

WOOD AS MATERIAL IN DESIGN OF PAVILIONS

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Summary: *Wood is probably one of the most often worldwide used materials. The contemporary buildings are often designed combining different materials such as brick, stone, earth, straw, glass, steel and concrete. Among all of them only wood offer warmth, specific texture and irreplaceable tactile feeling of cosiness. The contemporary wood industry offer new possibility for different architectural requirements. Increasingly important aspect of architectural design in 21st. century is low cost, sustainable, energy efficient, zero emission of CO₂ and high esthetical value of building. This paper discusses the different typology of wooden pavilions, their aesthetical, functional and structural perception. The aim is to present the important aspect of wood as building material in a perception of rather small architectural building as pavilion in a public places are. These wooden small buildings still hold significant role in design of open public areas (parks, squares). Wood as building material is ecological, sustainable, energy efficient and user friendly, can be from renewable sources and still gives tremendous capabilities of design until recently unimaginable free form shapes.*

Keywords: *Wood, pavilion, public places*

1. PAVILIONS IN OPEN URBAN SPACES

In architectural sense the term "Pavilion" is usually referred to free-standing structure, which could be perceived in urban parks, gardens or in public areas. The function of pavilions is to provide shade, sheltered space for different activities (music, dance, tea, hunt, sport, recreation, rest or gathering) or as specific feature in landscape (sculpture).

Often they are designed as open structures. When they are shaped as closed small buildings (kiosk), the function is oriented to commercial aspects (shops, information desks, renting equipment, traffic stops, etc.). [1]

Since the public places (parks and squares) are spaces for social meetings and pleasure, pavilions with their functions could provide extended quality of urban life.

Urban parks as green oases, designed on principles of landscape architecture (trees, grass, plants, flower beds, water - lakes) without pavilions could be less appealing for citizens. Attractively shaped ephemeral and mobile aedicule could provide aesthetical and cultural identity of open spaces-squares, and eye-catching spots in the town.

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2. PERCEPTION OF PAVILIONS

Light contrast i.e. visualization of figure on the background is the basic principle of perception of any space. At the first sight, the size and shape of the observing object is dominant, while in a second glimpse the colour, material and texture are distinctive. Design principles (symmetry / asymmetry, hierarchy, proportion, dynamic, rhythm, balance, etc.) have important role in a perception. In built environment, the object exterior is the first perception, while interior and details of the structure is perceived as the second picture. [2]

In open shaped pavilions, the interior is closely related with exterior envelope, where the green colour of verdure stands as a background. The columns of pavilions are design in a harmony with the vertical part of a tree, particularly when the structure is wooden.

The colours of pavilions have a significant role in perception: principle of contrast (red - green) is often used in conceptual design of parks. White colour creates an impression of lightness, while dark colours provide visual connection with surrounding trees (Figure 1, Figure 2).

Traditional design of pavilions is usually squared, round (rotunda), hexagonal or octagonal in basis. The fundament base is elevated from the terrain to create platform and to protect the structure from weathering impact. Materials used for open pavilions are traditionally timber and wrought iron.

In traditional concept closed pavilions-kiosks are frequently created on a principle: "form follows function". Materials for these pavilions varied from wood, iron, to brick, stone or concrete.

Used colours depend from effects which designers prefer to achieve.

In a contemporary life open and closed pavilions are designed using free forms thankful to new technological solutions and self-conscious, energy efficient principle of life. Varied modern timber products allow unimaginable forms emphasizing the natural colour and texture of wood.

Thus sculptural formed pavilions create unforgettable images of open spaces in towns.

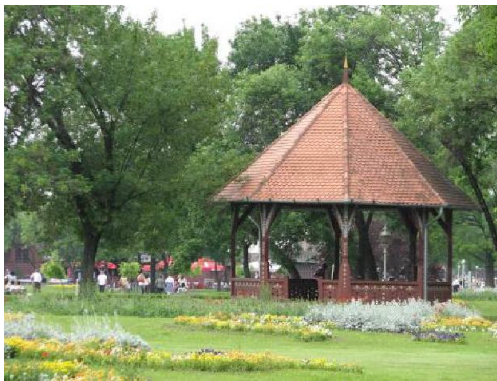


Figure 1. Traditional open pavilion in Palić park, Subotica



Figure 2. Traditional timber white pavilion in Dunavski park, Novi Sad

3. DESIGN OF WOODEN PAVILIONS

The use of wood in pavilion design dated from old China and Japanese architecture, but in European landscape architecture started to spread in early 18th century (with English gardens) and till nowadays has significant importance. Thanks to its natural and tactile beauty, related to its organic origin, as well as to good mechanical properties and easy processing, wood offers a huge possibilities and practical advantages. As a building material it is ultimately energy efficient (in production and use), sustainable, ecological and user friendly, from renewable sources, with great opportunity of shaping and production, so that the application of wood in pavilion design will remain inevitable in the future. Due to modern technology, the nowadays palette of wood based products, apart from the commonly used solid timber, provides standardized quality and increased durability, with possibility to fulfill the strong structural requirements and imaginative architectural demands, oriented to open spaces and free form shapes. Palette of wood based materials includes a wide range of products manufactured in form of glue laminated timber (Glulam), laminated veneer lumber (LVL), different durable panel boards and in form of innovative cross laminated timber (CLT).

Traditional use of timber in pavilion design considers the relatively simple structural system, which consists from columns, beams and rafters, covered by tiles or bitumen shits. Simple basis shape dictates the position of columns. Stability of vertical elements is provided with plugged fence and by struts imitating the branches of the surrounding trees, (Figure 1). Ornaments and changing of cross-section give the experience of natural and plastic perceive. In cases where struts are omitted, the timber lattice in upper zone of structure could be placed in order to increase the overall stability, (Figure 2). Basis of pavilion is elevated from ground in order to increase durability, entrance could be emphasized by few steps and there is no door. Nowadays, following the modern technologies and urban way of life, pavilions get the new meaning. They are placed in urban areas, squares and parking places, sometimes with clear function, sometimes with idea to enrich the urban life with sculptures.

A special type of pavilion-canopies appears in the spa parks, were they are covering drinking fountain with mineral water. In Japan culture there are pavilions for ceremonial tea drinking. Closed pavilions-kiosks are often small size (4-10m²), except in cases where functional programs are developed and when they grow in to the size of a building. Customers are not entering in to kiosk-pavilion, since communication with inside function is through the window-counters. Located in a car park outside Aix-en-Provence, small timber pavilion designed by Jean-Luc Fugier 2011, is an extraordinary pavilion-box structure. The main function of this pavilion is parking attendant's office, a kiosk window, a restroom and a bin. Hyperbolic paraboloid shape of pavilion is achieved with wrapped horizontal timber batons (Figure 3). "The apparently simple geometric form hides the kinetic game at play, influencing the way in which one perceives the building and making it difficult to understand". [3] Optimization of a view to parking area in a widest angle is accomplished with an L shape of plan (Figure 4). Two facades with an entrance to restroom, with a ticket machine, information and payment window are protected with a canopy, since the whole pavilion is creating a twisted cube. Transparent horizontal strips between timber batons are illuminated during the dark, when the interior of pavilion starts to be visible more than outside membrane. This

horizontal twisted timber batons, in natural colour of dark wood, are in the same time functioning as a brise-soleils.



Figure 3. Parking attendants' pavilion in Aix-en-Provence, France

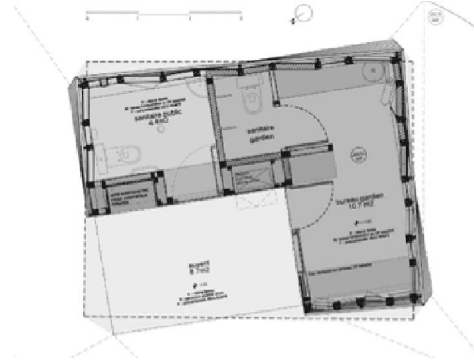


Figure 4. L shaped plan of a pavilion with a twisted timber batons

„Asuntomessut“ in Finland is an annual Housing fair organised each year in different city. Info Pavilion in City Espoo, designed by architect Teemu Seppänen 2006, is used in the construction of modern woodworking-glulam timber product elements (Figure 5). Computer-controlled processing technique allows diversity of three-way curved shapes. The idea was to create a place that does not need a function. The shape of pavilion is a self bearing cube 6x6x6 m, where windows and door openings in walls create an image of cube looking like spider net or bird nest. “Information Bar is displaying a meeting and information point at which the housing fair visitors can get relief from the thirst for knowledge.” [4]

As an experimental project of an automatic cutter, which enables a diverse and irregular shape of the pavilions walls, the purpose of Infobar pavilion was to be a service point for exhibition visitors and customers of houses.



Figure 5. “Infobaari, asuntomessut puupaviljonki“, Espoo, Finland



Figure 6. “Swoosh” pavilion in Bedford Square, London

Student-designed pavilion (Valeria García Abarca 2008), placed at Bedford Square in London, has explored the architectural potential of experimental timber construction (Figure 6). The structure is made from laminated veneer lumber. The main shape of pavilion is a swirling, 60m-wide mechanically jointed grid structure, which wraps itself around a sturdy lamppost and skirts the pavement. Pavilion is designed from timber and consists of vertical curving columns connected with short beams which are spiralling out from a central point of structure. In a middle part of a pavilion (centre) the structure is dense and enclosed, while in the same time the outside part of structure swirled in a spiral and transformed into a benches.

The main idea of using timber as sustainable and ecological material can be understand from student Scoufaridous' comment: "It's part of the detailing and tells the story of the structure. It also means the pavilion can be easily dismantled, stored and rebuilt." [5]

4. CONCLUSION

Pavilions or gazebos, as small buildings in urban open spaces, can provide different satisfaction to a citizens. According to their structure and function, they can be very attractive urban spots - where people of all ages could gladly spent some free time. Having in mind that wood comes from renewable sources, that is sustainable, ecological, ultimately energy efficient in production and use, designers easily decide to utilize its advantages in creating process of pavilion buildings. Natural tactile beauty and good strength characteristics, offer to designers unlimited possibilities in creative shaping of such small buildings. Regardless the typology of pavilions (open or closed), they represent structures of memory and very often identity of a certain place in a contemporary urban life. The beauty of such human creation can provide a sculptural image perceived as different function of a space than it looks like. Very often, the natural colour and texture of timber products are kept for a final surface of structural forms, because the warmth and pleasures of tactile perception of wood. Modern technologies of wood processing offer huge possibilities to designers, so the high aesthetical values of pavilions could be achieved by creative thinking and innovative design.

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DRVO KAO MATERIJAL U PROJEKTOVANJU PAVILJONA

***Резиме:** Дрво је вероватно један од најчешће употребљаваних грађевинских материјала широм света. Конструкција савремених објеката је комбинација различитих материјала као што су опека, камен, земља, слама, челик, бетон и стакло. Од свих набројаних материјала само дрво има посебну топлину, специфичну текстуру и незаменљив тактилни осећај пријатности. Савремена технологија производње дрвених конструктивних елемената нуди могућности за нове и различите захтеве пројектаната. Дрво испуњава и веома важне компоненте изградње у 21. веку као што су економичност, одрживи развој, енергетска ефикасност, нулта емисија CO₂ и потреба за високим естетским вредностима. У овом раду се разматрају различите типологије дрвених павиљона, њихова визуелна, функционална и структурна перцепција. Циљ рада је да се прикажу значајни аспекти дрвета као грађевинског материјала у сагледавању и доживљавању мале архитектонске структуре као што је павиљон. Иако релативно мале, ове грађевине имају битну улогу у дизајну паркова и јавних простора. Дрво као грађевински материјал је производ из обновљивих извора, еколошки, одржив, енергетски ефикасан, пријатан на додир и даје огромне могућности за дизајн и обликовање до недавно незамисливих форми грађевина.*

***Кључне речи:** Дрво, павиљон, јавни простор*