


# A METHOD PROPOSAL FOR INTERIOR DESIGN ANALYSIS VIA VILLA SAVOYE

Nilay Özsağas Uluçay 

PhD, Assoc. Prof., Mugla Sitki Kocman University, Turkey


## Research Article

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 Corresponding author:  
E-mail: nozsavas@gmail.com

**ABSTRACT:** The aim of this study is to examine the subject of modernism and the international style and to analyse a building of that period. The study provides a method for interior design analysis. In order to make interior analysis, a system consisting of basic design principles and architectural design criteria has been created. According to this method, space is evaluated in two parts as physical environment that includes architectural and interiors parts and aesthetic environment that includes elements of design and principles of design. In the study, interior design analysis of Villa Savoye designed by Le Corbusier is performed. Villa Savoye, which constitutes the basis of the design principles of the modern period and is one of the important examples in interior design, is analysed according to this method. As a result of this examination, Villa Savoye has been found to have the characteristics of the term appropriately but also has some application problems. With this study, it is aimed to contribute literature about interior design analysis method and adapt this method to a building.

**KEYWORDS:** Interior Design Analysis, Method Proposal, Modernism, The International Style, Villa Savoye.

## INTRODUCTION

At the end of the 19th Century, modernism emerged with the development of the industry. It is used to describe a style other than traditions. Coates, Brooker and Stone [1] describe that modernism is a movement that developed between 1890-1960, defining the modern world, and being a social as well as design and architecture. As a new cultural approach, modernism is based on the idea of seeking simple solutions to the requirements of the age and questioning everything [2]. The ideas of modernism spread in the first period of the 20th Century. In architecture, it is an apparent, smooth, pure and complete approach that the function is at the forefront. Adolf Loss, Frank Lloyd Wright, Peter Behrens, Auguste Perret, Le Corbusier, Walter Gropius, Mies Van Der Rohe are regarded as pioneers of modernism [3]. Thomas Broad [4] says that the term of modern in architecture cannot have any other meaning, which is "honestly contemporary". Nevertheless, Colquhoun [5] states that modern architecture is a term that is open to interpretation that can mean more than one. Based on abstraction and anti-historical expression, architecture was seen as an expression form in art in modernism and it also emerged increasingly from

new technologies during the nineteenth and twentieth centuries [6].

The International Style is the modern architectural trend that came to the fore in the 1920s and 1930s. Modernism and the International Style began to replace the tradition-oriented and modernistic directions [7]. It is based on a book by Henry Russell Hitchcock and Philip Johnson for the International Exhibition of Modern Architecture in New York in 1932. This exhibition was held to describe modern architectural works and the style. In this style, the seminal figures are Ludwig Mies van der Rohe, Walter Gropius, J. J. P. Oud and Le Corbusier [8]. Pile [7] emphasizes that all works in the exhibition have similar qualities: "flat roofs, smooth (and usually white) walls, large areas of glass and asymmetrical planning, along with a total of any historical or ornamental detail".

*As tastes changed and the construction industry embraced the technology necessary to detail and build to this new aesthetic, industrial products became features and in many instances, along with the parallel decline in the use of ornamentation, came to define the essential character of a work of architecture [9].*

In the International Exhibition of Modern Architecture, there were eleven works and the interior illustrations were included in these works.

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This was one of the basic principles of modernism, as architectural design included interiors and these illustrations had the same features such as the absence of historic and ornamental detail just like the external form of the building [7]. “Among the principles of the International Style, volume, regularity, and the avoidance of applied decoration were explored in special detail” [10].

Villa Savoye, which is the subject of this study, is one of the important examples of the International Style. In this project, the mentioned internal-external relationship is emphasized to a great extent. The project was designed by the Swiss origin French architect Le Corbusier (Charles Edouard Jeanneret) (1887-1965). For Philip Johnson who was curated and co-authored the catalogue and book of the exhibition, Le Corbusier's "Vers Une Architecture" signalled the beginning of the new style [11]. Le Corbusier is known with his designs in the style of Modernism and the International Style. He believed the aesthetic of engineering for modernism and his designs was always regulated by an orderly, mathematical modular system [12]. According to Le Corbusier; “Architecture is the masterly, correct and magnificent play of masses brought together in light” [13]. Le Corbusier and Pierre Jeanneret explained five points towards a new architecture in 1926. The first item is the supports that he expresses as “pilotis”. Thus, the walls cease to be carriers and the mass is separated from the floor by columns. The second one is the roof gardens. Gardens are located on the flat for the natural environment and structural harmony. The third one is the free designing of the ground-plan. Free plan design can be made because the walls are not any longer carriers. The fourth item is the horizontal windows (ribbon windows). Horizontal windows along the facade and providing light to the rooms. The fifth item is free design of the facade. It provides free designs that separate the facade from the structural function of the building [14]. Roth [15], emphasizes that the five points of modern architecture mentioned by Le Corbusier, are seen in Villa Savoye with its structural frame with pilotis that lift the mass off the ground, its free plan by means of the concrete frame, highlighting the floors from the carrier columns, horizontal windows providing good illumination and a roof garden inspired by the Mediterranean architecture.

Interior design, which was a tradition before the 20th century, started to be seen as a profession with the 20th century. In this period, there were two different approaches in professional practices, both traditionalist and innovative. With its simplicity,

functionality, and spatial structure, Villa Savoye is not only a good example of the international style and five points of modern architecture Le Corbusier based on his architectural view but also becomes a milestone that has a great impact on interior design. For this reason, it is aimed to conduct space analyses of Villa Savoye within the determined method, which reflects all the features of the period. Due to the fact that it is one of the important examples of modern period interior design and its widespread influence on today's design approach, this structure was chosen as a sample.

## METHODOLOGY

This study aims to present a method for analysis of many studies in the field of interior architecture. As a result of the researches, it is seen that there is no certain method for analysing the space. It is anticipated that determining the criteria for interior design analysis will be useful for guiding future studies and creating a systematic analysis. To create a method, the definitions and limitations of profession determined by international federations (such as IFI: International Federation of Interior Architects/Designers, ASID: American Society of Interior Designers), and the criteria determined by the accreditation institutions of interior architecture/design education (such as ECIA: European Council of Interior Architects, CIDA: The Council for Interior Design Accreditation) are taken into consideration. In addition to the mentioned criteria, the classifications and definitions in the books of Pile [12] and Ballast [16] are discussed and an analysis scheme is created. In this context, the building is aimed to be handled separately within its physical and aesthetic environment.

Considering as a part of a whole, it is seen that the aesthetic and physical needs of the structure are defined by the general needs. These emerge from the needs of the whole rather than a singular function [17]. In Pile's book there are three stages of space evaluation. These are Function, Structure and Materials, Aesthetics. When these three stages are examined in detail; function stage consists of the size and shape of space, placement, and choice of furniture, circulation, lightning and acoustical environment. Structure and materials stage consists of material selection according to function, durability, maintenance ease, good quality construction and cost, safety and environmental conditions [12]. In this study space analysis divided into two parts. In the first part, the physical environment deals with function, structure, and

materials as a whole. This section is divided into architecture and interiors design. Information about the structure and the function is given, construction, facade, mass, mechanical systems, wall, ceiling, floor, dominance, and circulation are examined in this section. The second part, called aesthetic environment, is evaluated in two sections as elements of design and principles of design. In Pile's book [12]; design elements are point and line; form of shape; texture, pattern, ornament; value and colour; opacity, transparency, translucency. And principles of design are size, scale, proportion; unity and variety; balance; rhythm; emphasis. For evaluating space design, harmony and light should be in the list of analysis. In the book of Ballast [16], elements of design are form, scale, colour, texture, pattern, and light; also the principles of design are balance; harmony and unity; rhythm; emphasis and focus; contrast and variety; proportion. Thus, the aesthetic part of the method is completed with these sections. The classification required for a space design analysis is determined. The analysis scheme used in the study is below.

**Table 1.** Interior design analysis scheme

Physical Environment		Aesthetic Environment	
Architectural	Function Structure Material Mechanical Systems <i>-electrical, sanitary, acclimatization, fire, security</i>	Elements of Design	Form Scale Colour Texture Pattern Light
Interiors	Wall Ceiling Floor Dominance Circulation	Principles of Design	Balance Harmony and Unity Rhythm Emphasis and Focus Contrast and Variety Proportion

### Villa Savoye interior design analysis

All the cited papers in the text must be listed in References. All the papers in References must be cited in the text. Villa Savoye was designed by Le Corbusier and his cousin Pierre Jeanneret in 1926 in Poisy / France for the Savoye family. It is among the 11 projects exhibited in the International Exhibition of Modern Architecture and is one of the best examples of the International Style. Villa Savoye put its stamp on this period with its simplicity and design; horizontal windows, terrace gardens, and the structure separated from the ground with thin columns. The mutual relationship between the interiors and architectural structure draws attention.



**Figure 1.** Villa Savoye, Poissy, France [18].

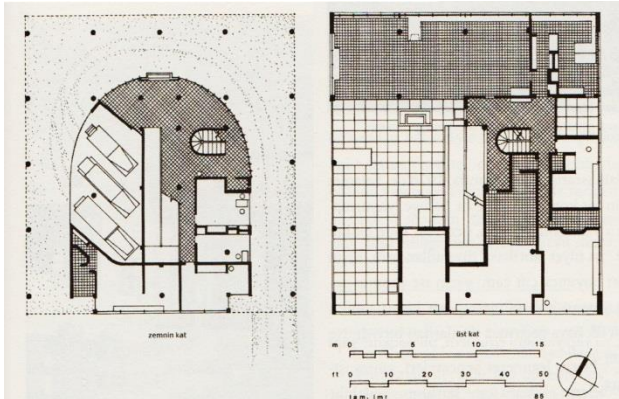
### Physical environment

Villa Savoye is known as a structure where five basic principles of Le Corbusier on architecture can be seen. The villa was designed as a residence and later started to be used as an exhibition gallery. It was built in Poissy, near La Seine River, 30 km from Paris in France. It is located on large green land and is located separately from the main street and other residential areas.

**1) Architectural (function, structure, material and mechanical systems):** The building was designed primarily as a residence, and it is observed that suitable solutions are made for the housing function. However, there is currently no function plan other than exhibiting. With a ramp, general usage, core concept, integrated design with nature, and adequate space analysis show usage in accordance with the function plan. Villa Savoye looks like a box raised from the ground and is located on its thin columns. Le Corbusier had shown that the building could get carried to the columns without bearing walls. It was built using reinforced concrete [19]. The facade has a simple mass. The horizontal windows of the house are not interrupted even in the open-top balcony section, the facades of this section are also shown as living room windows. Birksted [20] states that Le Corbusier created a major turning-point in architecture with these windows stated in five points of modern architecture.

*At other times, they hold a thin metal section window frame, painted black and set nearly flush with the white concrete wall, except for a minimal drip. The wall itself creates a rebate on the internal face, providing the window with a ledge. The rebate is on the interior face of the wall, leaving the external wall smooth and flat. Thus any differences between the outdoor openings of the internal courtyard and the internal window openings are*

eliminated [20]. Le Corbusier [21] describes Villa Savoye as “the house is a box above the ground, perforated all around, without interruption, by a long horizontal window...” The regular geometric ratio on the facade draws attention. The form of the villa gains motion with circular walls. The garage is located at the bottom of the house and can be reached from a ramp. This ramp serves the transportation of all floors from the entrance to terrace floor.



**Figure 2.** Villa Savoye floor plans [15]

Detailed drawings of the building’s mechanical systems (electrical, sanitary, acclimatization) could not be reached. However, when the structure is examined, attention is paid to natural lighting. The rooms were located according to the sun’s direction and space arrangements had been made according to the natural lighting. Clean and wastewater systems show an innovative approach compared to the period in which they built. Besides, the free passages of the spaces and the open terraces provide natural air circulation. Drawings of fire and security, heat, acoustics, graphics and guidance could not be reached. However, in addition to the dampness problem, it is stated with a letter written by the homeowners that rainwater comes in [22]. This negative situation indicates that mechanical systems were considered but there were problems in the application.

**2) Interiors (function, structure, material and mechanical systems):** Savoye's thin and numerous columns carrying the big body, creating the feeling of flying, constitute the carrier system. The columns, which continue on all floors and the terrace, are not interrupted and it can be seen that they continue inside the windows in interiors. As the columns are not very rough in mass, the visibility of the system is an aesthetic element. The carrier system and the dividing system consisting of walls are separated from each other

and a free plan is formed. Ramps, fluidity in space and correct analysis of circulation provide a free plan. Independence of interior walls from the structural system allows designing large, uninterrupted and free spaces [23]. Also, the facade design independent of the carrier, which was the feature of that period, was allowed to horizontal windows without encountering the obstacle of the carriers.



**Figure 3.** View of the carriers [24]

The building has a grid plan model and is in a square form. It is calculated based on the golden ratio and divided into two symmetrical areas. The ramp, which is the vertical circulation area that connects the floors to the intersection point of these areas, is positioned [25]. The entrance hall, garage, maid’s room, laundry room are at the entrance of the building. There is a ramp at the entrance that leads the visitors up. Bedrooms, bathrooms, toilets, kitchen, and living room are on the first floor. Also, the roof designed as a terrace has a small garden. The ramp continues from the hall on the first floor to the solarium and roof terrace on the second floor. The terrace and garden roof create free usage as in the whole structure.



**Figure 4.** The ramp [26]

The relationship between the exterior and interior of the building is quite clear and excessive. When we consider it as a house, we need to divide spaces into private, semi-private, and public spaces. While interiors are partially separated by the walls, the free plan set up, the interior-exterior relationship established with the windows surrounding the spaces, and the use of the roof as a terrace reflect this. Carriers and windows are among the main elements that dominate the building. In some interior walls, the use of dominant color and

free plan layout draw attention. The dominant element in the interior is the ramp that provides the circulation of the space. Considering the interior and exterior relationship, the density of the gardens and the gardens on the terraces can be shown as the dominant element.



**Figure 5.** Interior-exterior relationship [27]

### Aesthetic environment

Pile [12] states that “*in engineering, design may deal with sizing structural members, piping, or ducts, while in the fine arts it deals with the way an artist organizes the formal elements of line, shape, color, and texture in a space.*” In this study, aesthetic environment examined in two parts as elements of design and principles of design. Villa Savoye has a sculptural structure that creates the feeling of being on a pedestal. It has features to cover many principles in terms of design. The correct integration and usability of these features with the function is important. It is seen that the concept of the garden, terrace, and free plan in a modern design affects the visual balance positively.

**1) Elements of design (form, scale, colour, texture, pattern and light):** The form should be examined in two aspects, two-dimensional and three dimensional. The term of the two-dimensional describes the plan of the structure and the term of the three-dimensional describes the form created by the architectural elements such as furniture and columns beams [12]. In terms of form; Villa Savoye is a rectangular prism designed in accordance with the principles of purity, simplicity which is the pioneer of modernism. This form is disrupted only by the cylindrical walls surrounding the roof terrace sunbathing place, and the fixed mass gains motion. Columns that lie inside independently of the exterior and walls do not partition indoors and create a unique effect. Transparency supports the relation of spaces with each other. In the interior, the plan is divided symmetrically with the ramp in the middle. Horizontal dominant windows and width gather the perception in this direction. The fact that the carrier system is not reflected on the exterior also balanced

this integrity and openings. In the interior, its appearance as thin columns adds an aesthetic appearance.

Brooker and Stone [23] divided scale into people, rooms, and buildings. As the building scale, the structure spreads over a large area. It has lightened a heavy and large mass with the appearance of hanging in the air. In the scale of the room, the interior spaces are visually clear as they are defined by a free plan. Transparency, which does not interfere with the spaces instead of the dominant walls that cover each other, supports the fluidity of movement in the space. Considering that it is designed as a house, the area sizes of the rooms and the distribution of the furniture show that the spaces are very large in scale. This does not make the interior of the building easy to perceive.

Some colours are seen as physical features and/or cultural connotations [1] as well as certain architectural period features. Colour, with its physical and psychological effects, can provide the perception of surfaces differently than they are. Tate states that [28] the effect of the colour used changes by its interaction with other colours, the size and the place of application, light, and textiles. For this reason, factors such as usage style, location, and intensity of use create a difference in the perception of space. Villa Savoye has a reputation for showing an important feature of this period with its white mass. White shows itself as it is completely intertwined with nature. In addition to columns that lighten the mass, horizontal windows provide transparency. To balance all this whiteness, dark and warm colours are used in the interior especially with wall surfaces and furniture. It can be said that this colour scheme indicates the characteristics of the period.

Textures that materials naturally have or that can be applied to them often define the main characteristics of space [29]. In addition to the technical properties of the materials, the texture and pattern of the surface they possess create many perceptions such as temperature-coldness, weight-lightness added by the colour. Looking at Villa Savoye in terms of texture and pattern; smooth white wall and glass surfaces provide lightening in the texture. The dark colour preferred in furniture is balanced with glass and metal parts. With the dark colours and ceramic surfaces, smooth and white surfaces are tried to be balanced, but the whiteness of the very large areas created the feeling of emptiness in the space. The use of ceramic and mosaic in wet areas gives a bright and smooth

texture and a small size pattern. At the same time, with the green area and terrace gardens surrounding the building, the green texture is felt completely inside the house. Apart from these perceptions, different materials and textures are not seen.

Light provides the realization of the vision event by perceiving all the properties of the objects. All spaces in Villa Savoye are designed to receive natural light. Since almost all of the spaces are in a close and open relationship with the exterior, natural light can be used excessively. The direction of the hall opening to the terrace is south, with tall windows so that it can be fully illuminated by sunlight. The bedrooms are located in the south-east, north-east direction, the main bedroom is in the south and can receive natural light. Since natural lighting is sufficient, a different lighting source is not needed during the day. Luminous windows from the ceiling have been opened to the spaces without windows like bathrooms. However, it is stated that this had become quite noisy on rainy days [30, 31].



**Figure 6.** Bathroom [1]

**2) Principles of design (balance, harmony and unity, rhythm, emphasis and focus, contrast and variety, proportion):** Balance can be created in several ways such as symmetrical, bilateral symmetry, radial symmetry and asymmetrical [12]. In the plan, symmetrical

balance is seen by dividing the centre with a ramp, the interior spaces are located asymmetrically. The continuation of the windows in the terrace gardens on the exterior and the arrangement of the columns provide balance by creating symmetry.

Harmony in a composition is the agreement of the parts to each other and the whole [16]. From the perspective of harmony, the architectural and interior design elements form a meaningful whole. This meaningful integrity is an indication that they are in harmony with each other. Unity consists of the fact that the elements seemed to belong together, not randomly placed. Also, unity is formed when all elements agree in design [32]. The windows and walls, the column and the carrier system, and the interior spaces have a separate unity in themselves. It is intended to create harmony in the use of materials and colours in the facade and interior spaces of plain and simple lines, which are characteristic of modern architecture. The dominant layout in the horizontal and numerous delicate columns in the vertical is in a meaningful whole with each other.

Rhythm relates visual elements together in a regular pattern. Rhythm is an important element in both historic and modern design [12]. Repetition produces rhythm [7, 32]. Looking at the whole structure, there is a rhythm created with both horizontal and vertical element repetitions. The effects of surfaces on the rhythm continue with forms and colours. Vertical perception of columns and horizontal perception of windows is a rhythm consisting of contrasts both in the interior and the facade.

From the perspective of emphasis and focus, it is the line with the ramp that dominates the design. Despite the intensity of all horizontal and vertical linear lines, the ramp that rises up to the roof and reaches the roof is an indicator of fluency and circulation, emphasis and focus interiors and exteriors. At the same time, continuing both inside and outside provides integrity. The spatial dominance of terrace gardens is in the foreground. The predominant use of white is dominant and is supported in some places by primary colours. In terms of lighting, it is seen that natural lighting is the focus. Also, the internal-external relationship is dominated by the perception of transparency. However, the scale focus point was not kept in the space-user relationship.

White [32] states that in order to one element to dominate another there must be contrast and it is related to dominance. There are repetitions with the carrier system and opposite directions with the

windows. Repetitions, hierarchy, and contrast appear in all elements as a whole. The repetition of horizontal windows on the facades, the repetition of the bearing system in the whole structure, the circular walls rising on the roof despite the completely angular lines and the staircase form also show that there are contrast and variety in the design.

Proportion of an element is perceived according to the whole or the parts next to it [12, 32, 16]. Villa Savoye is a structure in which the internal-external relationship is strongly established. As in free plan understanding, there is no limit in interior spaces. The design is free as the walls are saved from being a carrier element. However, this freedom created in the interior of the building damages its suitability to the human proportion and creates a feeling of emptiness with very large volumes. It is seen that the exterior and the structure are proportional, the structure of the interior and the rooms do not have the same proportion.



**Figure 7.** Exploded perspective drawing [33].

## RESULTS AND DISCUSSION

Villa Savoye was designed with ideas beyond the era in terms of both architecture and interior space and became one of the pioneers of modern architecture. The building contains five points of modern architecture that Le Corbusier based on his architectural view. Free plan has been implemented that provides independence by removing the carrier feature of the walls. All carrier systems and walls are used as an aesthetic element. With the use of horizontal windows and terrace gardens, natural

lighting was provided in the interior and integrity had been achieved with green nature.

In the study, physical environments, which are architecture and interior design, and aesthetic environments consisting of elements and principles of design are analysed. The building has been one of the pioneers of modernism with an approach beyond the age and has shown innovative approaches in structure and material use. However, problems with functional solutions and mechanical systems have not been unnoticed. Although problems such as moisture and dampness were encountered, the fact that the mechanical system was available at that time is one of the most important features. Dominance and circulation issues are well emphasized in interior spaces, and free plan implementation is a great innovation for design. Walls and floors are detailed, but lighting windows related to ceilings have had negative results.

When examined in terms of aesthetic environment, the simple form and design details used in the building are important for its period. However, although the scale is properly worked on the building, the relation of the interior space and the furniture is in accordance with a monumental structure rather than a house. White colour was used predominantly following the style of the period in which it was made, only some of the dominant dark colours on the walls and the materials and colours used in the furniture are also different. It is seen that natural lighting is at the forefront throughout the building, and even lighting windows are considered in the bathrooms. Unfortunately, homeowners had problems, especially in rainy weather due to the noise coming from these windows. The building plan provides a symmetrical visual balance by ramp, architectural and interior design elements have meaningful harmony. Unity is seen in walls-windows, carrier system and the facade. The fact that the horizontal windows and openings can be kept so large is also due to the positioning of the carrier system inside and adds an aesthetic value to the interior. Rhythm is seen in horizontal windows and structural repetitions. Principles of design such as contrast and variety are seen with emphasis and focus being on the ramp in the building centre, angular and circular lines, and directional contrasts.

Considering all the criteria, two issues are open to discussion. The suitability of the house on a human scale is particularly controversial about proportion. In addition, according to complaints

about moisture, humidity, and precipitation that may arise from the application, had Villa Savoye become a house that does not provide comfort for the users?

## CONCLUSION

This study aims to present an interior design analysis method proposal for examining a building in detail and contribute to the literature. As a conclusion, definitions and limitations of interior architecture profession that determined by international federations and the accreditation institutions are examined. In addition, studies, methods, and classifications conducted in this context have been investigated. And an interior design analysis method is proposed. According to this method, the building is examined separately in physical and aesthetic environment. To make the method more readable an iconic building has been examined and the method has been adapted. Villa Savoye has achieved a successful result in terms of design for the period of modernism. According to the evaluations made in spatial analysis, it is seen that most of the stated principles have been followed. As Le Corbusier has an important place in the history of architecture and Villa Savoye has a positive contribution to International Style and Modernism, detailed analysis is made for this structure. And it leads to creating ideas for and offers an insight into new designs.

### Competing interests

The author declare that there is no competing interests.

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