

PhD Degree Theses

**ARCHITECTURAL ROLE OF WOOD IN THE PAVILION
BUILDING OF WORLD FAIRS, ESPECIALLY THE EXPO-S
OF THE TURN OF THE MILLENNARY**

Zsolt Eke

University of West Hungary
Sopron
2010

Made:

in the Cziráki József Doctoral School of
Wood Science and Technologies of the
University of West Hungary
(head: Dr. Dr. h. c. András Winkler)

within the Ph.D Program F3 Wood Structures
(head: József Szalai CSc)

Sciences:
architect sciences

Advisor:
Dr. habil. Gábor Winkler DSc
Professor

The researches underlying the thesis were made by the
scholarship of the Universitas – Győr Foundation

ARCHITECTURAL ROLE OF WOOD IN THE PAVILION BUILDING OF WORLD FAIRS, ESPECIALLY THE EXPO-S OF THE TURN OF THE MILLENNARY

Though the timber architecture has a rich literature and a number of books and studies deal with the world fairs, during my research I could find no product describing the architectural connection between the world fairs and wood. However, the history of EXPO-s is accompanied with wood as a building and architectural mean from the beginning.

The detailed study of the EXPO architecture made it obvious for me that it is worth to examine the architecture of the world fair pavilions under a microscope from this aspect.

1. Significance of the research project, set aims.

Presently the architectural role of wood, the reasons and possibilities of its application and the artistic expressiveness hidden in it are not adequately exposed and known. Study of the special, representative field of timber architecture, the architecture of world fair pavilions can establish the basis of a new kind of processing, systematization which can be extended to the whole bulk of the timber architecture.

It was an important aspect for selecting the research projects to have some Hungarian concerns. The world fairs of "A" category organized in the period of the turn of millenary Hungary participated and participates with pavilions getting high international success all of which can be considered as the pearls of the timber architecture. The main point of the present thesis consists of the analysis of these pavilions, the whole bulk of it is the examination of the buildings with significant timber architectural values of the relevant EXPO-s.

The basic objective of the research was to find the reasons and role of the architectural application of wood in building world fair pavilions, then having

this knowledge to create a new systematizing theory of academic value which was suitable for processing the material of research.

2. Setting up of the thesis, research methodology

The thesis was set up by means of “approximation” methodology. After processing the general knowledge, basic information necessary to the project the architectural world of the world fairs under review and then the specific buildings and the role of wood in their architecture got into focus. In the thesis the analyzed buildings were grouped according to the 3 EXPO-s called them into being. These 3 world fairs formed the main sections of the thesis. Within these groups the description of the pavilions were ranged on the basis of the set up complexity index from the lower intensity to the higher one. At last a comparative table was made on the examined pavilions in which the order of all described pavilions was determined.

3. Hypothesis

As during the examinations I had the consequence that no accurately definable dividing line could be drawn between the different application methods of wood, I created a so called complexity index. I assumed that this index would be suitable for the comparative evaluation of the world fair pavilions produced by means of the toolbar of the timber architecture.

The elements of the index crystallized during processing of the wood using pavilions of the studied EXPO-s. After systematizing these buildings, summarizing the role of their wooden components, the following five relevant grouping aspects could be clearly differentiated:

1. Role of wood as a supporting structure
2. Ecologic role of wood
3. Aesthetic role of wood
4. Traditional role of wood
5. Symbolic role of wood

The following degrees were set up within the elements:

- no (0 point)
- observable (1 point)
- less significant (2 points)
- significant (3 points)
- crucially significant (4 points)

For setting up the number of degrees it was an important point of view to guarantee the differentiating ability and appraisability index generated by them. In order to define the uniform rate of the degrees assigned to the index elements they are defined in the thesis detailed.

The index:

Role as a supporting structure	Ecologic role	Aesthetic role	Traditional role	Symbolic role	Complexity index

4. Summary of the research results, theses

Thesis I

Academic problem

The architects designing the world fair pavilions often avail themselves of the possibilities of wood as a structural, architectural material, expressive tool. The motivations of this behaviour have not revealed yet.

Thesis text

During the research, analyzing the large number of studied buildings it was stated that the motivations of wood application in the architecture of world fair pavilions were the following:

1. Wood as traditional building material for some nations

- 1 a) It can be well observed that in the countries– where the architecture of the 20ies century is internationally acknowledged - which are rich in wood and traditions of timber architecture, the architects apply wood as emphasized elements for the architectural design of their pavilions.
- 1 b) In the products of the architects of these countries wood appears – both as material and in its comprehension – not only as a copy, but re-interpreted in the language of contemporary architecture.

2. Copying representative timber buildings of national, folk and sacral architecture

- 2 a) Such copies of their representative timber buildings are built in those - mainly South-East Asian – countries which were identified with symbolic force by their preterit products of high architectural level and where the contemporary architecture is not full-fledged to do the same.

The society of the South-East Asian countries – looking backwards to millenaries – is significantly saturated with religiousness (mainly Buddhism). Together with the large volume of tropic wood species at site which is suitable for building and ornamenting, this religiousness resulted in a specially decorated, exotic architectural diction which perfected itself in the field of the sacral architecture. A significant part of the domestic income of these countries is from tourism which generally identifies them with the above architectural image. For those countries which have no considerable contemporary architecture it is reasonable to represent themselves in the world with buildings of well-known effect in order to avoid the risk of experimentation.

- 2 b) Additionally this tool of building a “copy” is used also by those, generally also “exotic” countries where a laic building type famous all over the world (e.g. Polynesian residential house) became their “trade-mark” and the architectural language of the end of 20ies century is not spoken confidently.
- 2 c) Traditional timber buildings of some countries having generally an origin of folk architecture, are for only to “garnish” the function in them (e.g. Polish tavern) intimately. Their message is less emphatic than that of their “accommodated content”.

3. Wood as a medium for mythological, symbolic messages

The pavilion designed by Makovecz of 1992 used wood expressly as a multiple symbol. In addition to their supporting role the glued wooden girders are like ribs in a human chest. The “wooden being” standing in the glass floor which “sings downwards and upwards forced to a vertical communication”, makes a mythological connection between brightness and under-earth darkness.

4. Wood as fashionable membrane

There is a group of pavilions for which the designers of the buildings use wood as a kind of user-friendly, warm covering material of comfortable, aesthetic appearance. Though in the architectural image of these pavilions the wood material has a significant role, it hasn't any deep, symbolic meaning.

5. Wood as supporting structure

- 5 a) Due to the introduction of glued plywood girders it became possible and a pleasantly applied constructional solution to bridge large distances – which are typical in the architecture of pavilions – with wood without any shoulder.

5 b) In addition to their structural advantages the glued timber girders have a significant aesthetic effect so it is reasonable to use them for an international competition.

6. Wood as a reusable, ecologic material

Towards the end of the 20ies century the sustainable architecture having larger and larger emphasize, the application of recharging building materials, the expressly temporary character of the world fair pavilions and the moderation of the costs aimed to the EXPO of the relevant country aroused hardly new ideas in several architects. The Swiss and Japanese pavilions in Hannover EXPO are typical instances of this architectural approach. The former one was totally reused, the latter one was made of reused materials from Germany and re-processed after closing the EXPO.

7. Tree as design

Application of trees as the nature, the environment which is attractive for people is a consciously used architectural element for a group of world fair pavilions.

8. Wood is a building material which can be quickly built, worked with simple tools and easily demolished

Some of the typical determinants for the application of the building timber are the temporary character of the world fairs, the narrow time-limit for building, simple accommodation to the modification becoming necessary during the building work, availability "abroad" and easy dismounting after closing the world fair.

9. Wood material according to the EXPO motto

You can specially observe the architectural application of wood with preference connecting to the motto of the EXPO Hannover in 2000 ("Man – Nature – Technology"). Architectural descriptions of several pavilions expressly mentioned the consonance of the motto and the wood application.

10. Material usage according to architects

Among the pavilion designers of the examined EXPO-s several architects' professional careers are followed along with the architectural application of timber materials. A number of them were honoured with international awards of timber architecture not at time of designing their EXPO buildings. José Cruz Ovalle, a Chilean architect, the designer of the Pavilion of Chile of 1992 was honoured with the Spirit of Nature award of timber architecture in 2008; Peter Zumthor, the master of the Swiss pavilion in 2000 got the same for his exemplary timber architectural work in 2006.

Wood is the determinant material for the architecture of Imre Makovecz, independently of the date, site or motto of the EXPO of 1992.

Thesis II

Academic problem

Can we set up a systematizing theory, method which is suitable for the comparative evaluation of the world fair pavilions made by means of the toolbar of timber architecture, for measuring the application intensity of wood?

Thesis text

The complexity index is suitable for determining what complexity degree is wood applied with in case of each pavilion.

- II a) The complexity of the architectural application of wood does not depend on the age when the pavilion was produced.
- II b) It can be observed that wood is applied in the contemporary architecture in the most complicated manner for designing their buildings by architects who represent the highest level and strongly connecting to wood emotionally.
- II c) The Far Eastern traditional sacral architecture uses wood as an architectural element at a high intensity level without the appraised presence of the designing architects.

5. Closing thoughts, utilization of the experiences

During the research work it got obvious that expounding the topic and expanding the research field to all organized world fairs exceed the frames of a Ph.D thesis. This fact gives the basis for continuing the research and determines its direction at the same time.

By expanding the complexity index with additional parameters can make it suitable for developing a new academic evaluation system relating to the whole of timber architecture so promoting knowing further and processing this branch of architecture.

6. List of publications

Announcements in scientific journals in foreign language:

- Zsolt EKE: Gems of timber Architecture-Pavilions of Expos
Hungarian Electronic Journal of Sciences (2006)
- Zsolt EKE: 3 hungarian EXPO pavilions – similarities and distinctnesses
Hungarian Electronic Journal of Sciences (2010) – transmitted for publication

Announcements in scientific journals in hungarian language:

- Eke Zsolt: A fa alkalmazási területei a kortárs építészetben egy magyar épület példáján: a győri termálfürdő
Magyar Építőipar (2004) IV. pp. 232-235.
- Eke Zsolt: A harmadik...
Magyar Építőipar (2006) III. pp. 125-131.
- Eke Zsolt: Győr új gyöngyszeme
Értékmentő (2006) No. 5. pp. 14-15
- Eke Zsolt: Megnyílt a győri ÁRKÁD bevásárlóközpont
Építőmester (2006) No. november-december pp. 14-19
- Eke Zsolt: A győri neológ zsinagóga felújításának és faszerkezeti munkáinak rövid története.
Faipar (2007) No. 1-2. pp. 41-43
- Eke Zsolt: Alpárné Dr. Szála Erzsébet, Dr. Winkler András (szerk.): 225 éves a Soproni Evangélikus Templom. A 2009. január 17-én rendezett emlékülés előadásai. Sopron 2009.
Soproni Szemle (2010) No. 1. pp.108-110
- Eke Zsolt: A 2010-es sanghaji világiállítás magyar pavilonja
Faipar (2010) – közlésre leadott