



Good practices on built heritage conservation/restoration

Restoration of Valdemar's Wall, Danevirke

Main idea/goal of the intervention.

The project's goal is to stabilise and extensively restore Valdemar's Wall. Valdemar's Wall was the largest and the oldest secular brick structure in Northern Europe. The conservation measures focus on Valdemar's Wall, an approximate 80-metre-long section of the brick wall. Works include repairs and upgrades of the technical facilities and improvement of visitor management.

Location.

The site is located in the municipality of Dannewerk, a village very close to the town of Schleswig in Schleswig-Holstein, Germany. The wall is located about 200m from the Danevirke Museum, Ochsenweg 5 • D-24867 Dannewerk and part of the so-called Archaeological Park Dannewerk.

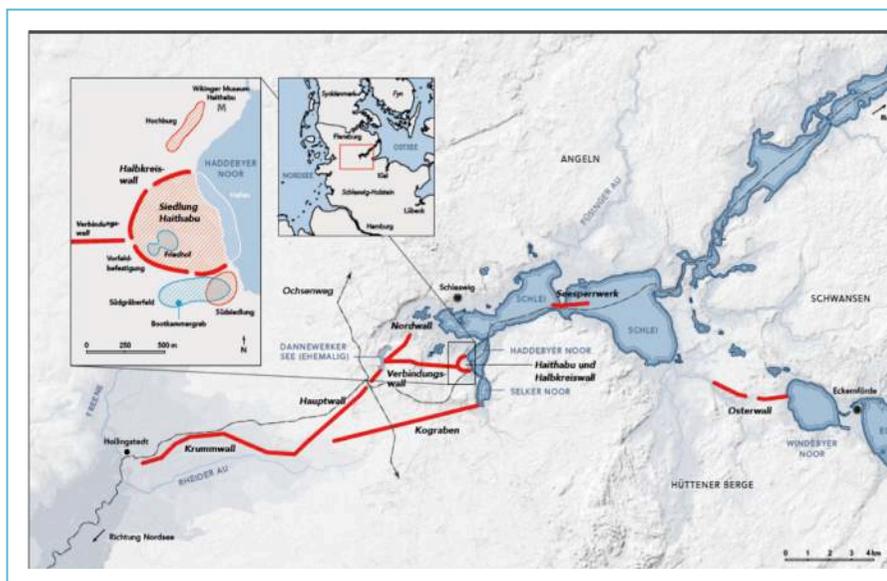


Image No. 1, Overview of Hedeby and the Danevirke
 © ALSH/GeoBasis-DE L VermGeo SH

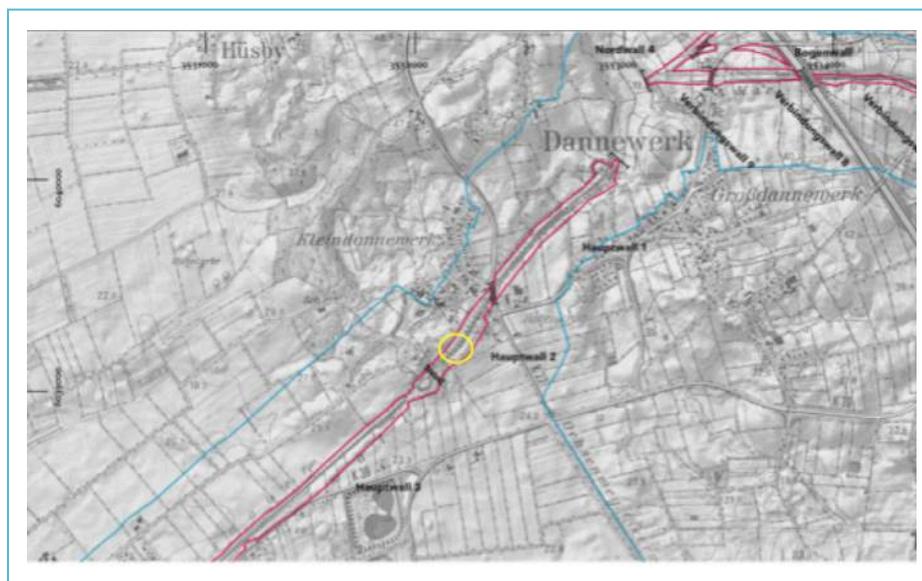


Image No. 2, Location of Valdemar's Wall (yellow marking).
 © ALSH/GeoBasis-DE L VermGeo SH

Functions.

Valdemar's Wall was originally a brick-built structure of about 4-4.5 km length in front of an approximate 30-metre-wide rampart, consisting of older construction stages of the Main Rampart of the Danevirke. This section of the Danevirke was an estimated 100-metre-wide fortification belt, consisting of a rampart, the brick wall, a berm, a ditch of formerly 15m in width and 2.5m in depth, and an additional rampart in the forefront. The brick wall is assumed to have originally been up to 7m high and 2m thick.

At the time, bricks were a novelty in Northern Europe, and their use on Valdemar's Wall of the Danevirke can thus be seen as an expression of great political and military power. The significance of the wall, in terms of power politics is made especially clear by two inscriptions on Valdemar I's grave and the earliest histories of the Danes, written in the same period by Saxo Grammaticus and Svend Aggesen. Valdemar's Wall was in use until the middle of the 13th century and afterwards fell to ruin.

As a consequence of nationalist movements all over Europe beginning in the late eighteenth century, by the middle of the nineteenth century, the Danevirke and the, then ruined, Valdemar's Wall emerged as a Danish national symbol for defence against the Germans. Consequently, the Danish military erected a new fortification line at the Danevirke in the middle of the 19th century. During World War II, an anti-tank ditch which had been dug directly in front of Valdemar's Wall was refilled in 1946.

Valdemar's Wall as part of the Danevirke became legally protected by a conservation order in 1950, (as a Nature Protection Area) and since 1965 it has been a listed monument (and has preservation orders to safeguard it). The wall is an important part of the UNESCO World Heritage Site "Archaeological Border complex of Hedeby and the Danevirke", inscribed 2018

Today, the wall is an important historic monument and point of interest for visitors, notably from Denmark. The ruin is located in an archaeological park around the Danevirke Museum.



Image No. 3, Protective measures in August
© ALSH



Image No. 4, Valdemar's Wall after the conservation in 2009.
© ALSH/Foto: Michael Lang

Owner/manager.

Valdemar's Wall is owned by the District of Schleswig-Flensburg, and managed by the Haithabu und Danewerk society ,in cooperation with the State Archaeology Department of Schleswig-Holstein (ALSH, in charge of archaeological cultural monuments and the Danevirke).

Heritage category.

UNESCO World Heritage site, listed archaeological monument and zone.

Short historical background.

Valdemar I did not obtain the Danish royal crown until 1157, after years of civil war; during the first years of his reign he also had to battle stiff resistance within Denmark. At the same time, he ran military campaigns and crusades against the Slavic Obotrite tribe. From 1162 to 1181, Valdemar was also forced several times to give in to German feudal lords. As a reaction to such political and military challenges, Valdemar I had the front of the Main Wall of the Danevirke (extant since the 5th century) reinforced with a wall of brick, presumably soon after 1162.

Valdemar's successor, Canute, was the first to refuse to give an oath of fealty to the German rulers. Valdemar II, who succeeded Canute, followed a policy of expansion towards Holstein and into the Slavic areas along the Baltic Sea coast. Under Valdemar II, the wall played an even more important role as part of his expansion policy; it was probably still maintained at this time and only abandoned entirely after his death. The wall – and the Danevirke -eventually lost its meaning in the course of the Middle Ages.

Afterwards, the wall fell into decay and was used as a quarry supplying building material for the surrounding area. As a result, major parts of the wall ruins were covered by soil sliding down and are no longer visible today. In the 19th century, the section referred to as Valdemar's Wall was uncovered to its present length, revealing its ruined interior. The wall front and the coping are missing. An approximate 22-metre-wide section of the rampart behind the wall is still preserved.

Main issues.

The first restoration measures were taken in 2006 and 2008/2009. These included installing rear drainage in the rampart behind the wall ruins, applying a layer of sealing material (Dernoton®) on the coping and reinforced parts of the wall base, and individual areas near the coping with custom-made bricks (as a “sacrificial layer”). Since 2013, relevant institutions, such as the District of Schleswig-Flensburg as the owner and the Schleswig-Holstein State Office for the Preservation of Monuments, have been consulted to plan further conservation measures.

Research.

The restoration concept includes a precise mapping of both the original bricks and the new bricks laid in the course of the restoration measures, as well as an analysis and a list of brick formats and mortar used so far. Comprehensive photographic documentation, as well as photogrammetric and 3D images of the wall taken over several years.

Recent analyses identified harmful salts, which are exacerbated by moisture, as a major factor contributing to the brickwork’s loss of structural fabric and stability. Other factors include frost damage, humification, animals and plants entering the wall structure and improper visitor behaviour. The analysis of the previous measures, as well as the provisional stabilisation measures implemented in 2017 and 2018 have made it possible to accurately determine the effects of the old and new mortar on the wall. The measures aim at reducing the formation of harmful salts to a minimum.

In the course of examining drainage, trial pits were dug at the wall base to determine the dimensions of the foundations and to locate the drainage directly in front of the wall.

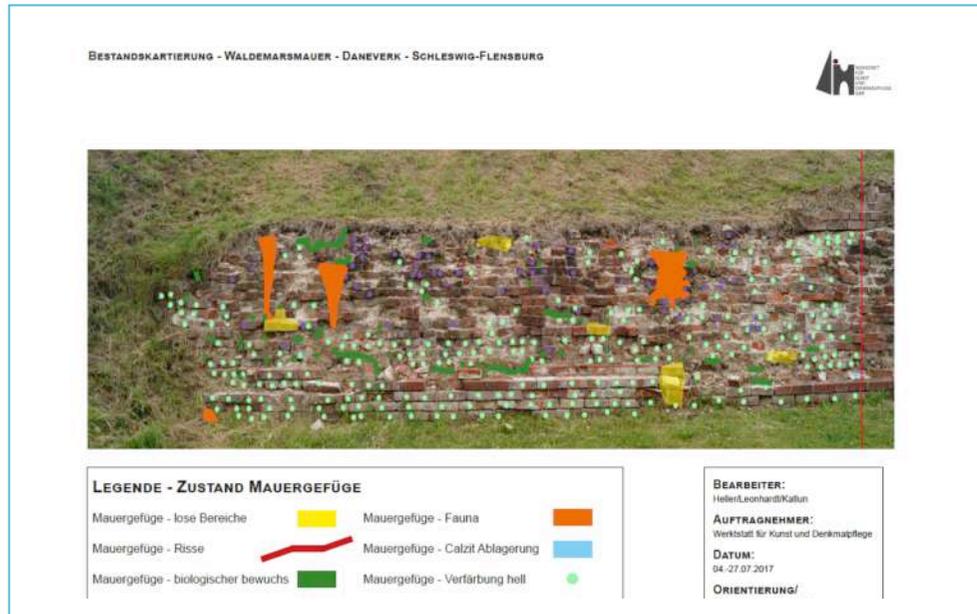


Image No. 5, Excerpt from the conservation concept, mapping the state of conservation.



*Image No. 6, Valdemar's Wall, October 2019.
© ALSH*

Conservation/renewal project.

Stakeholder involvement.

Since 2015, an expert panel has been convened on a regular basis to supervise the preparation of further measures to preserve the wall. Alongside district authorities (both owner and lower monument protection authority), the State Archaeology Department of Schleswig-Holstein and the Danevirke Museum, the panel also includes experts for historic walls from the State Office for the Preservation of Monuments in Kiel, and from the Danish Agency for Culture and Palaces, as well as a now retired professor of stone conservation from the University of Applied Sciences in Potsdam. Since 2017, restorers from the contractor for restoration works have supported this panel. ICOMOS Germany has been involved through two members of its monitoring group since 2019.

Conservation measures since 2017.

Based on the conservation concept, the monument owner has been taking stabilisation measures and, since June 2020, also extensive restoration measures on Valdemar's Wall. These include repairs and upgrades of the technical facilities and improvement of visitor management.

The restoration measures were completed in mid-October 2020. They were aimed at fully preserving the present condition of the brickwork. To this end, dirt, humus, plant remains, animal nests and other deposits had to be removed from the wall. All previously removed original bricks worth preserving were put back into their original position and reintegrated into the brickwork. Damaged subsequent mortar additions were removed and the original grout was reinforced. Fillings of endangered areas were made to achieve long-term stability. Cracks and flaws were closed exclusively to repair existing and prevent further damage.

Large-scale bricklaying has not been carried out. However, parts of the wall base and the entire exposed and unprotected coping need to be reinforced, with a sacrificial layer of hand-made red-tinged bricks to ensure protection from weather, as well as flora and fauna. Losses of original bricks were not documented in the past; since 2017, however, all alterations made in the course of the restoration measures have been documented.

Covering the coping.

Due to the wall's partial demolition over the course of time, the coping of the wall ruins were previously covered by soil from the rampart behind it. As part of the 2006-2009 restoration measures, a layer of sealing material (Dernoton®) was applied to protect it from the elements. The first emergency stabilisation measures in 2018/19 brought to light the extent of the damage: The coping was found to be severely damaged far into its deeper layers. This was not prevented by the Dernoton® layer, because it was destroyed by vegetation, animals and weathering (especially desiccation), most likely a few years after it had been applied. Hence, it did not prove effective for conservation purposes.

In the 2018 expert workshops, the long-term conservation and presentation of the coping and various examples of other structures were discussed against this background. Following pre-analyses and expert discussions in July and August 2020, laying a new brick coping to serve as a sacrificial layer ultimately seemed to be the best solution to protect the wall from weather, and ensure the

long-term stabilisation of the fragile upper wall layers, and the entire wall structure. During implementation, it turned out that at least two to three layers had to be applied to keep the sacrificial layer stable and create a protective layer of uniform thickness. Compared to other coverings, this sacrificial layer is expected to more effectively prevent soil from sliding down, animals and plants from entering the wall structure from above and extreme weather effects on the original layers. A steep wall front prevents moisture from entering the brickwork from above and flowing down its front.

The sacrificial layer on top of the coping was designed to match the irregular pattern of the ruined surface and fit into the existing structure, while still being clearly recognisable as a modern addition. Following a field test, the design of the sacrificial layer was seen by the expert panel as a necessary compromise between minimizing visual change to the monument, and conserving it as far as possible. The sacrificial layer is reversible and can be further adapted if better ways for covering the coping are found in the future. Since the wall is stronger and broader towards the base, the thin protective layer on top of the coping is not predicted to involve any problems concerning the structural stability, of either individual sections or the entire wall. The sacrificial layer was completed at the end of October 2020.



*Image No. 7, Restored brickwork, July 2020.
© ALSH.*

*Image No. 8, New sacrificial layer on top of the coping,
October 2020. © ALSH.*

Implementation of the conservation works.

Contractor.

All contractors were selected according to national and EU regulations, i.e. mainly using the bid-at-three procedure.

Werkstatt für Kunst und Denkmalpflege GbR for restoration and concept.

Gebr. Clasen, Construction, for larger masonry incl. the covering of the coping.

Neue ZIEGEL-Manufaktur Glindow UG for the new bricks.

Abwassertechnik Kapp for the drainage system.

Sources of funding.

The project was mainly funded by the Ministry of Education, Science and Culture of the State of Schleswig-Holstein, and carried out and further financed by the owner of the wall, the District of Schleswig-Flensburg. The District is also responsible for the annual follow-up restoration works for maintenance.

Main issues during the works.

The balance between having a minimal visual impact and long-lasting and effective restoration measures, notably with respect to the covering of the coping with several layers of brick, was subject to intense discussion. A similar discussion is now ongoing concerning visitor access to the top of the wall via a barrier-free causeway, to a platform overlooking the wall in order to prevent unregulated access, which had been very damaging in the past. The plan aims at providing controlled visitor movement to the top of the wall, a place which people are very keen to experience – with or without official access.

Discoveries.

Following the work on the rampart embankment behind Valdemar's Wall to uncover the drainage system, an archaeological examination was conducted. Structures of the early medieval Fieldstone Wall were uncovered in the process. The exact course of the wall at this position has not yet been determined.



Image No. 9, Drainage area behind the wall, October 2020. © ALSH



Image No. 10, Investigation area north of Valdemar's Wall with exposed top of the Fieldstone Wall, August 2020. © ALSH



Image No. 11, Course of the Fieldstone Wall behind Valdemar's Wall (red marking). © ALSH, Foto: L. Hermannsen.

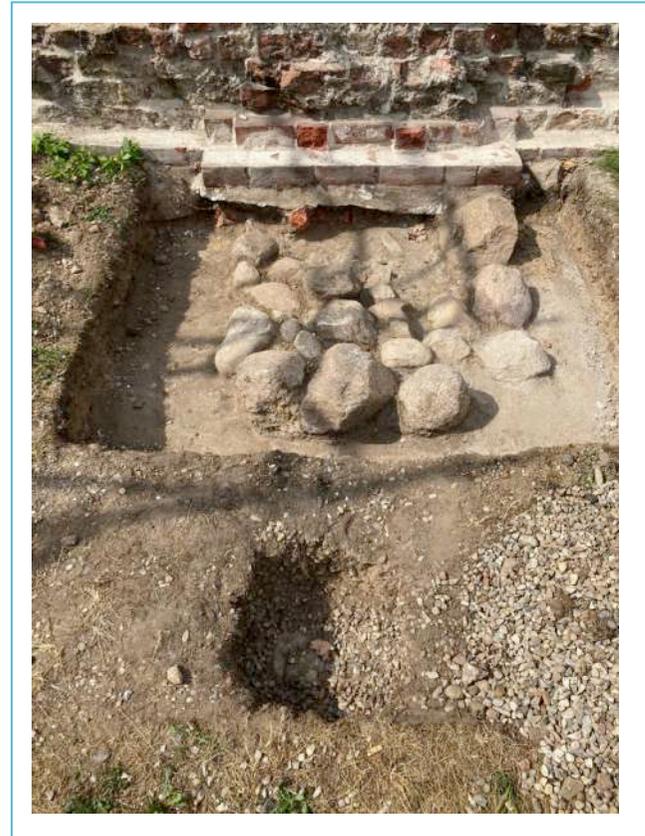


Image No. 12, Field stone foundation of Valdemar's Wall and position of the drainage in front of the wall, August 2020. © ALSH



Image No. 13, Front of Valdemar's Wall with the new sacrificial layer on top of the coping and the still-barren rampart behind it, December 2020. © ALSH



Image No. 14, Valdemar's Wall, winter covering, January 2021. © ALSH



Image No. 15, Valdemar's Wall, September 2021 after conservation. © ALSH



Image No. 16, Valdemar's Wall, September 2021 after conservation. Bird's eye view. © ALSH

Plans for the future.

To ensure further conservation of Valdemar's Wall and avoid extensive overall restoration measures in the future, a preservation and maintenance concept is currently being developed, including yearly monitoring and maintenance activities such as the removal of dirt, humus, plant remains, reintegration of loose bricks, closing of cracks, and refill of mortar.

As part of a separate project, the visitor management in the Archaeological Park will be redesigned to prevent inconsiderate and careless visitor behaviour, such as climbing, touching and taking souvenirs, while also improving the visitor experience and the communication of monuments. In addition and complementary to this project, there is another ongoing project entitled "Open space

concept in the municipality of Danevirke”, which will allow visitors to better experience and access the municipal area around the monuments and connect them to the municipality.

The redesign serves to protect the archaeological monument, while also enhancing the area’s value as a highlight for visitors, allowing an appropriate visitor management concept and more accessible visitor infrastructure, while ensuring more effective communication of the World Heritage Site.

Evaluation.

While adding protective layers of brick to the coping of a ruined wall is common practice in Denmark, it is not usual in built heritage management in Germany. The discussion in the expert group reflected the different weight experts, from different disciplines put on maintaining the earth and grass covered look of the ruin in recent decades vs. improving the long-term resilience of the wall.

Visitor access and experience is considered an integral part of the conservation works as uncontrolled and careless behaviour had been a major cause for damage. On the other hand, a positive experience can enhance awareness and understanding for protecting monuments, and support informed and voluntary respectful treatment of the ruins.

Experts from all relevant institutions, disciplines and stakeholders from Germany and Denmark, such as from the local Danish minority, have been involved from the start. Experienced experts for the restoration of stone masonry carried out analyses, planning and restoration works and were part of the expert group for decision-making. Decision-making was based on topic scientific and practical knowledge and experience and careful weighing of effects. A new approach was followed, by carefully adapting the appearance of the ruin in the past decades in order to improve its resilience to visitor damage and other impacts (both regarding material of conservation and social aspect, e. g. outstanding example of conservation in situ, exceptional skills and/or authentic techniques necessary for conservation, excellent public-private partnership, community involvement etc.).

More information.

Matthias Maluck, State Archaeology Department of Schleswig-Holstein, email: matthias.maluck@alsh.landsh.de.