RESCUE EXCAVATIONS OF A VENDEL ERA BOAT-GRAVE IN SALME, SAAREMAA

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In September 2008, an illuminated cycling track was going to be built along the Sõrve road, between Tehumardi and Salme on the island of Saaremaa. While an electrical cable trench was being dug for the lighting of the track, a large number of human bones were found near the border of the Salme village. In addition to the bones, the workers found a spearhead, a sword blade, a knife, some gaming pieces, two dice[1] and half a dozen of iron rivets. The construction work was stopped, and rescue excavations financed by the National Heritage Board and arranged by Saaremaa Museum were initiated. The excavations directed by Jüri Peets (AI) and Külli Rikas (SMI), later by Marge Konsa (TÜ) revealed the remains of a 7th century ship. The workers digging the cable ditch had dug into the stern of the ship.

ON BOAT-GRAVES IN ESTONIA AND ELSEWHERE

Burials in boats became more and more common among the elite of northern Europe from the 6th century AD, as a way of burial suitable for the noble social standing. There were different ways of conducting such burials. The most common way was burying an unburned boat in a trench or placing it on the ground with supports. The boats were either covered with wood to form a flat surface, or covered with a barrow (Müller-Wille 1974, 197). Usually the body was placed in the middle of the boat, sometimes also into a specially built chamber with rich grave goods – weapons, household items, horses, dogs and other animals and birds. The most famous boat burials of Vendel Era (in Estonian periodisation also Pre-Viking Age) are Välsgärde

[1] Unfortunately, some schoolboys showing their interest to the finds lost the dice.

and Vendel in eastern Sweden, and the royal 7th century boat burial of Sutton Hoo in England. The greatest number of such burials has been discovered on the fjord-rich Norwegian coastline. The number of inhumation and cremation burials from the Vendel Era is more or less equal, but during the following Viking Age, the cremation is dominant in such graves. All the Vendel Era boat burials known in Finland are cremations (Anderson 1963, 5).

There are approximately 40 prehistoric burial sites along Estonian coastline and on the islands, where iron rivets have been found. Usually, the number of rivets collected from a site is very small. The minimum number of rivets necessary to build a boat is 50 (Müller-Wille 1974, 191), and there are less than 10 burial sites in Estonia, from which such a number has been found. Among these sites, a remarkable one is Viltina stone grave field in Saaremaa. During the excavations of the site, more than a thousand rivets were found, half of which were collected from a stone-free area about 15 metres long and 2 metres wide (Vassar 1940). Regretfully, the shape and possible construction of the boat has remained unknown. There were no artefacts or burials clearly related to the boat and so the dating of the boat has remained uncertain as well.

The better-preserved ship-finds from Estonia are from a later era. A cog found from the Pärnu River has been dated to late 13th to early 14th century. The Maasilinna shipwreck that was raised from the strait Väike Väin near Saaremaa originates from the 16th century (Roio 2006). This means that the Salme ship is the oldest of a kind in Estonia, and in several aspects, also a remarkable find in the wider context of the cultural and maritime history of the Baltic Sea.

LOCATION OF SALME SHIP-FIND

The Salme ship was located 200 m to the north of the Salme River, which separates Sõrve Peninsula from the south-western Saaremaa. The site is situated about 230 m away from the contemporary coastal line, and 4.58 m above the sea level. The water level reconstructions for Saaremaa, based on the databases of shoreline and buried organic sediments data (Saarse *et al.* 2003; 2006) indicate that the sea level in the 7th century AD Saaremaa may have been no more than 2.7 m higher than in current time, and so, the bottom of the Salme ship (3.89 m above present-day sea level) was about 1.2 m above the sea level. Hence, the sea water could reach the Salme ship only during storms. In the 7th century, Sõrve Peninsula was an island, separated from Saaremaa by a narrow, about 70 to 100 m wide strait (Fig. 1). The Salme ship was situated in the vertex of a headland, which was jutting seawards from the eastern peak of Saaremaa. To the east of the headland was Livonian Bay and to the west, the Gulf of Ariste, which extended to an area that now is a hayfield behind the Salme schoolhouse, 200 m east from the ship.

The boat was buried in the sedimentary sand of a former sea floor and situated in the NE–SW direction, with an absolute bearing of 43.5°. It is

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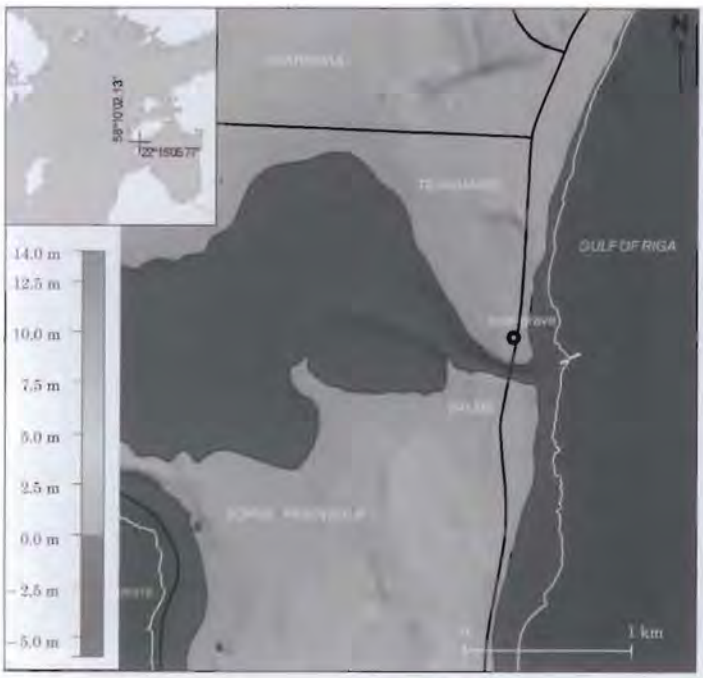

Fig. 1. The location of the Salme ship-find.
Jn 1. Salme laevaleiu asukoht.
Drawing / Joonis: Jüri Vassiljev

common that the prow of the boats in the boat-graves pointed northwards, which evidently had ideological and religious meanings. It has also been noticed, that the weapons, especially spears, have often been found from the stern of the boat (Larsson 2007, 275). Considering similar examples, it is likely, that the prow of the Salme ship was pointed to north-east.

DATA ABOUT THE SHIP

When the excavations began, a part of the prow, about 7 m long and 1.3 m wide, was extant. Digging the trench had destroyed the stern. Luckily, a 35 cm piece of the sternpost had been spared in one side of the trench. This piece made it possible to determine the length of the ship, and the orientation of its horizontal axis. The endmost distance between the rivets found from the prow and from the stern was 10 m. The amidships had been preserved for about 0.5 m in height. The part of the ship above it, as well as the stem, had been destroyed. In the sternpost part, untouched by the construction workers, the rivets were situated right below the turf, only a couple of centimetres deeper.

The wooden hull of the ship was almost completely dry-rotten. Only some very thin strips of softwood planks and pieces of the support beam of the frame made of pine[2] had been preserved. Most of the data about the shape and the construction of the ship were gathered by taking bearings

[2] The species was determined by Regino Kask from Estonian University of Life Sciences.

Fig. 2. View towards prow at stern. The support beam of the fifth frame in the foreground.

Jn 2. Vaade väljapuhastatud laevale ahtrist vööri suunas. Esiplaanil on näha viienda kaare tugitala.

Photo / Foto: Maili Roio

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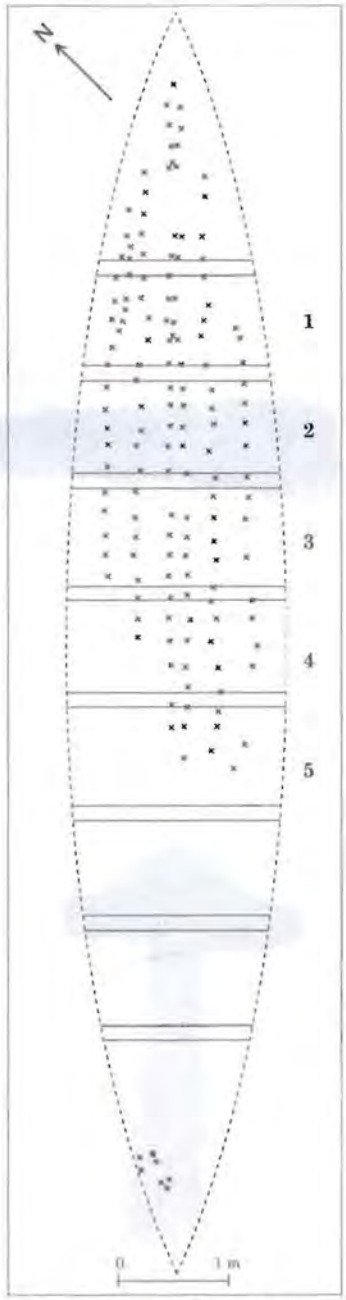
of the outline of the ship and the placement of the rivets in the site (Fig. 2).

Altogether, 275 rivets were found during the excavations. The exact location of 159 of them was pinpointed. Following the distance between the rows of the rivets, it can be said, that 30 cm wide planks were used, and that these were joined with iron rivets by clinker planking, in which the edge of one plank slightly overlays the other. The rivets were about 3–4 cm long, which means that the planks used were very thin, about 1.5–2 cm in thickness. In the middle of the northern part of the ship there was a keel, about 15 cm wide and narrowing towards the prow. On both sides of the prow, planks were riveted – a keel strake next to the keel and a side strake added to it.

Vello Mäss (2008; 2009), who analyzed the construction of the vessel, came to a conclusion, that the Salme ship might have been 11.5 m long, with a maximum width of 2 m (Figs. 3; 4). The sea gauge of the ship, with a low skid keel, may have been 0.4 m and the height of the boardside in the middle of the ship 0.75 m. The rows of rivets on the upper edge of the side strake showed that the ship had also had a third side strake, and possibly even a fourth one – a wash-strake. The ship had eight frames and these were probably attached by lashing. By its type the Salme ship is a twelve-oar rowing ship, its sophistication ranging between the log boat and the viking ship. The shape of the Salme ship was characteristic to a military vessel – it was fast, light and easily manoeuvrable. It can be considered to be an example of the Baltic Sea east coast shipbuilding technology and tradition.

ARTEFACTS

Most of the artefacts and human bones were collected from the stern, from about 3.5 m long area. These objects were gathered by shifting through the soil removed from the trench, and so, the exact locations of the artefacts remain unknown. The weapon finds from the stern consisted of two spearheads (Fig. 5) and artefacts related to swords.



Drawing / Joonis: Marge Konsa

Fig. 3. Reconstruction of the hull's shape. Crosses mark the location of rivets and numbers mark the frames at the excavated area.

Jn 3. Salme laeva kuju rekonstruktsioon. Ristidega on tähistatud neetide asukohad ja numbritega kaared kaevatud alal.

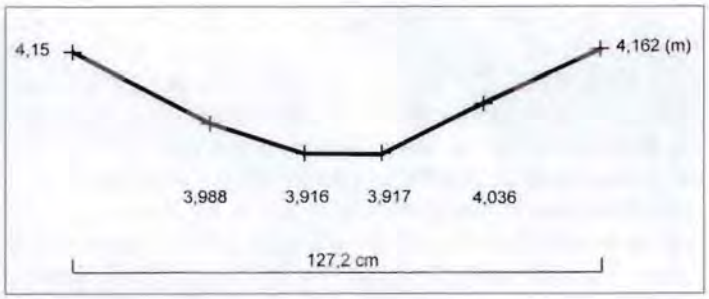


Fig. 4. The cross-section of the ship at the third frame. The height of the rivets is in meters above sea level.
Jn 4. Ristlõige laevast 3. kaare kohal. Neetide kõrgused on meetrites üle mere pinna.
Drawing / Joonis: Marge Konsa

Fig. 5. Spearhead from stern found by the workers.
Jn 5. Teetööliste leitud odaots laeva ahtrist.
(SM 10601: 1.)
Photo / Foto: Mirja Ots

Fig. 6. Sword hilt found from stern.
Jn 6. Mööga käepide laeva ahtrist.
(SM 10601: 228.)
Photo / Foto: Mirja Ots

The artefacts included a sword hilt with three-sided pommel (Fig. 6), a U-shaped scabbard end, and fragments of two sword blades (one with a double-edged blade and another with a one-edged blade). From the 18 knives found from the ship, 13 were from the trench, as well as five out of eight whetstones and three arrowheads out of six. The two dice (Fig. 7: 1) and most of the gaming pieces were also from the stern. The actual number of dice in the ship remains unclear, but the preserved ones are elongated and rectangular in shape, all of their sides marked with an eye motif (two circles inside one another). The half-sphere shaped gaming pieces are made of bovine bone and whalebone. The set of gaming pieces consists of 72 so-called 'warrior' pieces and one 'king' piece. This gaming piece is decorated with an inter-twined ornament, and has an image of a man cut into it (Fig. 7: 2).

The exact location of the artefacts and bones in the rest of the ship has been documented after its discovery. Prior to that, the upper horizontal layer of the ship, about 20 cm thick, was dug off. Above the sixth frame of the ship, in the bank of the trench, three skulls with some bones of upper body had been left. An accumulation of human bones was also discovered in the area between the third and the fourth frame. Above the third frame, 26.7 cm from the bottom of the boat, a slab of limestone (40 cm in diameter) with an unknown function was discovered. There was a human skull next to it.

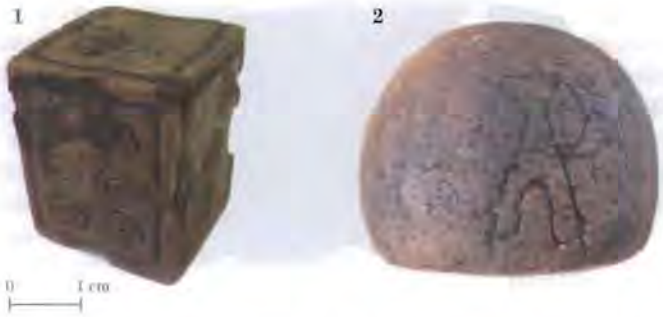


Fig. 7. Dice (1) and game piece with human figure (2).
Jn 7. Täring (1) ja inimese kujutisega mängunupp (2).
(SM 10601: 211, 222.)
Photo / Foto: Mirja Ots

During the excavation of the inside layer the ship (30 cm thick), a 10–14 cm layer of gravel was discovered. It had settled into the bottom of the boat and contained no artefacts. A thin dark brown layer of organic matter overlaid it. The dark brown layer may have been the remains of the boards of a burial platform. Above this layer, there was a gravel layer, containing artefacts and animal bones.

The artefacts were situated in three zones. Two arrowheads were discovered near the first frame of the prow, starboard, and a whetstone and a knife from the port side. Next to the abovementioned limestone slab, a gaming piece, a dice, an arrowhead and four pieces of flint were found. The third assemblage of artefacts was found amidships in the area between the fourth and the fifth frame. A knife and a so-called sword-sharpening stone, 15.7 cm in length, were discovered there. Near these, a piece of resin, 5.3 cm in diameter, was found, a piece of plain weave stuck to it. Next to the fifth frame, port side, a small iron tool with a socket was found. Animal bones were found in smaller or bigger accumulations in the bow, on an area about 2.5 m in length. There was also a clearer accumulation of animal bones near the fifth frame, where two pieces of iron and a bronze fitting were found.

In the sternpost of the ship, two knives were found from under the turf, and pieces of a comb 10 cm below them. It was a three-part one-sided comb with wide joining plates, decorated with an eye motif and line ornament (Fig. 8).

Several items, like the sword-sharpening stone, or the set of gaming pieces and dice, are unique among the artefacts from Middle Iron Age Estonia, but characteristic to the grave goods of elite boat-graves in Scandinavia (e.g. Arne 1934; Arwidsson 1954; Stolpe & Arne 1912; Whittaker 2006). The grave goods of the Salme boat-grave lack any household items, pottery, ornaments, horse harness etc. that are characteristic to the boat-grave burials of the local elite. The whole assemblage of the artefacts can be related to the equipment needed by armed seafarers.

PRELIMINARY RESULTS OF OSTEOLOGIC ANALYSES

Unfortunately during the rescue excavations the exact location of human bones was not fixed. Thus most of the human bones were commingled

Fig. 8. Fragments of comb found nearby sternpost.
Jn 8. Ahtertäävi juurest leitud kammi katkendid.
(SM 10601: 272, 271.)
Photo / Foto: Mirja Ots

anyway, only few parts of skeletons were intact. It is difficult to say when the skeletons were disturbed, because there have been several former road constructions and cabling works carried out in the past. During the archaeological excavations it was noticed, that human bones were in somewhat higher level in comparison with animal bones, of course we cannot say anything about the bones in the cable trench area, which were collected before archaeological rescue excavations. The bone material was mainly fragmentary; especially craniums and long bones were broken.

Preliminary osteologic analyses of the human bones collected mainly from the cable trench and soil heaps were conducted on the 3rd of November, 2008 on site (before the beginning of archaeological rescue excavations). The results of preliminary osteologic analyses referred to at least the skeletal remains of five people. Later on, following the rescue excavation and in laboratory conditions, two additional skeletons were determined.

Hence the results of osteologic analyses indicated the remains of seven men inside the ship contour. The number of men was determined on the basis of facial parts of craniums, hip bones, tibial bones and heel-bones. The usual method of recurrent bone fragments was used, which is common for analysing commingled bones.

The number of human skeletons – 7 – found inside one burial boat is exceptional. Prior to the Salme boat grave, there is no information about burial boats with inhumations in Estonia.

Until today only two burial boats are known in northern Europe where the number of skeletons found in is more than two. The first, is the boat-grave of Nabberör discovered in 1938 on the island of Öland in Sweden (Lamm 2002, 478) where 4 skeletons were found inside the boat, and the second is the Viking Age boat burial found in Scar, Orkney, in Scotland in 1991 where the skeletons of three people were found inside the boat remains (Graham-Campbell & Batey 1998,139).

The animal bones were collected from the preserved part of the Salme ship and from the cable trench area. No animal bones were found outside the ship contour nor in the profiles made around the ship, thus we may conclude that all the animal bones were originally inside the ship.

The preliminary archaeo-zoological analyses indicated mainly the remains of domesticated animals: bovine *(Bos taurus)*, sheep *(Ovis aries)*, goat *(Capra hircus)* and pig *(Sus scrofa domestica)*, but also bird bones were present. The bovine bones dominated in the preserved part of the boat, in the cable trench area (the disturbed area) – the bones of sheep/goat were most common. No complete skeletons of animals were found, only the parts of skeletons, which indicated that the hashed carcasses were placed into the boat.

There is a remarkable difference between the archaeo-zoological materials of Swedish boat-graves and the Salme boat-grave. In nearly all Swedish Vendel and Viking Age boat-graves – Valsgärde (Arwidsson 1942, 109–113; Arwidsson 1954, 120–121; Fridell 1930), Vendel (Stolpe & Arne 1912), Årby (Arbman 1936, 249–251) and Tuna in Alsike (Arne 1934) – the bones of dogs and horses have been found; in the Salme ship remains the bones of dogs and horses are totally absent.

RADIOCARBON DATINGS

A piece of wood that had preserved of a plank on the port board of the ship was dated in the radiocarbon AMS method.[3] The results showed that the pine used for the plank was cut down between 600–670 AD (Fig. 9). The weighted average of the calibrated date is 639 AD. Another sample[4] was taken from a tibia of a bovine *(Bos taurus)*, and dated to 656–773 AD, with the weighted average of the calibrated date of 709 AD. Also two samples[5] of human bones were dated by the AMS method. With the probability of 95.4 % both samples indicated that human burials dated from

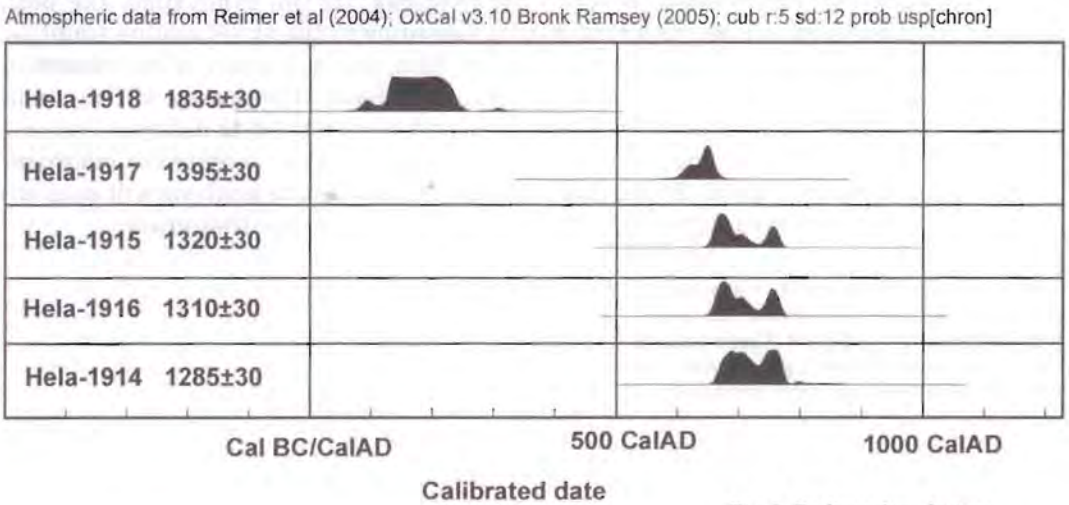


Fig. 9. Radiocarbon datings.
Jn 9. Radiosüsiniku dateeringud.

[3] Hela-1917.
[4] Hela-1916.

the period 650–780 AD. For both samples the first peak of calibrated dating was of higher probability (41.4%; 51.8% respectively) in comparison with the second and any later ones (26.8%; 16.4% respectively), thus the most plausible calibrated dating of human bones is between 650–720 AD. In conclusion, considering the results of carbon dating and the chronology of the artefacts, the Salme boat-grave originates from the Vendel Era (Pre-Viking Age), probably from the period 650–720 AD. The ship used for the burial was probably built in the first half of the 7th century, and had had its share of voyages before coming to its final port in Salme.

Another sample[6] was taken from outside the ship, from a coal found in a thin layer of clay 20 cm below the bottom of the ship. The result was 2.–3. centuries AD, when shallow water covered the site.

CONCLUSIONS

Compared to other known boat-graves from the Vendel Era and the Viking Age, the Salme ship-find has several different characteristics. The most obvious one is the great number of human skeletons found in the boat-grave. Another is the absence of animals common in Swedish boat-graves – horse and dog. Also, the assemblage of artefacts is specific and can be related to the equipment used by a warship crew.

The events surrounding the men, who found their burial place in Salme, are unknown. Whether they were local or foreigners, died by accident, disease or violence, are questions not yet answered. The grave goods resembling those from Scandinavia, as well as the way of burial different from other Estonian boat-graves of the period (cremations in stone graves) may refer to people from overseas. At the same time, the boat itself seems to be constructed more according to the ship-building tradition of the eastern shore of the Baltic Sea. Also, the occurrence of Scandinavian artefacts in Saaremaa is in no way exceptional. The society of Saaremaa has had international characteristics and been related to different cultural traditions for a long time. Thus the local origin of the deceased or mourners can not be excluded. Hopefully, the results of ongoing analysis will soon enable us to shed more light on the mystery of the Salme boat-grave.

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[5] Hela-1914, Hela-1915.
[6] Hela-1918.

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SALME EELVIIKINGIAEGSE LAEVAMATUSE PÄÄSTEKAEVAMISED SAAREMAAL

2008. a septembris rajati Saaremaal Sõrve maantee äärde, Tehumardi–Salme vahelisel lõigul valgustatud jalgrattateed. Salme asulapiiri juures hakkas kaablikraavi kaevamisel välja tulema rohkesti inimluid. Edasised teetööd selles kohas peatati ning järgnesid Muinsuskaitseameti finantseeritud ja Saaremaa Muuseumi korraldatud päästekaevamised (kaevamiste esimest etappi juhatasid Jüri Peets ja Külli Rikas, laeva väljakaevamisi juhatas Marge Konsa).

Salme laeva leiukoht jääb Sõrve poolsaart Saaremaa edelaosast lahutava Salme jõe äärde, sellest 200 m põhja poole (jn 1; 10). Laev paiknes liivas kirde–edela-suunaliselt asimuudiga 43,5°. Laeva vöör oli arvatavasti suunatud kirdesse. Kaevamiste alguses oli laevast säilinud u 7 m pikkune ja 1,3 m laiune vööripoolne kereosa. Samuti oli alles 35 cm pikkune tükk laeva ahtertäävi. Ülejäänud osa laeva ahtrist oli kraavi kaevamisega purustatud. Laeva keskosa oli säilinud u 50 cm kõrguselt, sellest ülemine osa laevast nagu ka vöörtääv olid hävinud. Laeva puitkere oli peaaegu täielikult kõdunenud. Säilinud olid vaid mõned väga õhukesed ribad okaspuust plangulaudadest ja katkendid männist laevakaare tugitalast. Valdav osa andmetest laeva kuju ja ehituse kohta saadi laeva jäljendi ning laevaneetide paiknemise dokumenteerimise abil (jn 2).

Laeva ehitustehnilise analüüsi teinud Vello Mässi hinnangul võis Salme laev omal ajal olla 11,5 m pikkune, suurima laiusega 2 m (jn 3, 4). Laeva süvis koos madala pakk-kiiluga võis olla 40 cm ning parda kõrgus laeva keskosas 75 cm. Küljeplangu ülemisel serval asunud needirida osutas, et laeval oli veel kolmas küljeplank ja ilmselt ka neljaski – pardavöö. Kaari oli laevas kaheksa ning need olid arvatavasti kinnitatud sidumismeetodil. Salme kaheteistaerulise sõudelaeva kuju oli sõjalaevadele iseloomulike omadustega: see oli kiire, kerge ja hästi juhitav alus.

Enamik esemetest ja inimluudest pärines laeva ahtriosast. Kuna need saadi kraavist väljatõstetud pinnase läbivaatamisel, siis polnud esemete täpset asukohta enam võimalik tuvastada. Ülejäänud laeva osas hakati leidude ja luude asukohti täpselt dokumenteerima alles pärast laeva avastamist. Sellele eelnevalt jõuti horisontaalselt läbi kaevata ligikaudu 20 cm paksune kiht laeva ülemisest osast. Laeva sisemusest järgi jäänud kuni 30 cm paksuse kihi kaevamisel ilmnes, et laeva põhja oli settinud u 10–14 cm paksune kruusakiht, mis leide ei sisaldanud. Selle kihi peal oli tumepruuni värvi kitsas orgaanikaviirg, mis võis pärineda laudadest moodustatud matuseplatvormist. Esemed ja loomaluud avastati sellele tasapinnale ladestunud kruusakihist.

Salme laevast leiti kaks oda- ja kuus nooleotsa, mõõkadest oli säilinud kaks teramikku, üks käepide koos kolmnurkse nupuga ning U-kujuline tupeotsik (jn 5, 6). Väiksematest esemetest olid veel laevas 18 nuga, kaheksa luisku ja rauast putkega tööriist, neli tulekivitükki ja väike pronksnaast. Laeva ahtrist leiti katkendeid sarvest valmistatud ja silmakestega kaunistatud kammist (jn 8). Mitmed esemed, nagu peeneteralisest kivimist mõõgaluisk või mängunuppude ja täringute komplekt (jn 7: 1–2), on Eesti keskmise rauaaja leiuaineses ainulaadsed, kuid iseloomulikud panused Skandinaavia elitaarsetes laevamatustes. Loomadest oli Salme laevas esindatud veise, lamba, kitse ja sea luud, samuti oli linnuluid. Üllatuslikult puudusid hobuse ja koera luud, mis on väga tavalised Rootsi laevamatustes.

Radiosüsiniku ja leiumaterjali dateeringute põhjal pärineb Salme laevamatus vendeliajast, ilmselt ajavahemikust 650–720 pKr (jn 9). Matuseks kasutatud laev on tõenäoliselt valmistatud 7. saj esimesel poolel ning enne lõplikku randumist Salmel jõudnud mõnda aega merd künda.

Salme laeva näol on tegemist Eesti kõige vanema laevaleiuga, mis on mitmete aspektide poolest tähelepanuväärne ka laiemas Läänemeremaade kultuuri- ja merendusajaloo kontekstis.

Võrreldes teiste teadaolevate eelviikingi- ja viikingiaegsete laevamatustega, on Salme leiu juures kõige silmatorkavam surnute suur arv. Tavaliselt on laevamatustes vaid üks väga rikkalike panustega kõrgklassi kuulunud inimene, harva on ühes laevas kolm kuni neli maetut. Salme laev seitsme mehe surnukehaga on omaaegsete laevamatuste hulgas erandlik.

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