

Protecting Cultural Property Buildings and Saving Forest Resources

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Preface

In the Principles for the Preservation of Historic Timber structures, which was adopted at the 12th General Assembly of ICOMOS held in Mexico in 1999, there is one section stating as below:

Historic Forest Reserves

The establishment and protection of forest or woodland reserves where appropriate timber can be obtained for the preservation and repair of historic timber structures should be encouraged.

Institutions responsible for the preservation and conservation of historic structures and sites should establish or encourage the establishment of stores of timber appropriate for such work.

When the draft of the Principles was discussed at the meeting of our ICOMOS International Scientific Committee on Wood (Wood Committee), I was very much concerned whether the idea of this section would be really effective and practical for each country, but finally I agreed to include this section in the Principles..

The reason why I agreed was that I knew well the tendency of decrease of the big and/or long timbers of good quality, through my almost 70 years' experience from the days of infancy in the master carpenter's family until the days of technical official in the Agency for Cultural Affair of the Japanese Government.

Since then, I have been thinking about how Japan can answer this difficult problem. Unfortunately, I found that the solution would be out of the hand of the Japan/ICOMOS, which is composed of mainly architectural historians and conservation experts. I realized we should open this problem to the gathering of people of knowledge and experience.

Very fortunately, three years ago, an organization, named "the Advisory Committee on the Cultivation of Forest in order to Hand Down the Cultural Heritage to the Future" was established, gathering bureaucracy, familiar with forest policy, both retired and incumbent, technical officials in charge of cultural property building conservation, private experts of conservation, professors of forestry, philosophers, high-ranking Buddhist priest, forest owners, lumber dealers and lumbermen, bosses of construction companies specialized in conservation, and so on.

After lengthy discussion, the Committee recently reached to the publication of interim report. .

A brief history of Japanese architecture and forest

It is presumed that people inhabited on Japanese islands from long time ago, when the globe was at the last stage of glacial period. About ten thousand years ago, the global

warming phenomenon happened. It is supposed that in the frigid days the predominant species of wood would have been coniferous, but in the course of global warming, deciduous broad leaf trees came first, and ever-green broad leaf trees came next. Nowadays, Japanese forests are composed of the mixture of these three kinds of trees.

People built not only small pit dwellings but also tall tower structures from the ancient Stone Age. For the construction, timbers obtained from broad leaf trees were used, because they were easily processed by stone tools. However, with the introduction of iron tools in about 3rd century B.C., coniferous trees were common used as the material of buildings, probably because they could be split by driving iron wedges and processed with spear-shaped iron edge planers. In this stage, people were not conscious of the idea of conserving buildings, but arbitrarily reconstructed when buildings were decayed or damaged. The famous system of regular reconstruction every twenty years, found even today at Ise Shrine, is presumed to show the tradition from the ancient times

.In the 6th century, Buddhism were introduced from the Asian continent, accompanied by new architectural styles and high construction techniques. In the 7th and 8th centuries, Japan had the first prosperous days and huge timber buildings of palaces and Buddhist temples were constructed. As building material, timbers from three species of coniferous tree, cypress, cryptomeria japonica, and pine, were mainly used. In addition, zelkova, a kind of broad leaf tree, were selectively adopted. These four species have been main in the Japanese building timbers throughout the history until recent times.

Just after the first culmination of construction in the 8th century, people realized the idea of maintaining and repairing monumental buildings. However, the preservation of monumental buildings had gradually become difficult due to the stagnation of aristocratic administration and following inner war.

At the end of 12th century, the first warrior's feudal government was established. Big temples founded in the 7th and 8th centuries were revived. Destroyed buildings were reconstructed and damaged ones were repaired. The reconstruction and repair works continued until the middle of 13th century. Indeed this period was the second culmination of Japanese architecture.

Thereafter, Japan experienced the days of stagnation and inner wars again. However, at the top 17th century, another warrior's feudal government was established and peaceful days finally came. Big and splendid temples and shrines were newly established, huge temples since the ancient and medieval times were reconstructed or repaired, and big donjons and residences for feudal lords were newly constructed. This period was the third culmination of Japanese architecture.

In 1868, Japan opened her door to the world and the modern political systems were introduced. In 1899 the first law for the protection of old art objects and buildings

was enacted. The government established an office responsible for the protection of historic buildings. It offered subsidies to the owners when necessary, and dispatched conservation experts in order to design and execute repair works. This system has been taken over to the present Agency for Cultural Affairs. Thus, by around 1960 the majority of monumental buildings had been repaired.

In short, the history shows that Japan had three prosperous times, namely 7th-8th, 12th-13th, and 17th centuries. Huge buildings were constructed, reconstructed, or repaired in these three periods. Repair works of ancient and medieval buildings were carried out actively in the 20th century. Each time rich forest resources were exhausted.

Let me review the history of the Great Buddha Hall of Todaiji, Nara. It was first founded in 752, but burnt down in 1181, and reconstructed in 1195, burnt down again in 1567 and, after 42 years gap, again reconstructed in 1709. The modern repair work of this present Great Buddha Hall was completed in 1913.

It should be remembered that the intervals of reconstruction or repair were around 300-400 years. From this history and experience, we are reminded that Japanese timber buildings should be repaired periodically, every 300-400 years, preferably every 300 years.

In 7th-8th centuries, timbers for the construction of palaces and temples are presumed to have been taken from the surrounding areas of the capital city, Nara, maybe within 100 km. In the 12th-13th centuries, forests around the capital city had been almost exhausted and timbers must have been taken from more distant areas. Timbers for the revival of Todaiji were obliged to be taken from Suoh Province, nearly 450km west of Nara.. In 17th-18th centuries, longest beams of the great Buddha Hall were cut down on the mountainside of Satsuma Province, the southern end of Japanese main islands, and lumbers were transported 600km on the sea.

This anecdote tells us that most of the main Japanese forests composed of big and tall cypress and cryptomeria were exhausted in the 17th century.. Then the government worried this poor condition, and established a large area of forest reserve on the mountainside in Kiso district, located in the middle of main land of Japan. The restriction was so severe that common people could not cut down even one tree inside the forest reserve. However, owing to this restriction naked mountain had again been covered with rich cypress forest. This recovery was mainly the effect of natural renewal, but today we call this forest as simply "natural forest".

This forest reserve was taken over to the modern government. Before the World War II, it was owned by the imperial household, and after the War, it has been cared by the Forestry Agency. The Agency must get income by selling big trees cut down in the natural forest. As a result, nowadays the resources of big trees have become very little in quantity.

Here, the relationship between the construction of huge buildings and the consumption

of forest resources in the course of Japanese history was explained, though in a fairly schematic way.. At the end of this section, I would like to mention one phenomenon unique in Japan. That is the fact that Japan did not use foreign timbers in the historical days, except for several cases. It is the result of geographic situation that Japan is an island country in the east end of the Asian continent.

From the Discussion at the Advisory Committee

Since the establishment of our “Advisory Committee”, members have exchanged their opinions.

First, we proposed several prepositions as the bases of further discussion as follows:

1. We must keep timbers for replacement of same species as those used in the historic buildings under repair. The number of species of timbers composing historic buildings reaches about 20, but cypress, cryptomeria and pine possess majority, followed by zelkova. Among these, pine is under the seriously damaged condition, suffering from the attack of worm, and zelkova does not generally form forest, but is found as an independent tree. Therefore, two coniferous trees, cypress and cryptomeria, which can be fostered as forests with silviculture should be discussed first.
2. We must keep timbers of same quality as those used in historic buildings. Generally speaking, historic buildings were constructed with timbers of excellent quality. It means that timbers with very fine and straight grains are necessary for replacement. The width of annual tree rings shall be less than 1mm. Besides, timbers with no knot or with rare and small knots are necessary.
3. We must get thick timbers. The definition of “thick” should be 45cm or more in diameter. Usually the thickness of standing trees are measured at the level of chest of adult, but in this case the diameter should be determined at the end of long timbers which are after eliminating sapwood. It means that the tree must be as thick as 70 – 80cm or more at the height of human chest. The tree should be at least as old as two hundred years or more.
4. We must keep long timbers. The length should be, in our view, 6m.or more.
5. The majority of cultural property buildings have already been repaired in the 20th century. But, when we consider the history of Japanese big buildings, we may find that they will have to be repaired again after 300-400 years, namely in the 23rd and 24th centuries.
6. In conclusion, we need forest reserves of extraordinary thick and/or long trees after 200 -300 years.

The Advisory Committee have had many meetings and made discussions repeatedly. As a result, some useful information for common understanding has been found, but, on the contrary, many difficulties have been uncovered.

The most useful information is a schema which shows the relationship between

building materials and standing trees. So far, architects have been thinking only the size of processed timbers, while those interested in forestry have been considering only the diameter of trees at the height of their chest. Now people can share a comprehensive knowledge.

As mentioned above, the majority of “natural forests” have been already cut down. Now new secondary natural forests are formed with the way of natural change of generation. One of several baby trees which grew from the seeds dropped on the stump, after the survival competition, win and stretch its root deep into the decayed stump and become the secondary generation of the forest. It is really a emotional phenomenon, but it takes much time and has no guarantee of success. In some forests, it is reported that the species are changing to another, for example, cypress forest, after clear cutting, is changing to that of Japanese arborvitae, probably because of the sudden increase of daylight.

Contrary to the exhaustion of natural forests, Japanese mountainsides are fully covered by young artificial forests. After the War, the Japanese government encouraged people to reforest on the naked land. Owing to the efforts, nowadays we can find here and there 50-60 years old (young) forests of cypress and cryptomeria. It might be imagined that when these young forests grow up to 200-300 years old forests, our posterity can easily get big and long timbers suitable to the replacement for cultural property buildings.

However, these young forests are now facing to very serious situation. In these artificial forests saplings were planted closely. They will be thinned out gradually, and finally remaining trees will be cut clearly after 60-80 years,. This is the ordinary cycle of artificial forest. During this term of silviculture, frequent cutting of underbrush and periodical pruning of offshoots should be taken. When saplings were planted just after the War, it is expected that slender thinned-out lumbers can be sold as the material for scaffolding or stay of trees in the parks and on the roadsides, and final clearly-cut trees shall be sold as the material of commoners’ timber dwellings. However, unfortunately, due to the sudden change of social life, traditional style timber buildings are decreased in number, and scaffoldings have been changed completely to steel ones. Moreover, due to the shortage of forestry workers, pruning has not carried out. If pruning is not executed, a number of branches remain on the stems, finally making ugly knots. Timbers can not be sold in high price.

There are many problems in the course of cutting, transporting to the market and lumbering. In old days, trees were cut and taken down to the stream in the form of long lumber and put together to the rafts and transported to the markets. This transportation on the water took much time, but during this time the surplus sap and resin were gone out, making the best condition for the carpentry works.

However, nowadays, trees are cut into standardized short lumbers at the spot immediately, brought to the collecting place by helicopters and transported to the

market place by tracks. Lumbers can be transported speedy, but there is no time long enough to remove sap and resin. There is problems also at sawmills. Skillful sawyers have already disappeared and even belt saws are nowadays rear.

Thus, the process of distribution of wood has been completely changed to modern style. It is one of the reasons why big and long timbers have become difficult to get.

Another difficulty is that it takes much time and efforts to foster trees. In order to get one big and fine tree, forest owners must bring up many similar trees around it, and in order to make such group of trees it is necessary to plant much more young saplings. And yet, nobody knows whether a best quality tree could be get or not.

Some forest owners are eager to keep big trees for their posterity, but they are worrying about the tax which must be paid at the time of inheritance.

Another idea for keeping forest reserve is that temples and shrines take the role of forest owners. In fact some big temples and shrines are seeking for this way. However, at the moment, they do not have the know-how of silviculture, and it is not clear if these home-made timbers will be useful. for the future repair works of cultural property buildings owned by themselves.

Conclusion

Japanese cultural property buildings have been preserved by applying repair works periodically. Whenever the buildings are repaired, some decayed and damaged parts must be replaced by new timbers. Of course, nowadays, we are trying to minimize the quantity of replacement timbers, but it is indispensable to replace timbers to some extent.

In order to secure future supply of replacement timbers, saving forests is of urgent importance. Therefore, protecting cultural property buildings and saving forest reserves are closely linked. However, saving forests requires many difficulties.

The activity of our Advisory Committee is reaching only just the middle point. We should continue every efforts aiming at final best solution

Thank you..