Rising damp in historic buildings
Documentation of damp-proofing and drain at Hørsholm Church

Most historical buildings in Denmark have foundations and solid external walls made of brick and lime mortar. The brick foundations absorbs damp from the ground, which spreads through external walls above ground level. Rising damp causes a number of problems: breakdown of bricks and joints as a result of precipitation of dissolved salts in the mineral materials; rot or mould in integrated wooden elements such as beam ends or window lintels; corrosion of unprotected metal elements such as cramps or steel girder; and mould or death watches behind panels or below wooden floors.

Several methods exist for preventing rising damp. In general, it is recommended to establish a mechanical or chemical damp-proof membrane at the footing to prevent or slow down damp absorption from the foundation. These methods include destructive intervention in the structures and are not permitted in buildings that are listed and thus protected or of antiquarian value. In those cases, exterior damp-proofing and/or perimeter drain is applied to limit the damp load. However, there is doubt as to the efficiency of this method in practice.

Hørsholm Church was built in 1823 and has ever since been affected by damp from the underground. Because of its location in the middle of the castle lake, the level of gravitational water table is relatively fixed. That makes this structure a suitable object for studying rising damp in brickwork. In connection with renovation of the exterior, a three-year measurement programme is initiated. A new measurement method is used that provides a detailed image of the distribution of damp through the wall. That allows for documentation of the long-term effect of drain and damp-proofing of foundations. If the measures to limit rising damp are successful, the need for maintenance is reduced, securing the long-term preservation of the structure.

In addition to this project, the following measurement programmes are ongoing: At Amalienborg Castle, the effect of electroosmosis is studied; at Frederiksborg Castle, the moisture content following re-jointing of the brickwork is measured; and at Nyborg Castle, the effect of heating a previously unheated structure is documented. This project is carried out in continuation of these studies and, combined, they will provide detailed knowledge about damp in brickwork in historic buildings. The results can be useful for building owners, consultants and builders, helping them select the most sustainable method based on an overall consideration of economic, engineering, antiquarian and environmental aspects.

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