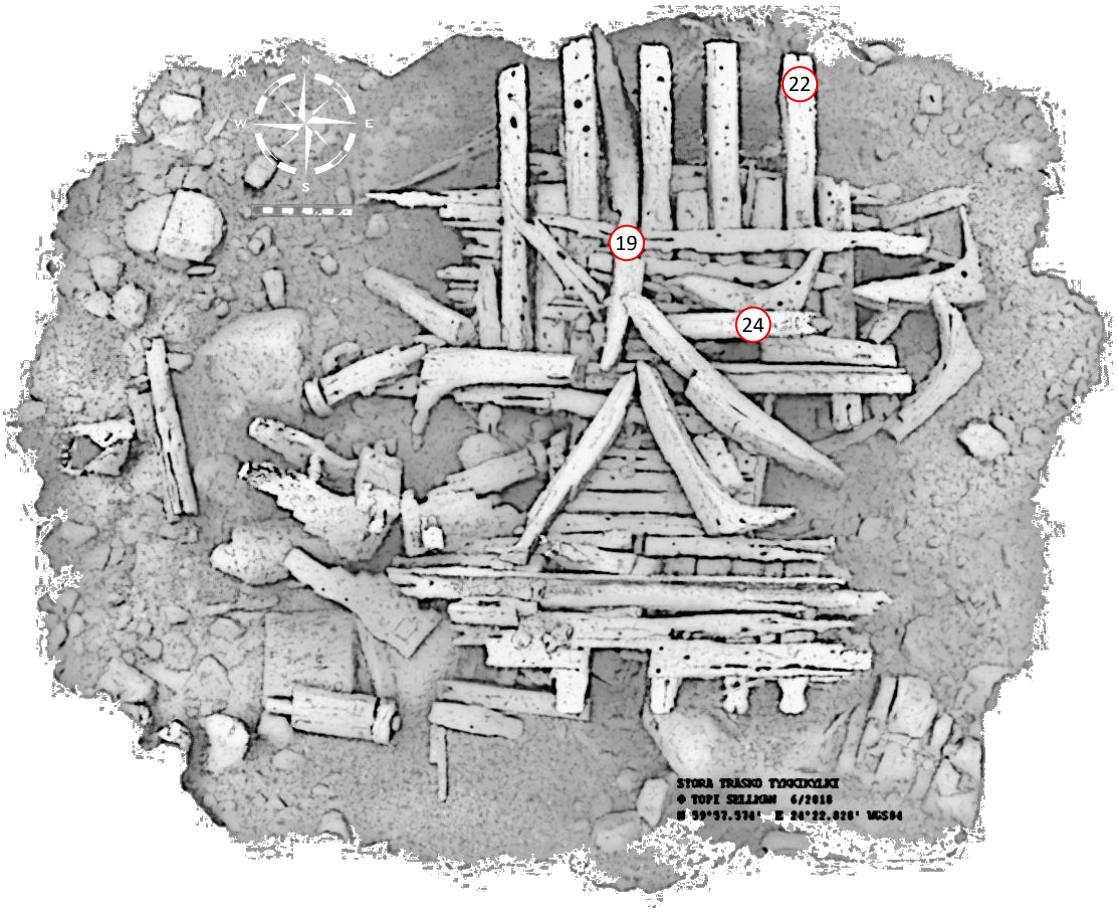
ID	päivämäärä	Hylky	Puulaji	Lustoja	Kyppi	MAS näytel	max% cal C14 date (std.C14 dat	Dendrolustot	Dendroalue
24	12.6.2020	Träskö segelkobben tykkikylki	mänty	21	1188				
19	17.10.2020	Träskö segelkobben tykkikylki	mänty	7	1188				
22	18.10.2020	Träskö segelkobben tykkikylki	mänty	56	1188	Tid22E	C14.AD.1660-1820 (<1790)		



The C14 dating from the same sample (Tid22E) puts it to mid-18th century, as the standard model date is 1790 and the areal maximum in about 1750.

Given the wood type, the wrecksite could well be part of a large, two decker Russian warship, which took part on the skirmishes during the summer 1789, when Russian fleet blockaded the coastal sailing routes at Träskön redi and the Swedes tried to break the blockade.

Other details of Tykkikylki wrecksite have been given in 2018 and 2019 annual reports.



Above is an overwiev of the Tykkikylki wrecksite with the marked sampling points.

ATTACHMENTS

Preliminary dendro and wood type analysis

C14 Datings & datums

Research permit (MUSEOVIRASTON TUTKIMUSLUPA)

RELEVANT LINKS

Sketchfab: https://sketchfab.com/mas-fi

MAS web pages: https://mas.fi/fi

MAS facebook: https://www.facebook.com/meriarkeologia

Porkkala Wreck Park web pages: http://wreckpark.eu/

Porkkala Wreck Park face: https://www.facebook.com/hylkypuisto

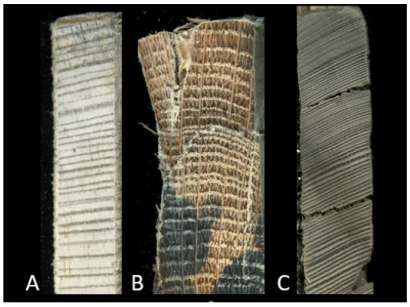
Preliminary dendro and wood type analysis

Below is the relevant chapter from the preliminary dendro dating report due to be made into scientific article on IJNA. This is confidential and proprietary information for the FHA, HY and MAS members not to be superdistributed.

3 Ajoitustulokset

Näytteistä ainoastaan kolmessa oli riittävästi lustoja ajoittamisen yrittämistä varten (taulukon 1 näytteet 1, 11, ja 21). Näytteet olivat peräisin hylyistä Utterböte, Rönnskär, ja Uunihylky. Muissa näytteissä lustojen määrä oli liian vähäinen (5-56 lustoa). Näistä näytteistä oli merkittävä osa liian pitkälle lahonnutta, jonka myötä lustot eivät enää olleet erotettavissa.

Kairatuissa näytteissä lahoamiselta säästyneissä kohdista lustot olivat kuitenkin hyvin erotettavissa (kuva 1), ja hylkyjen ajoittaminen on siten kairanlastunäytteistä mahdollista, kunhan näytteeseen saadaan riittävä määrä lustoja.



Kuva 1: Esimerkkejä käsitellyistä kairanlastuista. A - mänty, B - tammi, C - lehtikuusi.

Kaikista näytteistä määritettiin kuitenkin puulajit, riippumatta niiden lustojen lukumääristä (taulukko 1). Valtaosin (18/24) näytteet olivat tammea, mutta Rönnskär-hylyn kolmesta näytteestä kaksi olivat lehtikuusta. Loput neljä näytettä olivat mäntyä.

Kuva 2: Verrokkikronologioiden sijainnit nykyisen Pohjois-Saksan ja Pohjois-Puolan alueilla.

Taulukko 1. Yhteenveto näytteistä.

Lyhyt ID	Hylky	Tunniste	Puulaji	Lustojen lukumäärä
1	Utterböte	Utterböte	tammi	81
2	Uunihylky	Uunihylky Luoto Peräpää	tammi	36
3	Linjatauluhylky	Linjatauluhylky 1	tammi	2
4	Tynnyrihylky	Tynnyrihylky 4	tammi	13
5	-	Limisaumaköli	tammi	51
6	Träskön	Koe 3 irtokaari B2	tammi	33
7	Tynnyrihylky	Tuhokaari 3 Tynnyrihylky 3	tammi	32
8	-	P1-1	tammi	5
9	Tynnyrihylky	Tynnyrihylky 2	tammi	17
10	-	Limisaumaköli	tammi	17
11	Rönnskär	Peräsin Koe 1 ~75 min. kairaus	lehtikuusi	127
12	Träskön	Irtokaari A1 Träskön Koe 2	tammi	45
13	Rönnskär	Rönnskär peräsin 2. näyte ML	lehtikuusi	15
14	Engelskobbe	Engelskobbe Barrow keula	tammi	18
15	Engelskobbe	Engelskobbe Luoto perä	tammi	7
16	Linjatauluhylky	Syvä keula	tammi	20
17	-	Ryssbvg matala ML	tammi	15
18	Rönnskär	Rönnskär 1. näyte	mänty	37
19	-	-	mänty	7
20	Uunihylky	1st sample UUNIHYL	tammi	20
21	Uunihylky	2nd sample UUNIHYL	tammi	79
22	-	1st sample CANNONE	mänty	56
23	Utterböte	Erillis pohjatuk Utterböte	tammi	52
24	-	-	mänty	21

Utterböte-hylyn poikkileikkausnäyte oli tammea, ja siinä oli 81 lustoa, jotka ajoittuivat nykyisen Puolan alueelta koostettua tammikronologiaa vastaan ($t = 5{,}0$ [X]) vuosien 1249 ja 1329 välille. Näytteestä on kuitenkin syytä huomata, että näytekappale on hyvin pieni, suurimmalta halkaisijaltaan ainoastaan n. 12 cm, ja se on rungon sisimmistä osista. Koska tammet ovat pitkäikäisiä, kappaleesta on siten joko sahattu, veistetty tai kulunut pois mahdollisesti suurikin määrä lustoja, eikä sen perusteella näin ollen saa hyvää arviota puun kaatovuodesta. Voidaan ainoastaan todeta, että laivan rakentamiseen käytetty puu on kaadettu vuoden 1329 jälkeen.

Rönnskär-hylyn kolmesta näytteestä runsaslustoisimmassa oli 127 lustoa, joka on luotettavaa ajoittamista ajatellen usein riittävä määrä. Näyte ei kuitenkaan ajoittunut yhtäkään saatavilla olleita lehtikuusikronologioita vastaan. Näistä vanhin ulottuu vuoteen 1584, joten ajoituksen epäonnistuminen saattaa johtua riittävän pitkän verrokikronologian puuttumisesta.

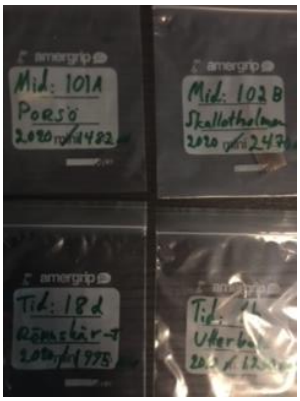
Uunihylyn kolmesta tamminäytteestä runsaslustoisimmassa oli 79 lustoa. Se ajoittui parhaiten nykyisen Pohjois-Saksan alueelta koostettua tammikronologiaa vastaan, jolloin lustot kattoivat vuodet 1390-1468. Ajoitustulokseen ($t = 4{,}5$) sisältyy kuitenkin ennen kaikkea kohtalaisen lyhyen lustosarjan tuomaa epävarmuutta.

C14 Datings & datums

2019 C14 samples

ICA ID	Submitter ID	Material Type	Pretreatment	Conventional Age	Calibrated Age
20W/0128	#1A	Wood	AAA	380 +/- 30 BP	Cal 1440 - 1530 AD (61.6%) Cal 1550 - 1640 AD (33.8%)
20W/0129	#2B	Wood	AAA	340 +/- 30 BP	Cal 1460 - 1640 AD
20W/0130	#3C	Wood	AAA	370 +/- 30 BP	Cal 1440 - 1530 AD (55.0%) Cal 1550 - 1640 AD (40.4%)
20W/0131	#4D	Wood	AAA	570 +/- 30 BP	Cal 1300 - 1370 AD (57.8%) Cal 1380 - 1430 AD (37.6%)
20W/0132	#5E	Wood	AAA	290 +/- 30 BP	Cal 1490 - 1670 AD

2020 C14 samples



ICA ID	Submitter ID	Material Type	Pretreatment	Conventional Age	Calibrated Age
14C-5450	Mid101A	Wood	AAA	100 +/- 30 BP	Cal 1680 - 1740 AD (26.1%) Cal 1800 - 1930 AD (69.3%)
14C-5451	Mid102B	Wood	AAA	280 +/- 30 BP	Cal 1500 - 1600 AD (55.0%) Cal 1610 - 1670 AD (37.8%) Cal 1780 - 1800 AD (2.6%)
14C-5452	Mid103C	Wood	AAA	130 +/- 30 BP	Cal 1670 - 1770 AD (31.1%) Cal 1790 - 1950 AD (64.4%)
14C-5453	Mid104D	Wood	AAA	260 +/- 30 BP	Cal 1510 - 1600 AD (29.4%) Cal 1610 - 1680 AD (52.6%) Cal 1760 - 1800 AD (13.5%)
14C-5454	Tid16B	Wood	AAA	90 +/- 30 BP	Cal 1680 - 1740 AD (26.0%) Cal 1800 - 1930 AD (69.5%)
14C-5455	Tid17C	Wood	AAA	170 +/- 30 BP	Cal 1650 - 1700 AD (17.4%) Cal 1720 - 1820 AD (46.4%) Cal 1830 - 1890 AD (12.2%) Cal 1900 - ..... AD (19.5%)
14C-5456	Tid18D	Wood	AAA	430 +/- 30 BP	Cal 1420 - 1500 AD (91.6%) Cal 1590 - 1620 AD (3.8%)
14C-5457	Tid1H	Wood	AAA	320 +/- 30 BP	Cal 1480 - 1650 AD
14C-5458	Tid21G	Wood	AAA	310 +/- 30 BP	Cal 1490 - 1660 AD
14C-5459	Tid22E	Wood	AAA	160 +/- 30 BP	Cal 1660 - 1820 AD (58.3%) Cal 1830 - ..... AD (37.1%)
14C-5460	Tid25F	Wood	AAA	350 +/- 30 BP	Cal 1460 - 1640 AD
14C-5461	Tid8A	Wood	AAA	230 +/- 30 BP	Cal 1520 - 1540 AD (1.2%) Cal 1630 - 1690 AD (44.9%) Cal 1730 - 1810 AD (44.1%) Cal 1920 - ..... AD (5.2%)
14C-5462	Tid14I	Wood	AAA	350 +/- 30 BP	Cal 1460 - 1640 AD

