



GERMANY
(Mecklenburg-Western
Pomerania)



BALTIC REGION HERITAGE COMMITTEE

Good practices on built heritage conservation/restoration

Frische Grube 5, Wismar, medieval residential building.

Main idea/goal of the intervention.

Restoration of the half-timbered construction.

Location.

Frische Grube 5, 23966 Wismar, Mecklenburg-Western Pomerania, Germany.

The origins of the city of Wismar date back to the 12th century. In the 13th century, Wismar joined the Hanseatic League. The city was economically important, and traces of this can still be seen in the townscape today. In 2002, the old towns of Wismar and Stralsund were entered into the UNESCO World Heritage List as Historic Old Towns of Stralsund and Wismar. The building Frische Grube 5 is located in the historic old town of Wismar. It is situated adjacent to the Nikolaikirche church and is associated with its construction. Both buildings are located on the namesake Frische Grube, a stream from the millpond to the harbour, which was regulated as early as the 13th century, dammed for the operation of mills and made navigable.

Functions.

Original: Craftsmen's shack
Current: Residential building

Owner/manager.

Natural person, private.

Heritage category.

- Listed building,
- part of listed urban area "Old town Wismar",
- World Heritage Site "Historic Centres of Wismar and Stralsund".

Short historical background.

The building is a so-called "Bude" (shack), a small structure built and used by craftsmen. There were several such shacks in Wismar before the building boom in the 19th century. It is a medieval storey post and a wooden beam construction. The wooden construction was dendrochronologically dated to the year 1393. Frische Grube 5 is currently proven to be the second oldest half-timbered building in Wismar. While the courtyard facade still shows the original half-timbered construction, the street facade was remodelled in the 19th century. It is an important testimony to the development of craftsmen's shacks at the time of the Hanseatic League and thus to Wismar's town history. It is in a good state of preservation with a high authentic documentary value. The building merits in monument status for historical, scientific and urban planning reasons.

The following elements determine the heritage value and originality to a particular degree:

- The building cubature with eaves and ridge heights including the roof truss.
- The perforated facade on the street side.
- The rear half-timbered architecture (including struts).
- The interior room structure with the walls (especially firewalls) and ceilings from the time of construction, including the historic floorboards.



Image No. 1, Frische Grube 5 with green facade colour before restoration 2013, © LAKD M-V, LD, Jan Schirmer

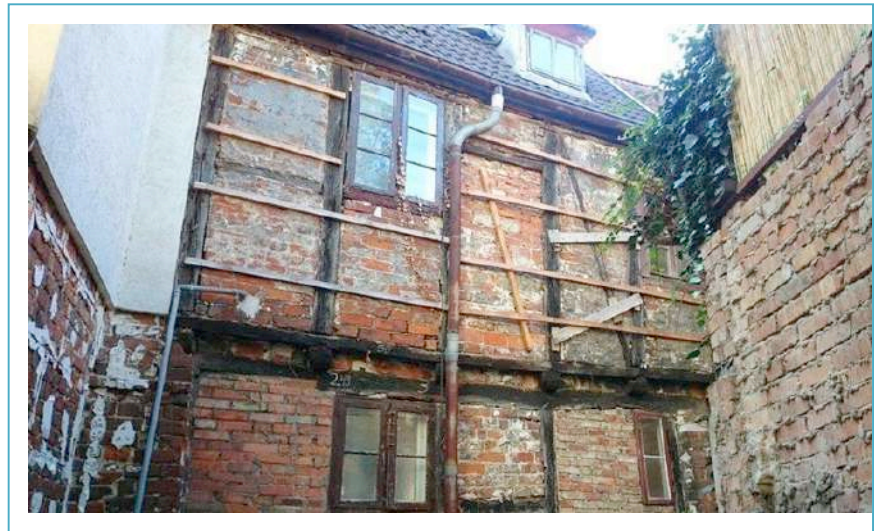


Image No. 2, Courtyard facade before restoration 2013, © LAKD M-V, LD, Jan Schirmer

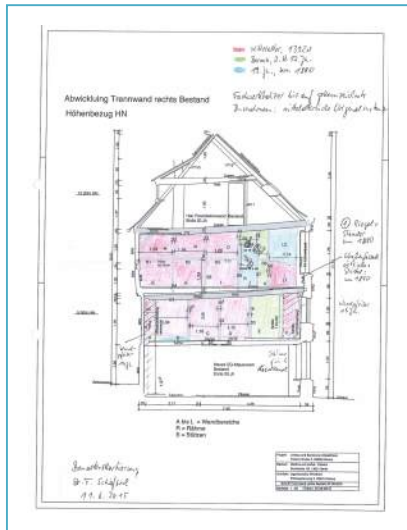
Main issues.

Due to its proximity to a stream, the building stands on a subsoil of peat fill, which has no load-bearing capacity for buildings. Only at a depth of 4m or more is there natural subsoil. Over the centuries, the building has been subject to strong vertical and horizontal deformations. The maximum deformation from the front of the house to the courtyard side was approx. 30 - 40 cm. Due to the narrow foundation width on the courtyard side; the foundation has given way due to ground failure. Damage was evident on almost all wooden structural elements. In addition, alterations carried out in the 19th century produced an internal room division with a low storey height of only 2.05 m in some cases, which posed a great challenge for residential use.



*Image No. 3, upper floor with deformations
and low room height, © LAKD M-V, LD, Jan Schirmer*

Research.



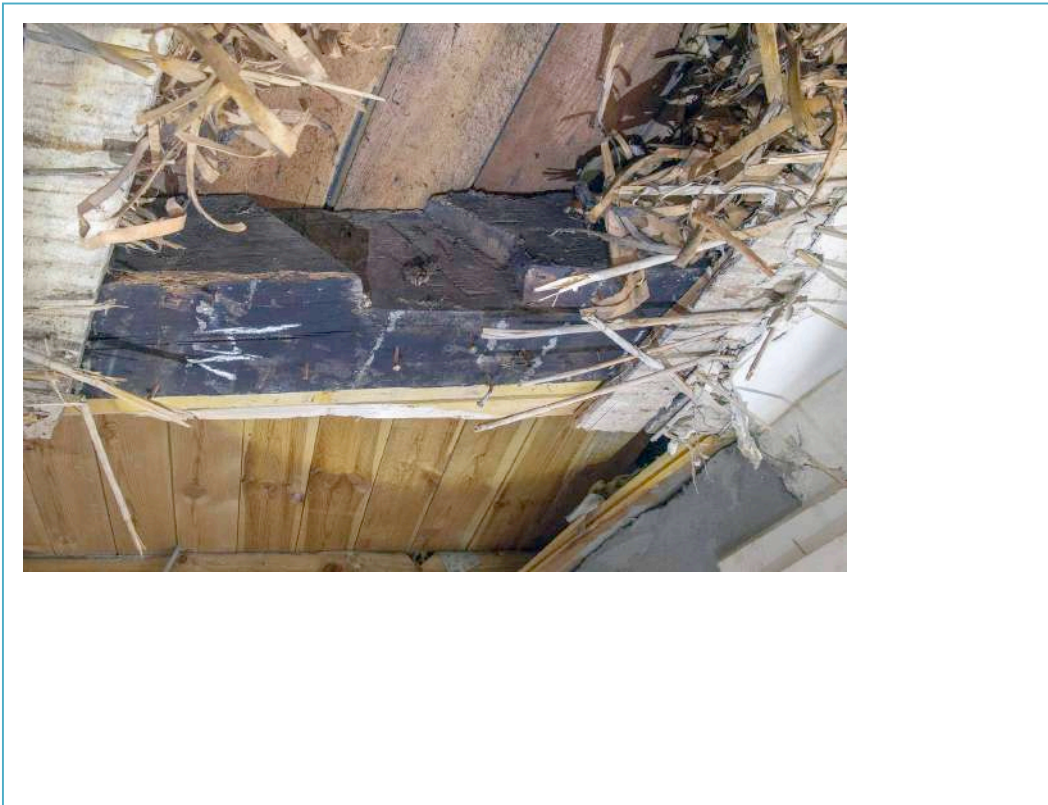
*Image No. 4, building age mapping 2015,
© Building research, Tilo Schöfbeck*



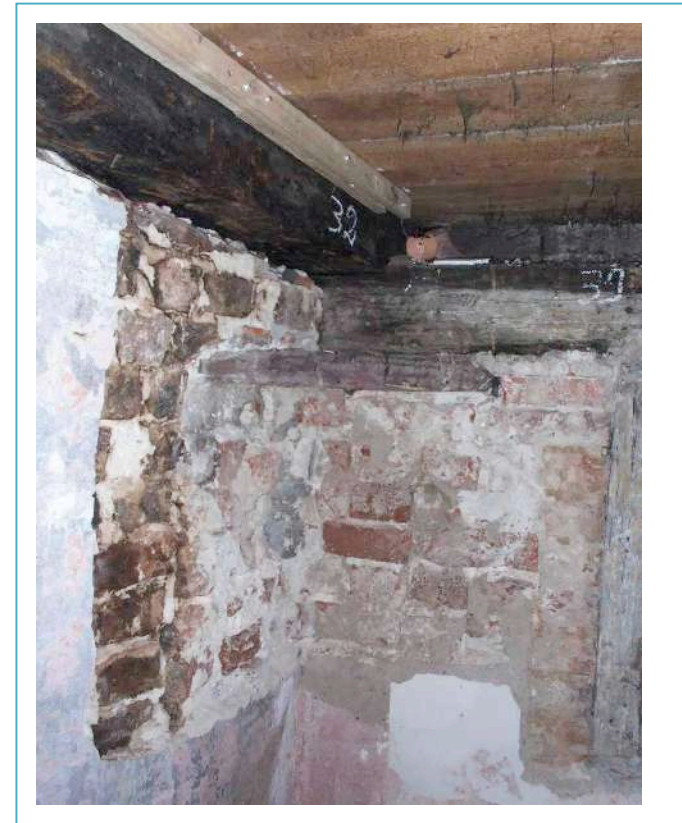
*Image No. 5, courtyard facade, upper floor with
traces of reconstruction and partly original infill,
original supporting post © LAKD M-V, LD, Jan Schirmer*

Building research: The building is a storey post-and-beam structure with predominantly medieval surviving components. As a result of the facade renovation in the 19th century, the building makes a rather inconspicuous impression from the outside. The only striking feature is the unusual storey structure. Inside, the house has a high hallway, which was subdivided around the middle of the 19th century. Until then, it was a half-timbered house with massive brick supporting pillars at its edges, typical of the Buden (shacks) in Wismar. Buden are mostly found in the form of side-gabled buildings, which were also often built as “terraced houses”. The individual supporting pillars of brickwork served as the basic framework and subdivision of the individual terraced houses. In between, there was timber framing on the street side and the courtyard side. While the side facing the Frische Grube only has the pillars, the rear has a largely preserved original facade, and even has the original compartments. The sill was located on a roll

layer, above which there was a high post and beam structure for the hallway. For the lower sub-floor, again a smaller storey was put on top. This was braced to the roof beams, which are also in situ, with angle braces, all of which had hooklike halvings, with the typical conical tapering that existed only until about 1400. The dendrochronological examination indicated that it dated from 1393.



*Image No. 6, mortise of the angle brace in the upper floor,
© Building research, Tilo Schöfbeck*



*Image No. 7, hearth on the upper floor,
© Building research, Tilo Schöfbeck*

As far as the structure's use is concerned, it is known that the hearth was located in the rear area of the house, in the north-west corner. When the supporting pillar there was worked back to gain space, presumably during the reconstruction in the middle of the 19th century, this surface remained without the typical blackening and sooting that otherwise characterise the fireplaces.

Soil survey: The exploratory excavation 1 in Fig. 8 shows an example of the structure of the ground: The foundation on the street side and courtyard side features a step-like widening of the foundation. In addition, a wooden grate was found on the street side, which is located below the foundation stepping. As a result, there is less settlement on the street side than on the courtyard side. Due to the narrow foundation width on the courtyard side, the foundation here has given way due to ground failure.

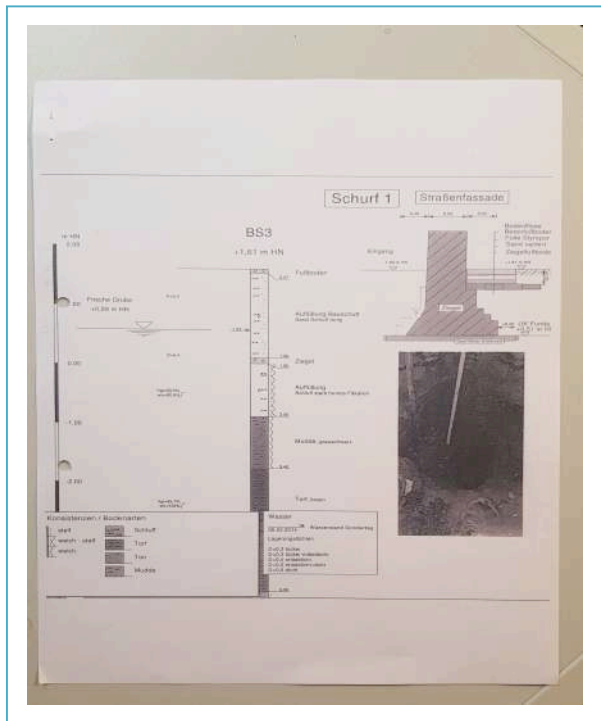


Image No. 8, exploratory excavation 1 with soil structure, © Soil survey, Windhorn Engineers, Wismar, 2014

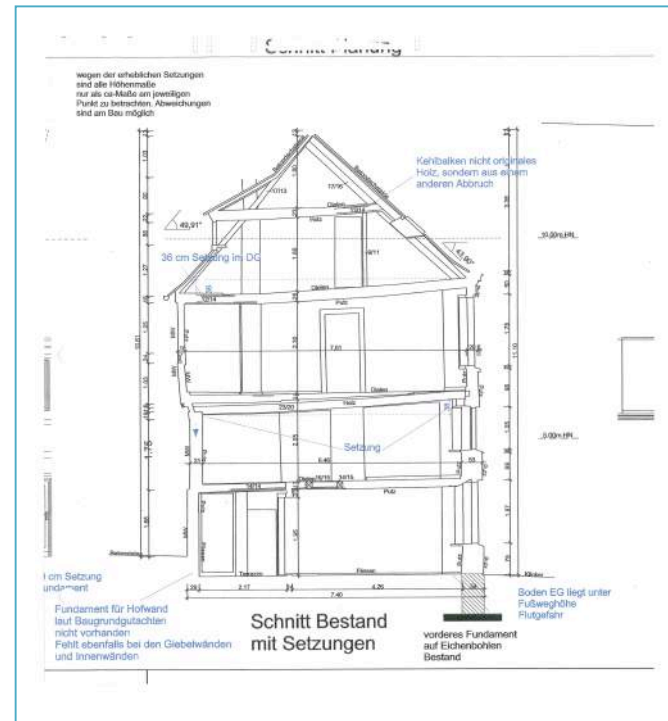


Image No. 9, building section with settlements, © Soil survey, Windhorn Engineers, Wismar, 2014

Restoration examination: On the upper floor, there are still brick infills from the construction period (large bricks in cloister format 28/28.5 x 12/13 x 9 cm), which were laid with lime mortar and carefully slushed-up roof joints. Originally, the appearance was one of brick with a lime slurry. There was no evidence of coloured finishes. Figure 10 shows the masonry filling of cloister-format bricks with a carefully formed roof joint with two horizontally running coating edges at an average distance of 4mm. The connection of the sill shows a well-set, crushed mortar bearing of the sill, which together with the installed oak wedges (arrow in Fig. 11) can be regarded as a sure indication of that this was the installation position of the overall structure dating from the building period.

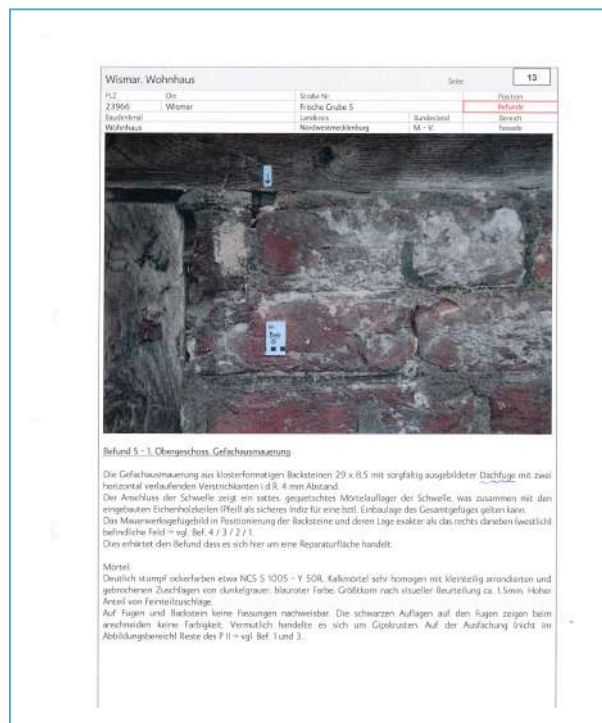


Image No. 10, masonry filling, 1st upper floor,
 © Restoration examination, Lange, Wismar, 2015



Image No. 11, 1. 1st upper floor, eastern compartment field,
 stone layer below the sill,
 © Restoration examination, Lange, Wismar, 2015

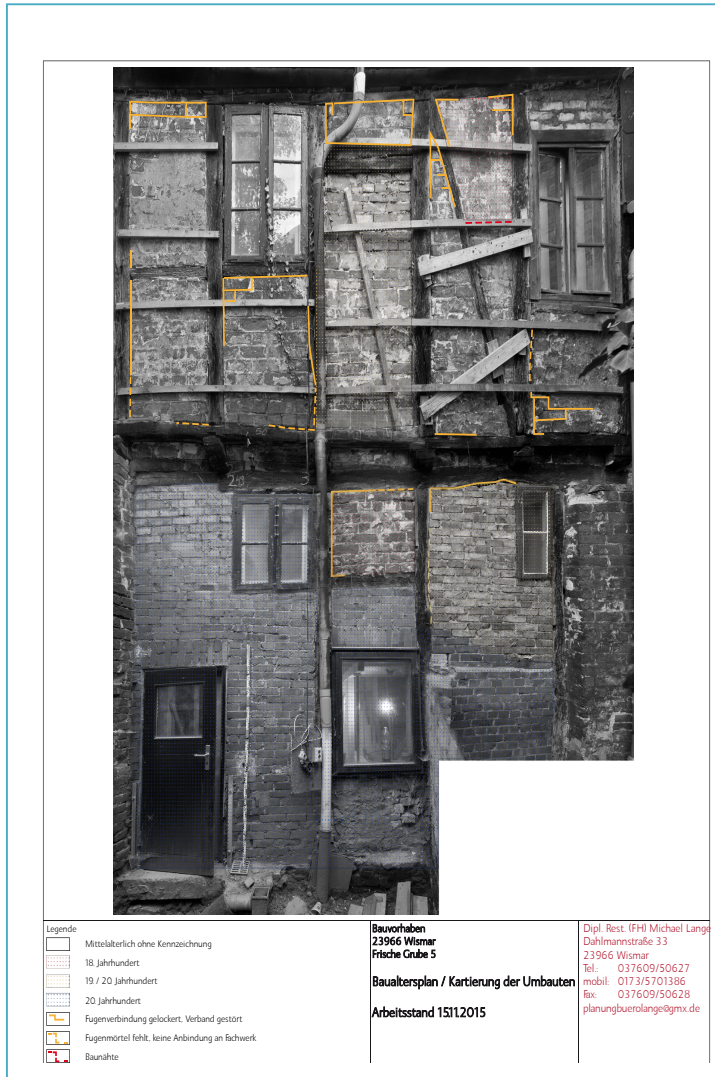


Image No. 12, building age plan/ mapping of the alterations, courtyard façade,
© Restoration examination, Lange, Wismar, 2015

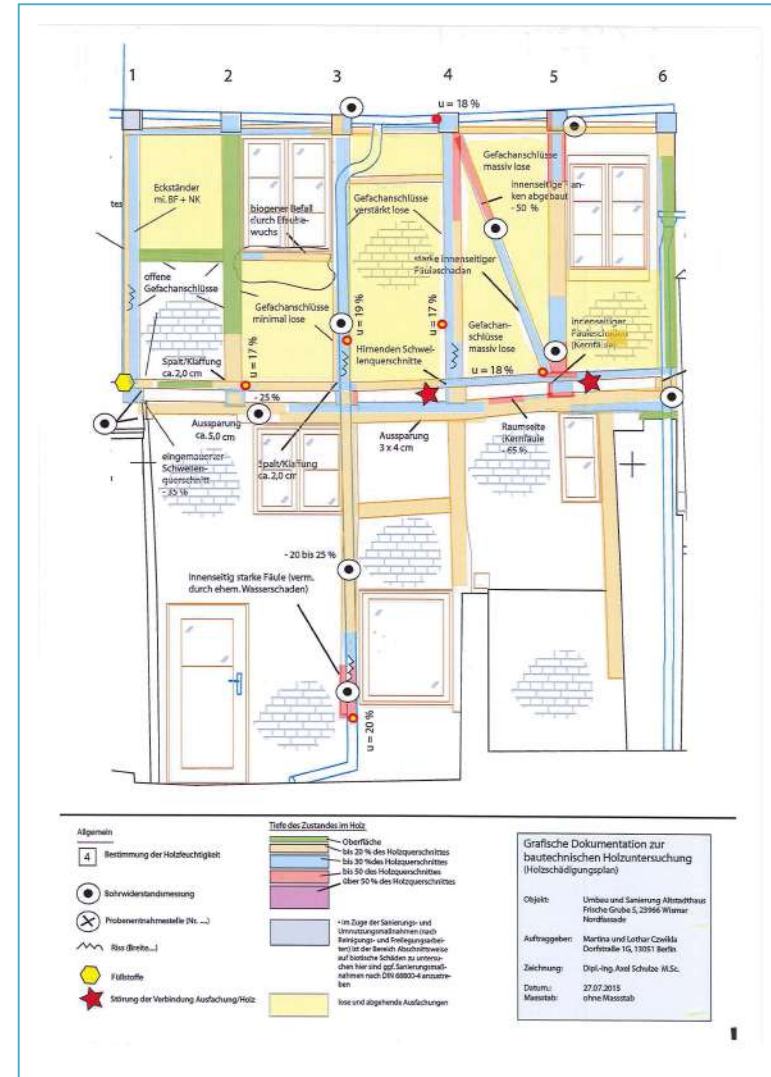


Image No. 13, timber damage plan,
© Restoration examination, Lange, Wismar, 2015

Conservation/renewal project (author(s), complexity, duration, institutions involved, other agents or circumstances, disagreements and compromises if there were any, decision making regarding conservation/restoration techniques and materials, budget.

Goals:

1. Stabilisation of the supporting framework.
2. Refurbishment of the existing building with the least possible intervention in its substance.
3. Conversion and modernisation for residential purposes.

As the building stands on a subsoil with no load-bearing capacity, the complete load-bearing capacity had to be achieved by retrofitting the foundation with micropiles. For this purpose, 24 auger piles were placed at a distance of approx. 35 cm from the outer walls.

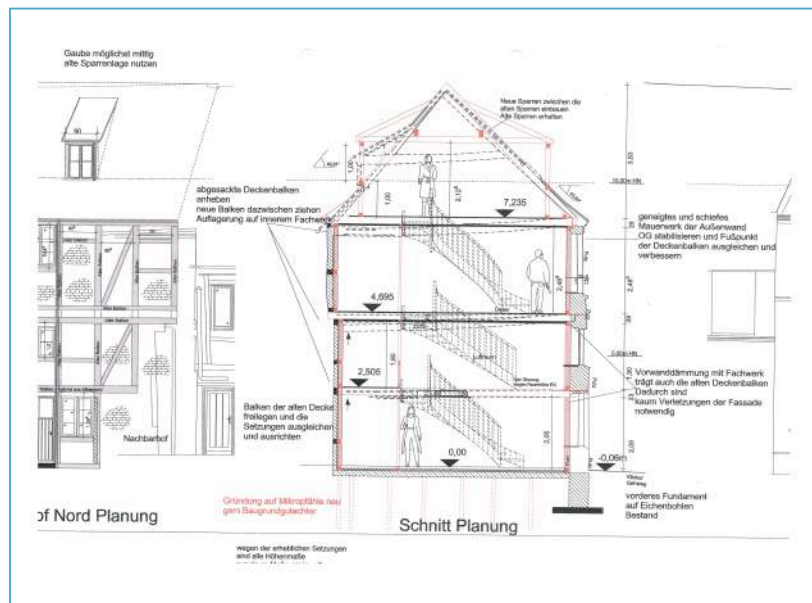


Image No. 14, planning of the house-in-house construction with micropiles, © Soil survey, Windhorn Engineers, Wismar, 2014

The original half-timbered construction had been completely replaced by solid masonry on the street side (Fig. 15). The half-timbering was only braced by means of angle braces and cogged ceiling beams, and the floorboards had been largely replaced. The structural engineer's idea was to create a wooden framework (Fig. 16) in the interior that would add little load, which was largely decoupled from the self-supporting exterior walls and at the same time accommodated insulation and the new loads of use.



*Image No. 15, street facade with head rail of the former timber frame construction,
© LAKD M-V, LD, Jan Schirmer*



*Image No. 16, the eastern gable wall with half-timbered construction,
© LAKD M-V, LD, Jan Schirmer*

On the eastern gable wall, a frame construction was carried out on the 1st and 2nd floor in order to be able to visibly experience the medieval masonry. A connection of the historic gable wall to the new supporting interior construction was not statically necessary. The medieval house corners, which were structurally built together with the neighbouring houses, did not have to be underpinned. The new interior supporting framework was set in a regular grid of approx. 65cm spacing according to static specifications.

The building has two half-timbered gable walls facing the adjacent houses. From examining them in more detail, it is evident that this is part of a medieval terraced house; the half-timbered walls are therefore of high heritage value. Replacing them with solid construction would not have been acceptable in terms of monument preservation. One of the two walls was clad, the other left visible, as the neighbour had already erected a massive gable wall. The rear side of the building was given the first version of the brick infill, which has been verified by restoration work. Incidentally, the construction does not require wooden nails for the framework rails, as these were historically only wedged into the legs. The building was insulated using soft wood fibre mats within an internal wooden frame construction.



*Image No. 17, the eastern gable wall with remains of the historical flooring of the adjacent building,
© LAKD M-V, LD, Jan Schirmer*



*Image No. 18, courtyard facade after sanitation, 2016
© LAKD M-V, LD, Jan Schirmer*

One problematic point in preserving historic interior structures was the room height. Inside the building, a mezzanine floor was retained as a low-height living area on the modern gallery within the former high hallway. The possibility of exemption from the specifications of the state building regulations was made use of. The medieval ceiling beams are an ornament rather than a “disturbing accessory”.



*Image No. 19, mezzanine above the new gallery,
© LAKD M-V, LD, Jan Schirmer*



*Image No. 20, access to the newly created levels,
© LAKD M-V, LD, Jan Schirmer*

Reshaping the brick infill (pushing it back), which was initially considered, did not appear to be a reasonable option and would have led to additional damage.

New brick linings were made using suitable sampled solid clay bricks in accordance with the existing bond.

In areas where the connection joints between the brick infill and the beams were loose or missing, the infill was additionally fixed with slender oak wedges. The wedges were installed in such a way that they grip against the brick and the beam. In areas where the edge joint was intact, it was left in place. After wedging, the connecting joints (defects) were sealed with a weak hydraulic lime mortar. Washed, crushed sand with a grain size of 0-2 mm was used as sand for a better grip, calf hair was added for reinforcement. The joint groove was cleaned (blown out, sprayed out), then the mortar was tamped in in layers, earth-moist, to achieve the best possible traction.

The surfaces to be treated (whitewash, lime plaster) were preserved (with aqueous dispersed silicic acid ether) and filled several times with aerated lime and then covered with sand with a grain size of 0 - 0.8 mm (2-3 coats). In this way, the joints and pores were optimally sealed and the surfaces were given a new wear layer. Damaged sintered surfaces were strengthened. More recent compartments were slurried with a trass and cement-free liming, the remaining compartments were given a thin over felting.

Implementation of the conservation works.

Contractor.

The project was officially supervised by the city of Wismar (Urban Planning, Subordinate Monument Protection Authority) and the State Office for Cultural Heritage and Monument Preservation. After a restricted call for tenders, the planning was carried out by a planning office experienced in the conversion of historic half-timbered structures. Only experts experienced in the preservation of historic monuments (archaeology, soil survey, statics, building research, restoration and construction companies) were involved in the preparatory and accompanying investigations.

Sources of funding.

For the micropile foundation, the underpinning of the half-timbered wall on the courtyard side and the securing of the medieval beams on the inside, a sum of €36,500.00 was contributed from the monument preservation programme of the federal state of Mecklenburg-Western Pomerania. The own share amounted to €39,000.00. Additionally, subsidies from the urban development programme were used. The costs of the project could be written off against tax.

Discoveries.

The examinations revealed that it is one of the oldest surviving buildings in Wismar and at the same time one of the oldest, so far unrecognised half-timbered structures in Mecklenburg. It illustrates the working and living conditions of the craftsmen of the Hanseatic towns and is therefore an important testimony to the development of craftsmen's shacks at the time of the Hanseatic League. In addition, it documents the coexistence of gable-end burgher houses and side-gabled craftsmen's houses, which were built as a row of shacks with a common firewall (half-timbering with brick infill instead of solid masonry), as early as the 14th century. It is thus an important document for the urban parcel structure and has a significant informative value for urban development.



*Image No. 21, building condition after restoration, 2016 (grey facade),
© LAKD M-V, LD, Jan Schirmer*

Results/current situation.

The building is in use. It is privately managed. All interventions are amenable to the Monument act (Denkmalschutzgesetz Mecklenburg-Vorpommern). Due to the UNESCO World Heritage status there is a high interest for tourism.

Plans for the future.

Further comparative studies are needed to classify the house type.

Evaluation.

The restoration of half-timbered buildings requires expert knowledge of the historical construction and the choice of the right materials. In the recent past, materials such as cement mortar, acrylic paints, mineral wool, etc. that are used in new buildings but are ahistorical and unsuitable for half-timbered buildings have led to serious damage.

Overall, it must be noted that the possibility of exemption from the Energy Saving Regulations for buildings or building units protected under state law is too seldom taken advantage of, although it is known that high insulation thicknesses are pointless. Especially in small buildings, this has a negative effect on the usable floor space, so that individual solutions must be sought in planning, with the aim of avoiding damage.

The rigid application of regulations of the regional building code and standards applicable to new buildings can also lead to damage in half-timbered buildings or even to the loss of valuable monumental substance. Statics and fire protection occupy a special position in building law. Basic and individual requirements are regulated in general terms in the relevant ordinances and guidelines without, however, addressing constructive or regional peculiarities, especially of half-timbered buildings. However, the fact that fire protection and statics also played a role in earlier times. The knowledge about fire was incorporated into the constructions and passed on is shown, for example, by the Lübische Baurecht (Lübeck Building Code), which was valid for centuries and was used as the building code in the towns in what is now Mecklenburg-Western Pomerania.

This case is exceptional. In particular, the static concept of the house-in-house solution sets new standards for changes in the use of small-scale medieval half-timbered buildings.

1. The project is an exceptional example of the restoration and conversion of a medieval half-timbered building in an existing building with exemplary character.
2. The restoration work was challenging due to the age of the building, the medieval structures and the requirements for contemporary residential use. The cooperation with all those involved in the construction was excellent.
3. Only by recognising the historic construction details and developing sensible solutions based on these was it possible to find an economically viable solution for the restoration of the building - a model for similar half-timbered buildings in Wismar and beyond.

More information.

For more information, please contact Dr. Ramona Dornbusch, Head of Conservation Office, State Office for Culture and the Preservation of Monuments, Mecklenburg-Western Pomerania, E-Mail: r.dornbusch@lakd-mv.de.