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研究課題名（和文） 中央ヨーロッパの木造架構における棟持柱構造の原形と変容に関する形態史的研究

研究課題名（英文） A morphological study on origin and transformation of ridge-supporting post in the central European wooden structure

研究代表者

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研究成果の概要（和文）：本研究は、中央ヨーロッパの棟持柱構造を形態史的観点から探求した結果、日本と中央ヨーロッパとのあいだに、木造架構の原形と変容に関するたかい類似性がみとめられることをみとおした。とりわけ、本研究が調査したフィールドである、南ドイツ、スイス、オーストリア、北イタリアで、そうであった。まず、原形を、考古学的発掘遺構と岩壁線画と建築遺構から把握した。つぎに、原形をふまえて、その後の変容を、ドイツ語圏での既往研究から把握した。本研究の成果は、棟持柱構造が建築形態の生成元と位置づけることができる、という予想である。この予想は、ひろくユーラシア大陸にあてはまるものであり、今後、アジアを検証するうえでの見通しになる。本研究の最大の成果は、ユーラシア大陸へ、棟持柱構造を祖形とする観点があてはまる、という確実な予想をえたことにある。

研究成果の概要（英文）：The research has got the important perspective that the strong similarities could be seen between Japan and Europe in terms of the origin and transformation of wooden structure as the result of morphological study on the ridge-supporting posts in central Europe. Particularly the similarities could be seen in the field surveyed by the research such as southern Germany, Swiss, Austria and northern Italy. Firstly the origin of wood structure was made clear by archaeological documents, rock art and building remains. Secondly the transformation of wood structure was made clear by the academic report particularly written in Germany. The research can point out that the ridge-supporting structure is morphological element of wooden buildings through centuries. The hypothesis is applicable to the field called Eurasia continent that comprises Europe and Asia. It becomes clearer under the next survey in the field of Asia. The biggest result done by the research is that the origin as ridge-supporting structure is highly applicable to the Eurasia continent.

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1. 研究開始当初の背景

本研究開始当初の背景として、まずあげなければならないのは、2001年度～2003年度科学研究費補助金基盤研究(C)(2)「中世後期から近世に至る掘立棟持柱構造からの展開過程に関する形態史的研究」がある。この研究については、成果報告書を平成17年(2005)5月にまとめ、各方面に配布した。この研究は、従来、おもに日本建築史の分野で、とくに戦後になってから常識化されたさまざまな内容を個々にくつがえしていく内容をふくんでいる。

この研究をすすめているときから、本研究の構想は、すでにめばえていた。実際、南ドイツ、スイス、オーストリアを調査した初年は、平成13年(2001)12月であった。他方で、日本の建築史研究や考古学的発掘成果を根底から再検討する作業も、この研究でおこなっていた。この作業が、本研究を推進するうえでの原動力になった。

というのも、戦後の研究では、棟持柱が木架構の祖形である、という観点がながしるにされていた。しかし、戦前の研究をみなおしてみると、この観点が積極的に提出されていたことを発見した。この作業をふまえて、すくなくとも日本に関しては、棟持柱構造が木架構の祖形である、と判断して良い、という結論をえた。

本研究は、はたして、ヨーロッパの木架構ではどうなのか、という問いが研究当初の基本的な背景である。

2. 研究の目的

本研究の目的は、木架構をもつ建築の原形と変容を棟持柱構造という観点に即して形態史的観点から捕捉することである。とりわけ、中央ヨーロッパを対象とした形態史的考察を目的としている。

3. 研究の方法

以上の目的を遂行するうえで、本研究は、日本を対象にえた知見を土台に、棟持柱構造を祖形とする論点がヨーロッパに対して、どの程度、妥当するのか、という観点を方法の主軸にすえた。とくに、木架構がおおく遺存し、いまでも木造建築がたくさん生産されている中央ヨーロッパをあつかった。

中央ヨーロッパと日本との類似性を指摘することができるならば、つぎは、ユーラシア大陸という対象を、棟持柱構造に即してあつかうことができる。

本研究が採用した方法の特徴は、日本列島に近接する東アジアを対象にすえる前段に、ユーラシア大陸のはるか西方のヨーロッパをあつかった点にある。

具体的な方法は、考古学的発掘資料、岩壁線画(いわゆる rock art)、建築遺構を渉猟する作業をつうじて、棟持柱構造に関連する事例を収集していくことにある。他方で、棟持柱構造に

関連する既往研究をドイツ語文化圏のなかから渉猟していくことにある。さらには、イタリア語、フランス語による既往研究を渉猟していくことにある。

4. 研究成果

まず、ドイツ語文化圏(南ドイツ、スイスの一部、オーストリアほか)を対象として調査研究では、考古学的発掘資料、岩壁線画、建築遺構が、おどろくほど、棟持柱構造とふかい関連をしめしていることを確認した。このことは、ドイツ語でしるされた数々の既往研究からも、あきらかになった。

現在のドイツ語文化圏は、中世以降に形成された領域なので、これに即した知見は、先史にまでさかのぼったとき、有効でないだろう。それゆえ、木架構の原形を、現在のドイツ語文化圏のみに即して、捕捉した研究成果は十分とはいえない。それゆえ、イタリア語文化圏やフランス語文化圏などの知見をふくめていく必要がある。

では、以下に具体的な研究成果を提示する。

平成22年(2010)6月にイタリア北東のふるい小都市リヴァ デル ガルダ Riva del Garda で木造技術に関する国際会議が開催された。本研究の成果をこの会議で発表した。以下では、この成果である「ヨーロッパと日本における木架構の形成過程に関する類似性」を、紙面の関係上、図版を割愛して、掲載した。図版をともなう詳細は、SOME SIMILARITIES ON THE MAKING OF THE TIMBER-FRAMED STRUCTURES IN EUROPE AND JAPAN VIA THE EXAMPLES WITH RIDGEPOLE-SUPPORTING POSTS, WCTE(World Conference on Timber Engineering)2010 Proceedings, Riva del Garda, Italy, 2010(参考文献〔学会発表〕2)を参照されたい。

なお、平成22年度には、2001年度～2003年度科学研究費補助金基盤研究(C)(2)「中世後期から近世に至る掘立棟持柱構造からの展開過程に関する形態史的研究」を改訂増補したものが、学術図書として採択され、平成23年(2011)2月に刊行された。土本俊和『棟持柱祖形論』(中央公論美術出版、2011年)である。

SOME SIMILARITIES ON THE MAKING OF THE TIMBER-FRAMED STRUCTURES IN EUROPE AND JAPAN VIA THE EXAMPLES WITH RIDGEPOLE-SUPPORTING POSTS

Toshikazu Tsuchimoto

ABSTRACT: This paper traces some similarities between Europe and Japan in terms of the making of the wooden structures particularly via the

examples with ridgepole-supporting posts. The main similarities can be seen through the two transformations. The first is from 'Pfahlbau' to 'Schwellebau' in Germany and in Japanese from 'Horitate' to 'Dodai'. 'Pfahlbau' and 'Horitate' have posts that are fixed directly in the earth while 'Schwellebau' and 'Dodai' have posts that are on ground sills on the earth. The second is from 'Firstständerbau' to 'Stockwerkbau' in Germany and, in Japanese, from 'Munamochi' to 'Odachi'. 'Firstständerbau' and 'Munamochi' have posts that support a ridgepole or purlins directly on the earth while 'Stockwerkbau' and 'Odachi' has posts that support not a ridgepole but beams.

KEYWORDS: *timber-framed structure, ridgepole-supporting post, ground sill, central Europe, Japan*

1. INTRODUCTION

This paper traces some of the similarities between Europe and Japan in terms of the making of the wooden structures particularly via the examples with ridgepole-supporting posts.

The central Europe is chosen that includes European Alps. The region has been supplying so many timbers that it has very long tradition of wooden structures. On the other hand Japan's central mountain region is chosen. The region has also been supplying so many timbers to buildings that it have very long one. Both the traditions at present belong to one of the peripheries where old structures can survive.

The paper shows that both the traditions have many similarities especially in terms of timber-framed structures that are composed a part of wooden structures. The paper provides some examples of the similarities both in the two regions.

Firstly the paper refers to the academic papers especially of the general viewpoints that show transformation model from the old structure to the new one. A. Zeppelius and R. Weiss are chosen in the central Europe while K. Mita and T. Tsuchimoto are chosen in Japan.

Secondly the paper depends upon the archaeological remains of houses and villages. Good examples can be seen in the archaeological academic reports from the paleolithic to the medieval. Thirdly the paper glimpses the remains of rock art. For examples in case of Europe the rock arts in Capo di Ponte located in the north Italy

suggest the pre-historic wooden structures. In Germany one is from 'Pfahlbau' to 'Schwellebau' and second is from 'Firstständerbau' to 'Stockwerkbau'. Such sort of long and wide viewpoints should be much required in the fields of wooden structures in order not only to understand the deep background of our traditions but also to create the new structures from our traditions.

Thirdly the paper depends much upon the architectural remains of vernacular ones that succeed the old structures from the past. It reports the surveys done not only in Japan's mountain regions, that are located in the centre of the Japan's main island, but also in the central Europe that includes southern Germany, Swiss, Austria and northern Italy. Particularly the good examples are provided from the open-air museums. For examples in case of Europe the open air museums that has good examples are Beuren in Germany, Ballenberg in Swiss and Stübin in Austria.

In conclusion the paper provides the hypothesis of the making of the timber-framed structures from the paleolithic to the contemporary both in the central Europe and in Japan. It stresses the high degree of the similarities between them. The main similarities can be seen in the two regions through the two transformations.

2. SOME TRANSFORMATION MODELS

2.1 CENTRAL EUROPE

2.1.1 Model in the central Europe by A. Zeppelius

One of the oldest wooden structures in Europe is 'Pfahlbau'. Aderhalt Zeppelius showed some transformation models of wooden structure from the oldest paleolithic time. Fig. 1 has four types. Type a and b relates to 'Pfahlbau'. Fig.2 is one of the reconstruction models of 'Pfahlbau'. It depicts the posts standing in the earth support the ridgepole directly.

2.1.2 Model in the central Europe by R. Weiss

Richard Weiss showed the transformation model from the 'Ständerbau'. Top of fig. 3 relates to 'Pfahlbau'. The bottom of fig. 3 is 'Fachwerkbau' in Germany that has been evaluated from 'Pfahlbau'. The first step is to take 'Schwelle' (ground sill) at the feet of each post.

He also showed the transformation model in terms of the making of the roof truss in

Swiss. The bottom of fig. 4 is 'Reines Hochstuddach' that relates to 'Firstsänderbau'. The posts in the bottom of fig.3 stand on the earth and support a ridgepole directly. But in the middle of fig 4 the post are not on the ground but on beams. It means that the original posts have been cut and the rest of the posts has remained on the beams.

2.2 JAPAN

2.2.1 Model in Japan by K. Mita

Katsuhiko Mita showed the transformation model of fig. 5 in 1942. The first of fig. 5 has only a roof truss and two ridgepole-supporting posts. The second of it has not only a roof truss but a frame, and has three ridgepole-supporting posts. The third of it has three posts. Two of them at gable end are ridgepole-supporting posts but one of them are not a ridgepole-supporting post. It means that the post has been cut and rest of the post has remained on the ground.

2.2.2 Model in Japan by T. Tsuchimoto

Fig. 6 is a transformation model in Japan by the author. The model deals only sections of the smallest house.

The model has two main structures in the left of fig. 6. One is the 'sasū structure' with ridgepole-supporting posts (left above). Another is the 'sasū structure' with no ridgepole-supporting posts (left below). First one has various evolutions while second one has only a simple evolution. The 'sasū structure' with ridgepole-supporting posts (left above) is similar to the top of fig. 5 by K. Mita that has only a roof truss.

Later the structure (left above) has not only a roof truss but a frame but still has ridge-supporting posts. And then the ridge-supporting posts have been cut and remained in its roof truss. Lastly the structure has comprised a roof truss and a frame with no ridge-supporting posts. The last evolution is depicted in the right of fig. 6.

On the other hand, the other structure (left below) has transformed directly to the structure comprising a roof truss and a frame only with no ridge-supporting posts (right below).

3 TWO MAIN TRANSFORMATIONS

3.1 'PFAHLBAU' to 'SCHWELLEBAU'/'HORITATE' to 'DODAI'

The transformation from 'Pfahlbau' to

'Swellenbau' is one of the two main transformations in the central Europe. The transformation from 'Horitate' to 'Dodai' is also one of the two transformations in Japan.

These two transformations in the central Europe and in Japan have similarities that relate to the foot of each post. Both the transformations are dynamics from the posts of fixed end on ground to posts of hinged end on ground. 'Pfahlbau' and 'Horitate' have posts of fixed end on ground while 'Swellenbau' and 'Dodai' have posts of hinged end on ground. In other words, 'Pfahlbau' and 'Horitate' have posts that are deeply in ground at the bottom of them, while 'Swellenbau' and 'Dodai' have posts that are on sill on ground at the bottom of them.

3.2 'FIRSTSÄNDERBAU' to

'STOCKWERKBAU'/'MUNAMOCHI' to 'ODACHI'

The transformation from 'Firstsänderbau' to 'Stockwerkbau' is the other of the two main transformations in the central Europe. The transformation from 'Munamochi' to 'Odachi' is also the other of the two main transformations.

These two transformations in the central Europe and in Japan have also similarities that relate to the ridgepole-supporting posts. Both the transformations are dynamics that the ridgepole-supporting posts are disappearing step by step gradually. 'Firstsänderbau' and 'Munamochi' have posts that comprised ridgepole-supporting ones only while 'Stockwerkbau' and 'Odachi' have no ridgepole-supporting posts. In other words, 'Firstsänderbau' and 'Munamochi' have posts that support a ridgepole from the ground directly, while 'Firstsänderbau' and 'Munamochi' have posts that support a ridgepole not on the ground but on beams.

3.3 Similarity in both regions

The similarities between in Europe and in Japan depend upon the two main transformations. The first ones depend upon the evolution from the fixed end to the hinged end at the bottom of posts. Second ones depend upon the evolution from the structure with ridgepole-supporting posts to the structure with no ridgepole-supporting posts.

4 EXAMPLES

4.1 Prehistoric forms

The examples in the prehistoric remain both in the central Europe and in Japan.

Firstly rock art in the central Europe depicts the prehistoric houses. Some of them show a small house with ridgepole-supporting posts. Fig. 7 has two houses that have ridgepole-supporting posts. Fig. 8 is one of typologies by E. Savardi. Ridgepole-supporting posts can be seen in the section of central top, right top and right bottom. These examples are important documents that suggest the existances of ridgepole-supporting posts during the prehistoric periods in the central Europe.

Secondly in Japan the depictions on the big bell called 'Doutaku' show an upper-class house with ridgepole-supporting posts. Fig. 9 has a house that have two ridgepole-supporting posts. The example is an important document that suggests the existances of ridgepole-supporting posts during the prehistoric periods in Japan.

4.2 ARCHAEOLOGICAL REMAINS

Archaeological remains show the plan of houses and the condition of the end of each post.

Fig.10 is one of the examples that show both layout of buildings and post pits. The building at the right bottom has the post pits at the centre of their plans that suggest that ridgepole-supporting posts stand in the buildings. The post pits themselves suggest the condition that the bottom of each posts are fixed end in the ground. The building of right bottom has ridgepole-supporting posts with fixed end.

Fig. 11 is one of the examples that show both layout of buildings and post pits in Japan. There are a lot of small buildings. Most of them suggest the existances of ridgepole-supporting posts with fixed end.

4.3 ARCHITECTURAL REMAINS

4.3.1 Architectural remains in Central Europe

The architectural remains are important documents that show the structure of the buildings.

Fig.12 is an example of storages in Beuren in Germany. It has sills on the ground and ridgepole-supporting posts.

Fig. 13 is an example of vernacular houses in Kolliken in swiss. Sills on the ground and ridgepole-supporting posts can be seen.

4.3.2 Architectural remains in Japan

Fig.13 is an example of vernacular houses in Japan. Sills on the ground and ridgepole-supporting posts can be seen.

Fig. 14 is an reconstructed section of vernacular house in Japan. Big ridgepole-supporting posts can be seen but sills on the ground can not be seen.

5 CONCLUSIONS: ORIGINS OF WOODEN TIMBER-FRAMED STRUCTURE

Origins of wooden timber-framed structure have several roots in the world. Yet, dominant origin belongs to the structure with ridgepole supporting posts fixed in the ground. The main reason why the structure can be said to be dominant origin is that the structure can be seen both in the central Europe and in Japan from the very early Stone Age. Eurasian continent has been a stage for making of the timber-framed structure.

The very long tradition on the continent seems to have been created through the succession and spread from men to men.

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