Learning from the past - designing timber multi-story apartment buildings on the basis of the timber construction heritage

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ABSTRACT

Traditional Finnish timber construction is characterized by simplicity, clarity and scanty use of decoration. The traditional construction technique used a timberwork frame, which led to simple, cube-like building masses. Nevertheless, several log buildings erected around one yard formed a rich and varied entity, both in the country and in towns. The distinctive Finnish wooden town represents the peak of Northern timber construction. The long tradition of timber construction was interrupted in the 1900s. Now, as we hope to increase the use of wood and develop timber construction, architectural viewpoints have risen to a position of central importance. In many respects, modern timber architecture can learn from the old timber construction heritage. Modern timber architecture cannot, however, be a direct copy of old architecture. Instead, tradition must be applied in a modern way. Wood is a rich, versatile building material. Its richness comes from its picturesque surface and abundant uses of wood products. The nature of timber architecture is born from the seams and joints of bar-shaped wooden components, which give the wood surface its texture. The good characteristics of wood are best utilized when the entire milieu is wooden, as it was in old wooden towns. That is why it is more important to create whole groups or areas of timber multi-story apartment buildings than separate buildings. Then the timber multi-story or small apartment buildings can be small, simple and clear-cut, according to tradition. Plain building masses can be enriched with supplementary structures, such as shelters, stairways, loft walkways, storage buildings and balconies. A rich environment is created when residential buildings are supplemented with wooden outbuildings and fences. A strong sense of wood material is important in a good wooden milieu. The best modern timber multi-story apartment buildings are characterized by structural clarity. Their timber architecture is lightweight in appearance and includes decorative details. The wood surfaces are treated in various ways and different textures and types of boarding are used. A modern appearance is often created using lattices and gratings. Modern timber architecture also must pay attention to the long-term durability and maintainability of the timber structures and surfaces. In this respect, also, we can learn from the best timber construction heritage.

THE FINNISH TIMBER CONSTRUCTION HERITAGE

Finns have always had a close relationship with the forest and wood. Because it has always been available and it is easy to work, wood has been a natural building material. Wood has been used to make buildings, furniture, dishes, tools and even vehicles of transportation until the 1900s.

The Finnish construction heritage is largely a tradition of timber construction. Old timber construction is characterized by simplicity, clarity and scanty use of decoration, downright asceticism. A harsh climate, a lack of money and the use of wood as almost the only building material forced people to build simply and use plain forms. Wood has been used not only as the load-bearing frame of buildings, but also as the façade, the roof, and the material of doors, windows and other supplementary components. The clarity of timber construction and the adaptation of construction to changing seasons made the Finnish architectural heritage distinctive and durable. (Helander et al. 1989.)

Wood was the dominant building material in both the country and in towns. The timberwork of log buildings has been construction technique. For over a thousand years, the traditional construction technique in Finland used a timberwork frame, which was the commonly used method of construction in the entire Northern coniferous forest belt. Up to the 1930s town buildings were also log buildings. The timberwork frame led to simple building masses and the length of the logs gave buildings their uniform scale. Old construction both in the country and in towns was characterized by a large number

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of separate timber work frames in the same yard, as new ones were made whenever needed. Although the log buildings were cube-like structures, they formed a rich, varied entity bound by a common yard. The timberwork frame has been combined with gently sloping ridge roofs, which are characteristic of Finnish timber architecture. Because of their gently sloping roofs, Finnish towns and villages differ in appearance from the central European tradition with its steeper roofs. (Helander et al. 1989.)

The Finnish countryside was typified by farms with their varied clusters of wooden buildings. These farms formed villages, which were traditionally located near the cultivated land. All the towns in Finland were wooden towns that are unique and distinctive worldwide. Finnish wooden towns are based on a regular grid-like plan, giving them a town-like orderliness. Wooden towns are characterized by a clear-cut street space bordered by residential buildings. The buildings are one or two-story ridge-roofed buildings. The numerous outbuildings, barns, woodsheds and storage buildings inside the wooden town blocks formed protected, varied, private yards. Fences and gates were important in wooden towns. They not only defined the street space, but also shielded home life. The entrances to the buildings were always from the yard, never directly from the street. (Helander et al. 1989.)

Figure 1. A traditional yard in the countryside. Simple log buildings form a rich and varying entity.

The Finnish town buildings were simple, plain and for a long time, log-surfaced without facing boards or coloring. Windows were initially horizontal, but since the 1600s they have been vertical. Beginning in the 1700s, town buildings were coated with red ocher. At the end of the same century buildings were commonly faced with boarding and painted.
Yellow ocher and later a light gray color was used in addition to red ocher. Board facing was added to exterior walls to protect and seal the wall structure and also because of an architectural attempt to diversify façade treatment. The first facings were vertical, either alternating or strip boarding. During the Empirical period of the early 1800s it became normal practice to install façade facing. When facings became established it was possible to begin following international trends of style. According to the ideals of style of that time, it became customary to use horizontal boarding and also add Classical pillar systems to wooden façades. The late 1800s were dominated by the Swiss style, which was the first independent timber construction style. The eaves and window frames of buildings were decorated with complicated sawed board ornaments, and several different types of boarding in different directions were used on the façades. Because all façades were painted, color lost its status value and white was then considered a refined color. The Neo-renaissance period at the end of the century emphasized a rich, varied surface effect. Turned wooden ornaments were typical of that time. The significance of color grew during the Neo-renaissance period. (Lilius 1985.) Verandas, which began to appear on buildings in the 1800s, had an important place in timber architecture. In their simplest form, verandas were columned roofs in front of the door. At the end of the 1800s verandas were closed in and they had lace-like decorations with diamond-shaped window panes. The veranda is traditionally the most important ornament of the façade, which decorates the entrance to the building. (Pajula 1983.)

As late as the first decades of the 1900s the old wooden town heritage was followed and developed. One of the finest examples of this is the garden town of Käpyla constructed in 1920 – 25, which continued the nature and scale of the Finnish wooden town. The simple basic forms of the wooden buildings were given individual looks by means of different kinds of verandas and various facing and molding details. After this the tradition of timber construction was interrupted when the Modernistic architectural style became dominant. A short boom in timber architecture occurred after World War II, when all resources were directed toward reconstruction and wood again was the only available building material. The leading architects of that time developed reconstruction period wooden house types suitable for independent construction. The one and a half-story cube-like wooden houses with porches became so established as a natural part of the countryside and suburbs that they became the model of Finnish living. (Helander et al. 1989.)

The urbanization that took place in Finland in the 1900s was unusually brisk. Urbanization and the simultaneous upheaval in construction technology did the most damage to the best achievements of the timber construction heritage, the rural villages and buildings and the wooden towns. (Helander et al. 1989.)

THE COMEBACK OF TIMBER CONSTRUCTION

Throughout the 1990s there has been dialogue in Finland concerning more efficient use of forest and timber resources. More efficient use of timber resources would make it possible to foster exporting and develop the national economy. The greatest opportunity to increase the use of wood lies in construction and the furniture industry. The government has initiated a "Time of Wood" campaign with annually changing themes. The purpose of the themes is to increase the use of wood in construction, improve education in the field of timber construction and create new types of timber construction, timber architecture and timber art. In recent years the government has also given significant support through the Technology Development Center to timber construction research and development.

Accordingly, during the latter 1990s timber construction has been highly visible in public, and new types of timber buildings and timber structures have been created in Finland. The dialogue has resulted in a renewal of fire safety codes related to construction, noticeably increasing the possibilities of using wood. The new timber multi-story apartment buildings are perhaps the most visible result of this new wave of timber construction.

As timber construction increases, it would be important to rediscover Finland’s valuable, unique tradition of timber architecture. The tradition of designing wooden buildings has been interrupted, and no models of timber architecture can be found in the Modernistic period of architecture of the 1990s. In developing modern timber architecture, in many matters and principles it is possible to learn from the old tradition of timber construction. It is important to remember, however, that the old traditions should not be copied as is. Modern architecture should reflect its own time. Buildings constructed with modern technology should be genuinely modern, and it should be apparent when they were constructed. The designs can follow old principles, but the structures and façades and their details should be solved in a modern, honest manner.
THE NATURE OF TIMBER ARCHITECTURE

Wood is a rich, versatile building material. Wood can be used as a load-bearing structure and as a product that forms a surface. The richness of wood comes from its picturesque surface and abundant uses of wood products. Wood in construction is always a bar-shaped component: a log, plank, board, batten or molding. The nature of timber architecture is born from the seams and joints of these bar-shaped wooden components, which give the wood surface its texture and the timber construction its appearance. The color, grain pattern, knottiness and scent of the type of wood selected and the numerous alternatives for sawing, shaping and treating wood provide timber architecture with abundant possibilities. The profile, dimensions and orientation of the facing products and their spacing and roughness also affect the texture of the wood surface. Varied, rich use of wood, boarding oriented in different directions, strips or moldings and their coloring require a good layout skills and architectural vision from the designer.

A good façade should stimulate when viewed from various distances. The arrangement of building masses and the color of the façade can be seen far away. Closer up it is possible to differentiate openings and emphasized lines, such as moldings, corner boards and eaves. At close range it is possible to see the quality of seams and the surface and small details. Good architecture should have so many details it isn’t possible to remember them all after one glance. Wood provides good opportunities for making façade layouts that stimulate when viewed from afar and especially when view up close.

Modern architecture has not found natural esthetics for wooden façades. Architecture that strives for cube-like eaveless building masses and smooth surfaces is not suitable for timber construction. The architectural possibilities of wood are lost when the same type of boarding and scanty profiling are used everywhere. Recently, romantic attempts at varied use of wood by means of unfounded changes in boarding direction and surface moldings have been observed. Attempts at mimicking old timber architecture in the type plans of single-family houses have not seemed convincing, either. Old surface shapes and the features of old styles cannot be transferred as is to the new commercial method of construction. Often in modern construction wood has also been given a humble status with little value.

Because timber multi-story apartment buildings are a completely new type of building, direct models for their design cannot be found from tradition. Completely new esthetics, language of form and architecture need to be created for timber multi-story apartment buildings. The increasing popularity of timber multi-story apartment buildings requires the discovery of a natural, enticing timber architecture. In this respect architectural research and development work is of key importance. Timber architecture must also take long-term durability and maintainability into consideration. The designs that are developed must be sure and durable, like the best timber construction heritage.

MODERN TIMBER MULTI-STORY APARTMENT BUILDINGS AND TIMBER ARCHITECTURE

A timber multi-story apartment building is a new type of building in Finland and everywhere else in Europe. The rise of this type of building was made possible by the standardization of fire codes in different countries in the 1990s. Repeated fires in old wooden towns led in time to regulations forbidding construction of timber buildings over two stories high in towns. Now that the use of fire has lessened and fire-fighting equipment has improved, the regulations have been eased. Models for modern timber multi-story apartment buildings have been taken from North America, where a platform-frame timber construction system is the dominant method of construction.

Timber construction has been studied and developed and several new timber multi-story apartment buildings have been constructed in Finland and the other Scandinavian countries in the 1990s. At the present it can be said that the technical problems associated with timber multi-story apartment buildings are under control. To be economically competitive, the construction methods of timber multi-story apartment buildings need to become established and certain building components need to be simplified. In this respect we can learn from the North American platform construction system, which has been refined during its long history into a simple, quick and economical method. The greatest challenge in making timber multi-story apartment buildings a competitive alternative on the housing market is related to their architecture. In this the American buildings cannot be used as models, because the decorative American style of construction is foreign to the plain architectural tradition of the North. A natural outward appearance must be found for timber multi-story apartment buildings that will make them distinctive and enticing.

The old timber construction heritage includes several principles that can also be used in modern construction. The most significant difference compared to today’s commercial concrete construction is that wood makes definitely smaller-scale
construction possible. The flexible timber construction system permits small-scale housing solutions at no extra cost. A small timber apartment building in particular is a usable type of building that brings a completely new type of living situated between multi-story apartment buildings and single-family houses. A small-scale wood milieu can be designed according to the idea of old wooden towns. A modern wooden town is a culmination of the modern idea of timber construction, and it should be realized in a modern way. Wood can be used to construct with town-like density, which makes it possible to achieve efficient suburb construction similar to that of the past decades. Because the whole can be made rich and varied, the small-scale timber buildings can be simple and inexpensive. There is also reason to utilize the partial factors of old wooden towns that diversify the yard milieu, such as outbuildings, shelters and fences. Wooden buildings together with wooden outbuildings, shelters and fences make the yard they border a protected uniform-looking milieu.

The timber buildings of a modern wood milieu can be traditionally rectangular and simple in form. The buildings can have plane, sloping roofs and simply ornamented openings. Clear-cut building masses can be enriched by using veranda-like components, such as stairways, balconies, loft walkways and storage sheds. To balance the plain wall surfaces, the supplementary components can be fitted with delicate, light lattice or grating themes. They correspond to the lace-like decoration of old verandas.

In modern timber architecture, wood should be the dominant, main material and its feeling should be emphasized. For this reason, wooden façades should have a bold texture, as often is the case in old architecture. Wood should be used in different ways, with different surfaces emphasized using varied textures and colors. Wood surfaces are traditionally protected with paint.

There is also reason to follow the tradition of timber construction in matters related to long-term durability and structural protection. Sloping roofs, extended eaves and a high foundation also belong to modern timber architecture. The wood facing should be sufficiently thick, cut ends should be protected and wood surfaces should be coated with paint. Repainting should be taken into consideration when selecting the paint treatment. In this sense traditional paints are good, because they wear away and repainting can be done without difficult removal of the old layer of paint.

As it was mentioned earlier, traditional solutions should not be copied as is. Today we should produce buildings that reflect modern technology. Newness can be shown in timber buildings with the help of more lightweight, delicate details. Modern technology permits the use of larger openings, broad glass surfaces and thin casing profiles. Roofs and eaves can also be made to look lightweight. Modern use of wood on façades includes lattices and gratings, which make the façades look transparent, airy and layered. Also, plywood manufactured with modern technology makes possible modern, sheet-like wood surfaces that show the structure of wood. Timber construction can be combined in suitable proportion with other materials. Especially the use of glass and metal makes it possible to give a building and its details a lighter look.

The best of the new timber multi-story apartment buildings indicate that high-quality timber architecture can be achieved by using modern architecture and by applying examples from traditional timber architecture. The best modern architecture is characterized by a clear-cut structure and visual lightness. A modern look is achieved with lattices and gratings. As long as they are not too large, the building masses can be simple and clear-cut in form.

Figure 2. An example of the modern architecture of wooden medium-rise buildings where examples have been taken from tradition. Kiinteistö Oy Linnakotka, Oulu.
The Department of Architecture at the University of Oulu has participated in research and development work related to modern timber multi-story apartment buildings. One of Finland’s first timber multi-story apartment buildings was constructed in Oulu as a concrete result of this work. The design of this project strived for texturally rich, many-faceted timber architecture where wood is used in various kinds of facings. In Oulu’s project special attention was given to a protected yard. Storage space and car parking spots are situated in wooden outbuildings that border a protected, pleasantly scaled yard that resembles an old wooden town milieu. In conjunction with this project the Department of Architecture realized that it is more important to create modern wooden town environments with the help of multi-story and small timber apartment buildings than to construct isolated timber multi-story apartment buildings. The best features of timber architecture are brought forth when all the surroundings are realized using wooden structures. Accordingly, the focal point of the University of Oulu’s Department of Architecture has shifted to the study of wooden towns and wood milieus. As a concrete result of this research and development work, Oulu’s Modern wooden town, the largest modern timber multi-story apartment building area in Europe, is being constructed in Oulu. In this project an entire section of town will be realized as a new type of wooden town. The old wooden town tradition has been used as an example in designing and planning the area. The area will include about 45 multi-story or small timber apartment buildings with room for 450 – 500 inhabitants. The first inhabitants moved in at the beginning of 2000. The entire area will be completed during the summer of 2001.

REFERENCES