

The analysis of Louis Kahn's Salk Institute by means of a critical analysis grid

LEJLA KARGIĆ

FACULTY OF TECHNICAL STUDIES, UNIVERSITY OF TRAVNIK, BOSNIA AND HERZEGOVINA

ABSTRACT

Research in the field of architecture offers perhaps the most versatile range of topics. However, the methods are sometimes not specifically determined. Therefore, such analysis is usually conducted by means of different value grids / critical analysis grids. Salk Institute is the most prominent building designed by Louis Kahn, often seen as a representative of modern architecture. However, the building has many pre-modern influences visible and despite the initial impression of raw concrete façade, it does have a strong human thread intertwined into all levels of its design. The purpose of this paper is to analyse Louis Kahn's Salk Institute by using the critical analysis grid consisting of 4 key factors: functionality, design, comfort and efficiency and to bring a conclusion that evaluates the validity of the given critical grid.

Keywords: functionality, design, comfort, efficiency, modernism, natural light.

Introduction

The Salk Institute in La Jolla, California, designed by Louis Kahn, was imagined as a home of science by the inventor of the polio vaccine, Jonas Salk. Louis Kahn was chosen by Salk himself, since Kahn was an artist prior to becoming an architect and Salk wanted a masterpiece, "a facility worthy of a visit by Picasso" (Jonas Salk, <http://www.salk.edu/about/history-of-salk/>). Kahn and Salk tightly cooperated throughout the design process, which resulted in creating a building with a striking exterior – raw concrete, but with a logical, appealing and fascinating concept, as well as the interior. This building remains one of the most fascinating masterpieces of modern architecture. Much like the thought that the only worthy homage to the glorious classical architecture is creating present-day architecture in its own unique way, spirit and values, because everything else could only be a phony imitation, Salk Institute evokes certain universal values, but doubtlessly in its unique way. This facility is a proof that classical values can successfully be not only re-interpreted, but also given a new character, combined into a fusion of different influences where the aim is not mimicking the classical values per se, but creating a greater, completely unique outcome.

Architectural values analysis

A question arises from the above paragraph: can modern architecture then be analysed by the classical architecture grid or not? Can the universal, but somewhat general architectural values applicable in all analyses – utilitatis, firmitatis, venustatis, if applied to THE new-age architecture completely evaluate it? The answer is they are always applicable, yet, more specific value factors can and should be adopted for certain analyses. The question of beauty is perhaps the most un-answered and most raised question, especially in art and architecture. Louis Kahn said: "Design is not making beauty, beauty emerges from selection, affinities, integration, love. What stays unchanged is the fact that architecture is identifier of place; only the means of obtaining that status have changed over time. There is also a question of the architectural critical grid factors validity. How to establish them? Many architects and architecture theoreticians have tried to understand and describe what makes an architectural object successful or unsuccessful, valuable or ordinary. Christopher Alexander called it a rather hard-to-define value, "A quality without a name". He implied that

this would be a quality everyone would recognize, universal, non-mistaken, and as clear as black and white, alive or dead. It is hard to name it, but it is easily recognized when present. Such thought is agreed upon by many. Yet, there are always disputes on buildings, often whether it is a masterpiece or a controversy that some even call a crime. It is not the case only with modern and contemporary architecture; some great buildings (e.g. Casa Mila by Gaudi) were frowned upon at the time being constructed, to become highly appreciated years later. Therefore, the question whether architectural values are constant or changing remains open in

this part of the work and perhaps the analysis and evaluation of the given grid will answer this question in the end. The given architectural values grid for this analysis took in consideration four key values: functionality, design, comfort and efficiency. The analysis includes inspection of available materials used for the facility, including written sources, issues the architect dealt with during construction, renowned critics' opinion, photographs, floor plans, sections, facades, materialization, current use practices and prospects for the future. The summary of the analysis is presented in the table below.

Table 1: Critical analysis grid results, source: Author

VALUE	DESCRIPTION	EVALUATION
FUNCTIONALITY	servant and served spaces; successful problem solving; clear lines; adjustability; flexibility; unmeasurable-measurable-unmeasurable phases of design	High level of functionality obtained
DESIGN	clean space, reduced lines, clear geometry; preserving and reinforcing lines of sight; strong views and vistas; strong linear axis between the entrance and the exit; mirrored structures; silence and contemplation; order and symmetry; monumentality; full-void relation and repetition lead to obtaining specific, peculiar rhythm; simplicity of forms, colours and materials; extruded walls create sense of movement in space opposed to monumentality of the structure and materialization; open views to the Pacific Ocean and the water element; the water "line" serves as a tool for pulling the outer space inside the complex; unity	Unique Symbolic Truthful High aesthetic standards achieved
COMFORT	large amount of natural light in all the interior spaces; floor plans reinforce open views; reliability; convenience; flexibility; different materialization in different zones – easy recognition of the "allowed" and the "foreign" zones	High level of comfort both in the interior and the exterior spaces; ease of communication; simplicity of movement obtained
EFFICIENCY	underground spaces illuminated by light wells; natural lighting used as much as possible; open plan laboratory spaces enable future transformation; the used material will not decay easily and requires minimum maintenance	High level of space usage efficiency, energy efficiency and future transformations possibility obtained

Functionality

The well-known discussion whether form follows function or the architect follows the image and idea first is a topic with still open questions. Yet, the idea that form follows function was becoming more and more recognized by modern architects. One of the best-known is Louis Sullivan: "It is the pervading law of all things organic and inorganic, of all things physical and metaphysical, of all things human and all things superhuman, of all true manifestations of the head, of the heart, of the soul, that the life is recognizable in its expression, that form ever follows

function. This is the law." Regardless of the fact that Kahn is a modern architect, these questions will not be discussed here. Instead, it is the Kahn's ingenuity in designing the Salk Institute what matters. The architect literally dismantled numerous different obstacles during the design process. One of them was the question of form and function. Actually, it seems it was not a question for Louis Kahn at all. The final product – Salk Institute reflects an image of a facility created by solving issues on several levels simultaneously and giving equal attention to

all the aspects – function, form, materials, efficiency, comfort... The means by which he accomplished this can be the distinguishing between “servant” and “served” spaces, i.e. those used by humans and mechanical ones, such as pipes or stairwells, with a significant point that utilities go directly through the structure. In conclusion, he was neither strictly modernist, nor formalist, so his design relied on a humanist approach. One word that best explains the whole space concept and functionality in terms of space arrangement is adjustability. The laboratory spaces are clean and can easily be modified in future, which can be characterized as flexibility, a concept crucial in contemporary design.

According to the Visual Dictionary of Architecture, functionality is defined as “being appropriate for natural or proper action for which something is designed, used or exists.” In order for the building to be appropriate for that which it is designed for, but also to have the outcome is what many will admire later. Louis Kahn said that the designer must not forget being realistic during the design process.

“A great building, in my opinion, must begin with the unmeasurable, go through measurable means when it is being designed, and in the end must be unmeasurable. The design, the making of things, is a measurable act. At that point, you are like physical nature itself, because in physical nature everything is measurable—even that which is as yet unmeasured. But what is unmeasurable is the psychic spirit. The psyche is expressed by feeling and also thought and I believe will always be unmeasurable.

I sense that the psychic existence-will calls on nature to make it what it wants to be. I think a rose wants to be a rose. Existence-will, man, becomes existence, through nature’s laws and evolution. The results are always less than the spirit of existence. In the same way, a building has to start in the unmeasurable aura and go through the measurable to be accomplished. It is the only way you can build. The only way you can get it into being is through the measurable.

You must follow the laws, but in the end, when the building becomes part of the living, it evokes unmeasurable qualities. The design involving quantities of brick, method of construction, engineering is ended and the spirit of its existence takes over. The concept of observing the building through unmeasurable-measurable-unmeasurable phases is perhaps the tool by which both high functionality and aesthetics of the building were obtained.

Design

This point in the value grid is very broad and can be analysed through a number of different sub-points. Through Kahn’s opus, his strong sense for preserving and creating lines of sight is visible, which is an important design criterion. Salk Institute is not an exception either. The geometry of the building complex is based on symmetry, which additionally reinforces the views and vistas concept. A strong linear axis between the entrance to the complex and the “exit” (symbolic) to the Ocean exists and enables the direct views.

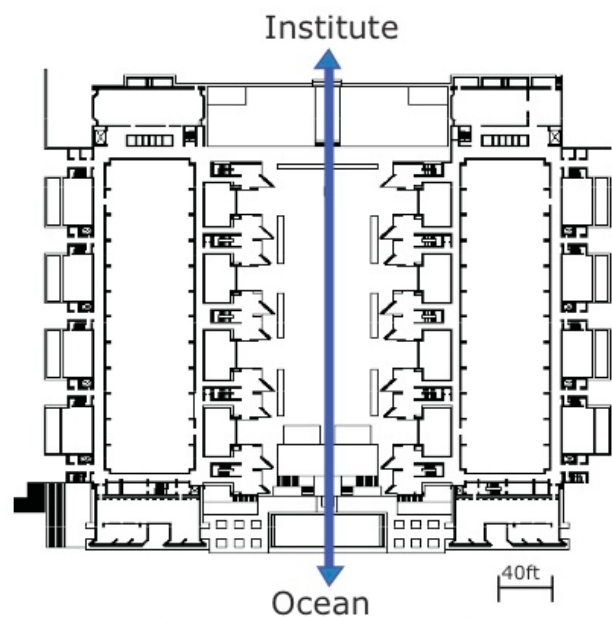


Figure 1: Visual connection through the complex.
Source: <https://arch220.files.wordpress.com/2012/02/salk-institute-hazal2.jpg>, Accessed on 2nd May 2017

The vast and empty plaza in between the mirrored structures reflects the architect’s value for silence and contemplation. The mirrored structures embody order and symmetry. Paradoxically, monumentality is obtained through raw concrete. Such use of this material is another proof of Kahn’s virtuosity.

According to Leslie, one can see Kahn’s “philosophical appeals to such metaphysical values as light, silence, and order”. Silence here is expressed through “void” (courtyard) between full spaces – buildings. It is silence both in rhythmical and experience (live) sense. Additionally, there are no trees, just water, the symbol of contemplation. This can additionally be connected to the image of a scientist in our minds – a person who deeply thinks, reflects, contemplates, and observes, often in silence.



Figure 2: Salk Institute, La Jolla California
Source: http://issuu.com/seasirisilp/docs/louis_kahn_final, accessed on 4th May 2017

Rhythm is one of the key determinants of this building (Figure 2). Repetition of the same form in the building plan and facades evokes the repetition of classical columns. The purpose is to enhance the monumentality effect of the building and reinforce the views from the plaza.

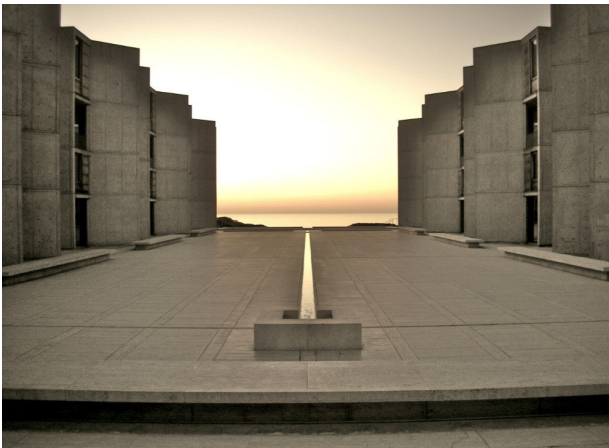


Figure 3: Salk Institute, view to the Ocean
Source: http://home.wxs.nl/~jvansant/z_kahn.html, accessed on 4th May 2017

In the simplicity of form, colours, material and peace of environment, the extruded walls suddenly seem to be dancing in space, which is an unexpected and refreshing moment in the whole concept. Their repetition and such rhythm gives a spiritual and almost zestful vibe to the design and space. Another highlight of the design is open view to the Pacific Ocean and the water element which is contrary to the modernist "ornamentation is crime" slogan. Yet, we cannot say that this design is deprived of ornamentation. Kahn stayed far from the ornamentation in its first meaning, but not from that

of broad, individual and deeper layers considerations. For example, the water element again; it is the utmost ornamentation purpose element here, in an environment of clean space, reduced lines, clear geometry. For Salk Institute, this element is what extensive sculptural ornamentation is for Baroque.

Furthermore, the water "line" serves as a tool for pulling the outer space inside the complex. Using the site characteristics at its best potential is often difficult, but if proper, always rewarding for the project. "Architecture is more to do with making frames than painting pictures; more a matter of providing an accompaniment to life than the dance itself. (...) It is also possible to compose works of architecture, in townscape or landscape, as if they themselves were objects in a picture, maybe to be seen from a particular point of view or ready to be painted by an artist."

Salk Institute is both of the above. The architect "framed" the fragment of the Ocean view by two mirroring structures and the courtyard. The framing also contributes to the element of silence, both physically and psychologically. Framing seems to be Kahn's speciality; a similar effect can be observed in his National Assembly Building in Dhaka, Bangladesh, where the effect is somewhat widened to "controlling the space", or shaping it.

By designing the Salk Institute, Kahn also composed a picture consisted of several elements: two facilities, vast courtyard, water element in it and its perhaps subtle, but strong psychological relation to the surroundings. Louis Kahn said: "Architecture is the reaching out for the truth."

Now, how much more truthful than they are could the raw-concrete facades be? Such finish (or lack of it) can be correlated to the Georges Pompidou Centre's philosophy. What is, should be seen as such. Even the formwork marks on concrete were left visible. Apart from the maintenance role described in the following paragraphs, such choice of material has other design purposes as well.

As emphasized above, using the site characteristics to their limits, regardless of whether in full compliance, or finding a reasonable contrast to it, but with sense, reinforces both the design and the nature, which so become support one for the other. The Salk Institute case is such, since a rather dull material, concrete with no finish, only emphasizes the beauty of the surrounding nature. Additionally, the building may seem to have followed the "Less is more" slogan.

However, I think that it is the building's character what defined it as it is, not the above mentioned slogan. If we imagine (or see) the building in different environment, under somewhat changed conditions, e.g. at night, the light and shadows are its modifiers and key properties of its design.

At the same time, the courtyard stays as mediator, as the antithesis to the sky above. In conclusion, it is important to emphasize that none of the elements and motifs used are there per se. Each movement has an explanation, cause and consequence, reasoning. For example, the monumentality which the architect himself spoke about might seem to mimic the classical architecture at first sight. On the contrary, it only praises the means by which it was obtained in the past – materials, scale, rhythm (and columns, here obviously left out with reason).

In the past, temples were the most monumental types of buildings. The real reason for creating such atmosphere in the Salk Institute is the Story of the building. It is imagined as a temple, shrine of science where all those seeking knowledge and who can benefit humanity can come and “pray” – learn and produce. Through our formal architectural education, our teachers and assistants have always emphasized the importance of such design approach. Therefore, I highly value it and conclude the Design point of analysis with praise to reasoning in design process that yielded the immeasurable values.

Comfort

Comfort can be observed as a measurable and unmeasurable value. It has its objective, easy to define part and the subjective one, changeable from person to person. The building exterior's key determinant is concrete, which is somewhat brutal and raw, both objectively and subjectively. In contrast, the interior satisfies users' comfort needs; the material used is wood. However, comfort in the exterior space is reflected in a vast courtyard, the water element in it and views to the ocean. Kahn respects the space immensely; the sense for views and vistas is visible in many of his works, perhaps the best being the Four Freedoms Park, where we can see the same element of approaching a distant point in space, as in Salk Institute with the water element in the courtyard. In the interior, comfort for all users is visible in a large amount of natural light in all the spaces of the building. The architect's passion for natural lighting is well-known and present in his many works. However, this case was a real energetic struggle for each beam of sunlight, more described

in the following section, Efficiency, both with purpose to save the energy, but also to bring comfort to people, because that is what will bring the people to the building. Furthermore, the floor plans are such that they enable excellent viewpoints to and from the standing points, which offers a sense of reliability and comfort and is convenient for academic purposes buildings.

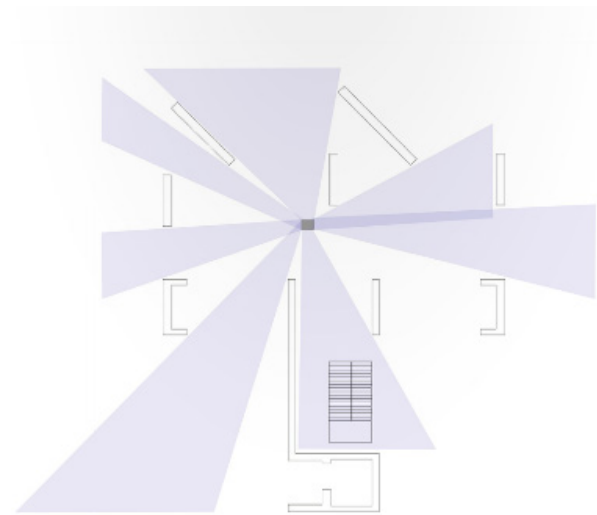


Figure 4: Floor plan 1; viewpoints diagram

Source: http://issuu.com/seasirisilp/docs/louis_kahn_final, accessed on 2nd May 2017

In order to additionally differentiate between served and servant spaces, Kahn used different materials in different zones, which is also helpful for users and visitors, who can easily recognize the “allowed” and “foreign” zones.

Efficiency

It is interesting that the local building height codes implied certain restrictions in terms of number of storeys above ground. As the laboratories and offices required a lot of space, Kahn decided having 2 storeys underground. At the same time, comfort and aesthetic requirements included natural light. Kahn solved this problem efficiently, by introducing light wells that bring a lot of daylight into the underground level laboratories. In terms of efficient use of space with respect to the future, most of the laboratory spaces are open plan, due to the need research laboratories had for change over time.

Efficiency in terms of material maintenance and time flow effects are the best expressed efficiency aspects in this building. The used material will not decay easily and requires minimum maintenance.

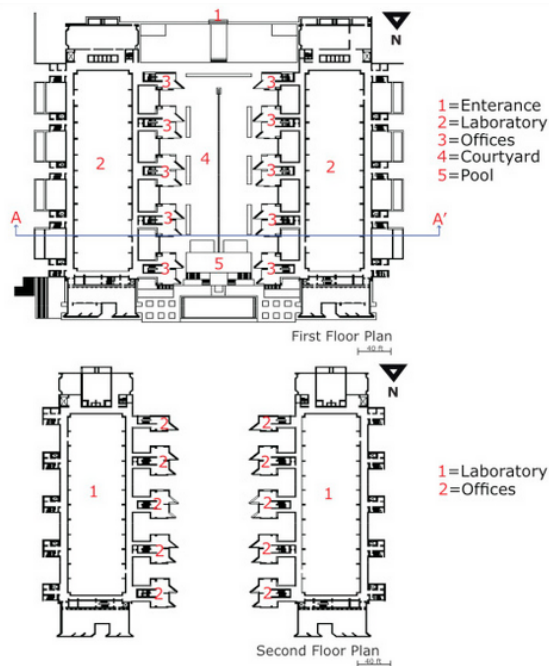


Figure 5: Floor plans, efficiency of space

Source: http://issuu.com/seasirisilp/docs/louis_kahn_final, accessed on 4th May 2017

Such choice is again related to the design and the Story: it is not the building, but what takes place in it that should be admired. Here, the building is yet another tool in service of mankind and choosing concrete reinforces this idea.

Conclusion

Even though represented as a modern architect, Louis Kahn expressed his own, unique style and very strong character in designing the Salk Institute. Pre-modern, even classical architecture influences are present in this masterpiece. Regardless of appearing raw at first sight, perhaps some would see it even as a show-off of modern architecture and frown upon the Institute building, through this analysis, it became very clear that a deep understanding of human behaviour and their needs, as well as an extraordinary sense of space and moulding the visions of future into the present, shapes and forms were the core parts of this design. The building is a complete work, with careful approach that can, after having finished this analysis, I understood, easily satisfy probably any architectural value grid we could set. In terms of the given critical grid itself, the conclusion is that the grid is successfully arranged, since the above described four key points (functionality, design, comfort and efficiency) do summarize the most important aspects of this building's design and do answer key requirements of the nature and purpose of this building.

Received: April 20, 2017

Accepted: May 25, 2017

Correspondence to:

Lejla Kargić

Faculty of Technical Studies,
University of Travnik (Bosnia and Herzegovina)

lejla.kargic@hotmail.com

References

1. Louis Kahn. (n.d.). BrainyQuote.com. Retrieved May 12, 2017, from BrainyQuote.com Web site: <http://www.brainyquote.com/quotes/quotes/l/louiskahn169687.html>
2. Alexander C. (1979) *The Timeless Way Of Building*, Oxford University Press, New York
3. Sullivan L. (1896) *The Tall Office Building Artistically Considered*. Lippincott's Magazine No. 57, pp. 403-09.
4. Ching F. (1995) *A Visual Dictionary of Architecture*, John Wiley & Sons, USA, pp. 58
5. Green W. (2011) *Louis I. Kahn, Architect*, Literary Licensing, LLC, Montana USA
6. Leslie T. (2005) *Building Art, Building Science*. Braziller Inc, pp. 78.
7. Unwin S (2014) *Analysing Architecture*, Routledge, pp 107.
8. Louis Kahn. (n.d.). BrainyQuote.com. Retrieved May 12, 2017, from BrainyQuote.com Web site: <http://www.brainyquote.com/quotes/quotes/l/louiskahn169686.html>

Analiza objekta Salk Instituta (Louis Kahn) putem kritičke analize

SAŽETAK

Istraživanje u oblasti arhitekture obuhvata najraznovrsnije teme. Međutim, metode istraživanja ponekad nisu specifično determinirane. Stoga se nerijetko kao sredstvo istraživanja koriste različite matrice kritičke analize. Salk Institute je najistaknutije djelo Louisa Kahna, često smatrano predstavnikom moderne arhitekture. Uprkos prvoj impresiji korištenog neobrađenog betona, objekat odiše prilagođenošću čovjeku na svim nivoima dizajna. Svrha ovog rada je analizirati Kahnov Salk Institute korištenjem kritičke analize koja se sastoji od četiri osnovna kriterija: funkcionalnost, dizajn, komfor i efikasnost, te u konačnici evaluirati i relevantnost postavljene analitičke matrice.

Ključne riječi: funkcionalnost, dizajn, komfor, efikasnost, modernizam, prirodno osvijetljenje.