De ordinaire kap : een bouwhistorische studie naar kapconstructies op Leidse huizen tusen 1300 en 1800

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SUMMARY

The research on the roof constructions on Leiden houses between 1300 and 1800 is primarily based on the systematic documentation and analysis of more than a hundred selected roof constructions of houses and twenty comparable on other types of buildings in Leiden. The research provides for the first time a summary overview of this type of constructions in one city. Partly due to dendrochronological research, almost all roof constructions are provided with a reliable date and information is available on the origin of construction wood and trade therein. The documented constructions are unambiguously recorded on a newly developed standardized catalog sheet.
By linking the data from the investigated roof constructions with historical sources and published research, an attempt was made to answer the main question about the appearance and development of roof constructions from 1300 to 1800 on Leiden houses and what the influences and indicators are.

The geographical location and demographic and economic development of Leiden are fundamental aspects for the origin and development of the roof. The location of Leiden and the adjacent region is determined by a maritime climate, where a steep roof slope of 50-60 degrees is customary. The origin and prosperity of Leiden is connected with the 12th-13th-century urbanization of the Western Netherlands. This urbanization with its relative autonomy, stability and progressive development offered the citizens a positive perspective and economic opportunities.
Because roof constructions were structurally compared for the first time in a single city, it could be established that in Leiden between 1300 and 1800 there was a gradual development of the form of roof construction. Typologically, the development was very limited with a common rafter roof as the basic type, a further development to a common rafter roof supported with trusses as a second type and as the last innovation the introduction of the ridge purlin with the ridge style, triangular trusses and scissors trusses as different types of ridge supporting trusses. The oldest houses will have been provided with a roof construction with coupled rafters for supporting thatched roofs. The basic common rafter roof is the basic construction principle throughout North-West Europe. The study shows that the houses in Leiden between 1300 and 1800 are equipped with transverse portal-shaped trusses, on which lie longitudinal carriers that support common rafters. The characteristic structural framework is part of the Flemish-Dutch group in the Dutch-speaking region along the North Sea coast, stretching from Germany to the North of France. The consequence of the 12th / 13th-century urbanization of the western part of the Netherlands was the emergence of a specialized carpentry craft. In the densely built-up urban context, the slate and ceramic roof tile stimulated by the city government instead of very fire-hazardous reed have been the reason for a support structure. Due to the greater weight of slate and tiles and the required steeper roof pitch, the carpenters developed a more robust and at the same time material-efficient support construction with transversely placed (stacked) trusses and lighter common rafters. With the stacked construction with its optimal and economical use of building material, the carpenter responds to the relatively expensive import construction timber in Leiden and the region. The truss construction is a technical innovation developed by the carpenters of the load-bearing frame of the stone house with a timber frame. This house is a confluence of the half-timbered house and the stone house and characteristic of the region during the research period. The use of the parapet, for a ' sunken floor' with a more optimal use of the attic, does not appear to be the primary reason for the development of the truss construction, as is assumed.

The combination of investigated roof constructions and archive data makes it clear for the first time that as a result of the arrival of the innovative pantile, in Leiden around 1545, the carpenter had to find a solution for a more stable ridge construction. This led to the introduction of the ridge purlin on triangular trusses or ridge post and individual rafters in the roof construction of houses. This is the most important typological development of the roof construction on Leiden houses. It is noteworthy that these kinds of significant improvements have a rapid application and also a spread over a large area. Another example is the constructive and material efficient crossed triangular trusss shortly after the middle of the 17th century. The roof construction on houses in Leiden has hardly any development in the research period. This is due to the fact that the construction of ordinary urban houses is reserved for members of the local carpenter guild because of the mandatory guild rules. Because of their conservative and protective organization and internal, largely unchanged training structure, modernization of the building structure is virtually impossible.

Under the influence of economic motives, in the course of time the construction is made simpler and more efficient, which saves on materials and labor. However, the effect of this on the design of the roof construction is limited. The transition from oak construction timber to pine wood from the end of the 16th century as a result of the more difficult availability also has had little effect on the design and construction of the roof construction. Extraordinaire structures and their constructions or carpenters from outside also have no influence on the ordinary works. The organization around the building of ordinary houses did not change. The tools and methods of the carpenter also remained unchanged. The principals, the building organization and the executing carpenters cannot therefore be designated as the cause for developments or modernization of the roof construction of ordinary constructions. The carpenter could vary with the flexible design of the construction and thus respond to functional or architectural requirements, such as a lean-to roof or a new M-shaped roof shape at the arrival of the architecture of Dutch Classicism in the 17th century, but the main setup of the construction did not change. The period of unhindered economic growth from the end of the 16th century to the ‘rampjaar’ (1672) led to the development of a local construction market in the flourishing cities. This allowed development of locally or regionally bound forms of construction. In the same period, the Leiden city council came in 1593 with a legislation to permanently replace combustible thatched roofs with hard non-flammable roofing. The hard roof regulations, the hard roof subsidy and the period of economic boom have resulted in the intensive renewal of Leiden roofs and roof constructions, whereby owners have taken the opportunity to raise their homes. The appearance of the city changes drastically. In general, in the city there were first low houses and later with storeys. However, this does not lead to developments of the roof constructions of houses. As a result of the emergence of a sawmill industry around Leiden, sawn timber with standardization of wood sizes was used from the second quarter of the 17th century, such as rafters and neatly sawn construction timber. However, this had no effect on how the carpenter constructed the main shape of the structure.
In the research period, the development of the roof construction on the houses in Leiden is thus very limited. With the lifting of the guild and guild rules (1798-1810) renewal and modernization of the age-old form of construction occurs. However, there was no abrupt change and both old and new constructions were applied. In addition, the industrialization of new technologies, structures and materials came, making an end to the use of traditional truss form.

It can be concluded that the primary factors for the development of the roof construction of ordinary Leiden houses between 1300 and 1800 were the guild system and the transition process from thatched roofs to non-combustible roofing. The guild system caused stagnation and the transition process caused technological development twice with new non-combustible roofing materials.

The research has made it clear that the Flemish-Dutch roof construction is a further development of the basic common rafter roof and cannot be classified as a purlin roof as a basic type. Thinking in a stringent, "linear-evolutionary", typological development of the construction, as is usual in older building history overviews, seems to make little sense. this also applies to the typological classification with subdivision and coding proposed by Janse. New research can be better focused on local and regional aspects and the dissemination of innovations and modernisations.

Historic roof construction are particular sources for research into social, economic, technical and material history. The research into the Leiden roof constructions shows the usefulness of building archaeological documentation. In order to prevent that irreplaceable building archaeological sources are unseen and undocumented lost for research, it is essential that documentary building archaeological research is mandatory before and during restoration and renovation work. With this, the Dutch legislation on and treatment of cultural heritage will finally comply with the ratified international conventions. Ultimately, this will create a greater and better awareness of the richness of the building heritage from our past.