



## ABSTRACTION IN ARCHITECTURE A REFLECTION OF 'ABSTRACT ART MOVEMENT' THEORIES AND PRINCIPLES

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**Abstract:** Abstraction is a concept that promotes evoking inner feelings and emotions rather than replicating the apparent reality. The idea of Abstraction can be best seen through Art, right from the prehistoric times when humans drew on walls with a depiction of forms with minimum and simplified sources. Each abstract style has an era dedicated to different methods through which the desired abstraction could be achieved. This research aims at understanding the concept of Abstraction through art movements, exploring their various styles and techniques. It focuses on finding out different approaches by which Abstraction can be incorporated in architecture through space and form. The use of gestures and movement patterns could be seen both in 'art on canvases, and in 'architecture through spatial elements' – line, color, texture, shape, and form, with the equivalent motive of creating a personal and evoking user experience - rich in emotions for them to relate to it. In making a space more expressive, architectural elements play a significant role. Five buildings – Notre dame haut (Ronchamp), Schroder house, Vitra fire station, Guggenheim Museum Bilbao, and Parc de la Villette (follies) have been studied based on architectural elements, each observed and related (Post justification) to their particular abstract style- Cubism, De-Stijl, Suprematism, Abstract expressionism, and Pop Art respectively. A qualitative content analysis examines all the elements of space making and understands how abstraction affects them, resulting in observations and conclusions directing to different roles each element has to play for acquiring a state of abstraction. Abstraction in architecture could be achieved by the use and composition of architectural elements which are best inspired by abstraction in art. From these observations, the study recommends creating spaces and volumes with the concept of abstraction incorporated through the elements of architecture for a rich user experience.

**Index Terms -** Abstraction, user-experience, Architectural Character, User-space relationship, Cubism, Suprematism, De-Stijl, abstract expressionism, pop art.

### I. INTRODUCTION

Unfolding Abstraction in architecture is a test because each structure is diverse and is a specific statement by its creator. Abstraction is often defined by what it is not. It is not usually symmetrical. The architects avoided traditional box shapes and abstained from basing their designs on past styles while designing Abstract structures. They tended toward **Abstraction**, which means no one based their designs on objects or edifices seen in the real world.

"The abstract architecture was designed to evoke inner feelings and exciting emotions. Buildings created in this style made a statement and stood out from the constructions around them. Architects often used unusual, distorted forms and incorporated ground-breaking building techniques using steel, brick, and glass materials." (Designing Buildings Wiki, 2018)

- "Suppose it takes a documentary to document the world as it is now, then the fiction is to fantasize about how it could be without the constraints of reality. In a way, architecture can be taken as the fiction of the real world. It turns dreams into concrete reality with mortar and bricks. It seems like Architecture is the canvas for our life." (Winston, 2015)
- A building is never complete, it has a beginning, but it has no end to it; it is always evolving, always waiting for new scenes to be added, new characters to build in.
- When one is studying architecture and tell people what it is, the most common question that they ask is – "Can you tell me why all new buildings are the same and so boring?"
- People believe that notable buildings came with shikharas, arches, details, spires, and engravings in the past. Today that has been replaced with containers of space and boxes. Somehow some of our choices today tend to settle with reaffirming the status by replicating it with what is already there than inventing what could happen next.
- If we take an example in the movie 'Inception,' the architect finds that they can finally realize their most desired architectural dream because they design inside a dream.

- When asked about their home retreats, many people come up with combinations such as living on a roof but staying near to the water or wanting a garden but on a high rise. They would have to choose in real life, but they could have it the way they wanted it in the dream.
- “Then Somebody could use this dream by abstracting our way through the design process. Abstraction, in a way, is defined as a full explanation with minimum strokes. There is no need for heavy elements or detailed decorations when Somebody could translate emotions into more straightforward and more convincing forms” (Winston, 2015).

“Our buildings are prototypes, ideas for how the space of living be different, and how culture or media could look today. The primary query is how we can design and explore things both functionally and experientially” (Winston, 2015).

The idea of Abstraction can be best seen in the field of Art, right from the prehistoric times when humans drew on walls with a depiction of forms with minimum and simplified sources; however, the idea was more popular in the 20th century with art movements based on the concept of Abstraction being carried out by famous painters and being used to express emotions most simply, as after the industrial revolution and invention of the camera that gave realism in Art lesser importance the idea of Abstraction became popular hence the use of simplified and organic shapes and strokes took the place of realistic Art as now there was a story narrated in each artwork.

“Taking inspiration from those artworks, many famous architects tried looking at architecture as a blank canvas that was to be given abstract strokes as the elements in spaces and structures. This particular practice started making architecture more experientially rich and also was famous in its contextual surroundings. Each space began connecting with the user and even the architecture itself” (Assignment, 2016). In recommendations for making architecture more abstract and experientially rich for the user to connect and relate it to a personal level.

## II. AIMS & OBJECTIVES

The research aims at understanding the concept of Abstraction through art movements, exploring their various styles and techniques. It focuses on finding out different approaches by which Abstraction is used in architecture in space, form, or any other medium to reflect art movement principles and theories.

The objective suggests -

- To understand Abstraction in art movements and their influence on architecture
- To explore the use of Abstraction in architecture as forms, spaces, organizations, and shapes.
- To proceed with a comparative analysis of abstract art movements and abstract architecture theories resulting in conclusions with the abstract designing recommendations.

## III. ABSTRACTION IN ART MOVEMENTS

Abstraction in Art always was a mystery to the layman's eyes; the use of strokes and personalized styles of each artist made people rethink Art's whole concept.

“The immediate reactions like *My cat could have made this* was often delivered, but the fact to think was that while anyone could have made them, it was only those artists that proceeded with the idea. They fearlessly went on with Abstraction, and as people understood more, it flourished, and the importance of displaying emotions was promoted through their art pieces.” (What is abstract expressionism?, 2016)

### 3.1 INDUSTRIAL REVOLUTION



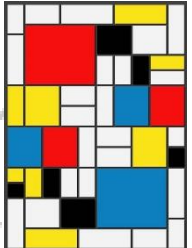


Due to photography advances, the focus shifted from realism to the Abstraction of forms - giving meanings and emotions behind the canvas much clearer importance and preference. The camera's likes invented a severe threat to the painters at the time as it could capture representation at one click, diminishing the need to charge it through the medium of paint. The sheer beauty of Abstraction lies in the ultimate joy that we may never completely understand and that Somebody can interpret it to a greater or lesser extent than what was initially envisaged by its creator. Reflecting on many artists' innermost minds, its beauty lay in its individuality, thus creating the problem of a common understanding in Abstraction and, indeed, all Art. Abstraction simplified emotions in brush strokes and color theories; it was carried forward in all the different fields, as whenever we see designed pottery or prehistoric engravings. (Assignment, 2016) “Rejecting the idea of representation (the style to present an image of the natural and existing world) as the primary function of painting and style was not a step that artists took suddenly. Instead, the process was gradual, with its roots in the era of the 1950s. The introduction of the idea of photography in 1839 played a substantial role in transforming painting from the need to depict nature.” (Wisotzki, 1990)

The main abstract movements that brought a noticeable change were as follows –

- a) Cubism
- b) Suprematism
- c) De-Stijl
- d) Abstract expressionism
- e) Pop/collage art

Abstract artwork is often seen as challenging to understand, so it is judged on the parameters based on – Line, Shape, Color, Form, and Texture that makes each abstract work different from another and more comfortable to interpret.

Table 1 Analysis and comparison of art movements based on parameters of an abstract art

S. No	ART MOVEMENT	LINE	SHAPE	COLOR	TEXTURE	FORM	FAMOUS WORK
1	<b>Cubism-Purism</b>	Monochromatic concentration on line and form. Representing Art from multiple angles and viewpoints at the same time, rather than a single fixed position.	Small geometric shapes, deconstructing and fragmenting the picture plane, showing multiple sides of a thing at once.	Drawings in the lack of colour/hue and monochromatic concentration on form and line.	Neither of the artists used 'cubes' in their artwork despite the name 'cubism,' but they used the mathematical and geometric shapes in their artworks.	Two-dimensional composition's pre-eminence on the flat surface Within the enframing. Use of 3D objects as 2D on the canvas	 <p><b>Pablo Picasso's 'Girl with a Mandolin'</b></p>
2	<b>Suprematism</b>	Necessary geometric forms and shapes, such as circles, squares, Lines, and rectangles, painted in a limited pallet of colours and textures.	Shapes such as circles, rectangles, Lines and squares.	Suprematism's three stages: 'black, red, and white.' Painted in a consciously limited pallet of colours and textures.	Primary and earthy toned texture with minimum surface coverage	Geometric forms could often be seen to be floating in space and an action of the explosion.	 <p><b>Malevich's 'suprematist painting.'</b></p>
3	<b>De- Stijl</b>	A strict geometry of horizontals and vertical lines (sometimes diagonal)	Use of block shapes (rectangle, square, and diagonals) The least use of curved shapes.	Primary colours with black, grey, or white lines or blocks.	Play of positive and negative emphasis	Asymmetrical forms with square and rectangular blocks.	 <p><b>Piet Mondrian's de stijl painting</b></p>
4	<b>Abstract expressionism</b>	The gesture made by the artist's hand Hence a continuous pattern of lines and curves.	No recognizable focus. Subconsciously mingling of shapes.	Primary and ground colours are used to create a painting full of grainy and layered texture.	The act of dripping and layering made the surface more of a grainy texture with no single focus.	The use of intense, rapid brushstrokes, dripped and bespattered paints onto a hefty canvas.	 <p><b>Jackson Pollock's drip painting</b></p>
5	<b>Collage/Pop Art</b>	No fixed focus with many points of attention and layering. (recognizable imagery)	Use of many shapes with mixed media and collage	Bright colours added to known imagery for a better focus	The texture that could be relatable to the familiar surrounding with an attentive colour quality	Recognizable yet mixed collage type of a form.	 <p><b>'women with a flowered hat.'</b></p>

## IV. RESEARCH METHODOLOGY

1. Firstly abstraction has been studied as a concept followed by the various abstraction styles that lead to eras dedicated to the particular art movements, based on various literature studies.
2. When observed, abstract styles are classified under an abstract painting's parameters – **line, color, shape, texture, and form**. These points make each style individual and different in its own way with their particular highlighting element. Although from a sea of various art movements, the five prominent art styles have been noticed and discussed - **Cubism, Abstract expressionism, De Stijl, Suprematism, and Pop art**.
3. Five buildings have been studied, each resonating with the ideas and principles of the respective art movements of the abstract art styles. The analysis of the five buildings in the paper have been done on three levels –
  - The resemblance of the building design principles to that of the particular abstract art style.
  - Qualitative content analysis of the design.
  - Effect of the abstract art principles on the building's architectural elements to understand the results of using different abstraction styles in architecture.
4. Once selected, inferences are drawn by each abstract style, and the resonating building further operational in the qualitative content analysis of the project mentioned. Each segment of the paper (case studies) is concluded with the analysis of the effect that those principles of abstraction have on the elements of architecture – **Wall, Floor, Fenestrations, Furniture, Spatial organization, and Form**.
5. The different effect of all the five abstract styles on the architectural elements makes each project responsive to user experience differently without losing the nuclei of empowering the emotions visually and experientially rather than following ornamentation and realism.

## V. CASE STUDIES

### 6.1 Case 1: Notre dame du haut (Ronchamp), France

The building was completed in 1954; the Ronchamp chapel was built for a Catholic church on a pre-existing pilgrimage site. “It is one of the most important known buildings of the 20th century and represents a critical shift away from the functionalist, sparse form of Modernism that Le Corbusier displayed in his earlier projects. The stone building previously built had mainly been destroyed during the second world war.” (Archdaily, 2012)

#### 6.1.1 Reflection of an art movement (abstract style)

The building has been taken as a case for in-depth analysis resulting in further recommendations and learnings based on its value and resemblance of design principles to a well-known and understood art movement.

When abstract art has studied the parameters - **line, shape, color, texture, and form** are the five essential criteria kept in mind, architectural projects with the principles of the art movement may also have a resemblance to these criteria for them to be built and inspired by the respective art movement.

##### 6.1.1.1 Role of Lines in abstraction of the case

Representing Art from multiple angles and viewpoints simultaneously, rather than a single fixed position, was what Cubism was about, the act of painting on a plane surface while the things they represent are 3-D—an art of conception with a fourth dimension. Similarly, when we talk about Cubism in architecture concerning the parameter of lines for the case study of Ronchamp when seen in elevation, there is a representation of vertical and horizontal lines from multiple angles and viewpoints at the very same time, along with the use of curved lines for contrast, rather than a fixed one. The lines running are in different directions and places as a fourth dimension.

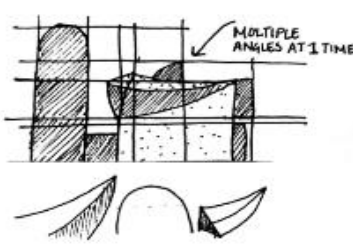
##### 6.1.1.2 Role of Shape in abstraction of the case

In Cubism, minor geometric shapes, fragmenting the picture plane, showing several sides of a thing at once is how shapes are dealt with. In this case study, the use of varied 3D forms in a 2D manner is carried forward, which means the forms are presented as shapes at a single point of view hence matching the Cubist art where the 3D objects are flattened on the canvas with an angled viewpoint.



### 6.1.1.3 Role of Colour in abstraction of the case

Drawings in the lack of colour/hue and monochromatic concentration on line and form were Cubism's primary practice. One of the chapels' interior sides is painted bright red, and the sacristy on the north side is painted violet.



**Figure 1** cubist principles  
(Author,2021)



**Figure 2** Contrasting colors of basic concrete and bright colored fenestrations used  
(Woodhouse, 2018)

### 6.1.1.4 Role of Texture in abstraction of the case

The structure is built mostly of stone and concrete, giving it a very subtle and monochromatic white color composition to warm earth hue. The use of red, yellow, and green stained windows is also added, giving the inside of the chapel a colored hue aura with the stained penetration of lights.

### 6.1.1.5 Role of Form in abstraction of the case

Neither of the artists used 'cubes' in their artwork despite the name 'cubism,' but they used the mathematical and geometric shapes in their paintings hence the term 'Cubism.' "The chapel's form is a sequence of convex and concave surfaces that create the sense of being into a sort of *nest* and a cupola, a space that embraces its visitors, users, and, at the very same time, seems to escape towards the sky." (Archdaily, 2012)

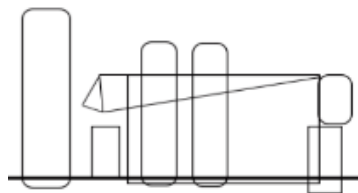
## 6.1.2 NOTRE DAME DU HAUT AND CUBISM – INFERENCES

As judged from the points above, when we study the Notre dame haut, certain things direct us into believing that the chapel was built on the principles of Cubism and purism, i.e., merely reducing complex figures into proportionate geometrical figures for adding an abstract edge to the whole structure which would lead to a better understanding of the idea behind it. "Artists of the era depicted three-dimensional art in the two-dimensional medium by employing tonal gradation and linear perspective techniques."

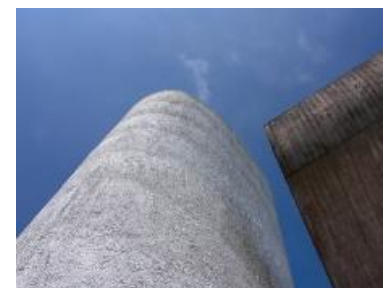
- The constant use of elements, mainly walls and fenestrations with multiple angles and viewpoints at the same time rather than a single fixed position.
- The common characteristics of this movement's buildings were spatial vagueness, transparency, form-faceting, and variety.
- "Ronchamp also brings out conceptions like abstraction, distortion, geometrization, symbolism, fragmentation, and illusion." (Woodhouse, 2018)
- "The building is distinct with its sharp, precise lines for perspective viewing, while the windows have cubic or rectangular and do not necessarily line up with each other, thus creates a radical appearance." (Woodhouse, 2018)
- "The use of reinforced concrete structure gives Cubism an edge in the building industry. Ronchamp has a frame made of concrete adding up the grainy texture." (Woodhouse, 2018)
- "Ronchamp has specific details from Pablo Picasso's 1930s masterpiece painting 'Guernica' hence deriving the influence cubism had on Le Corbusier." (Woodhouse, 2018)



**Figure 3** Cubist principles incorporated (Author,2021)



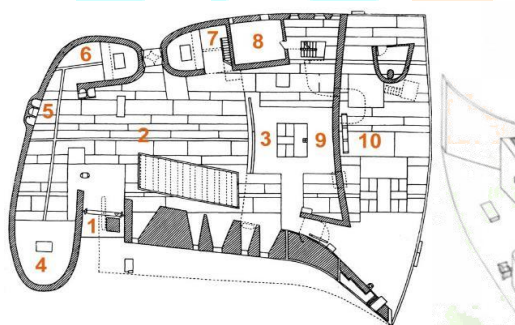
**Figure 4** Use of grainy concrete texture (Woodhouse, 2018)



### 6.1.3 Qualitative Content Analysis –

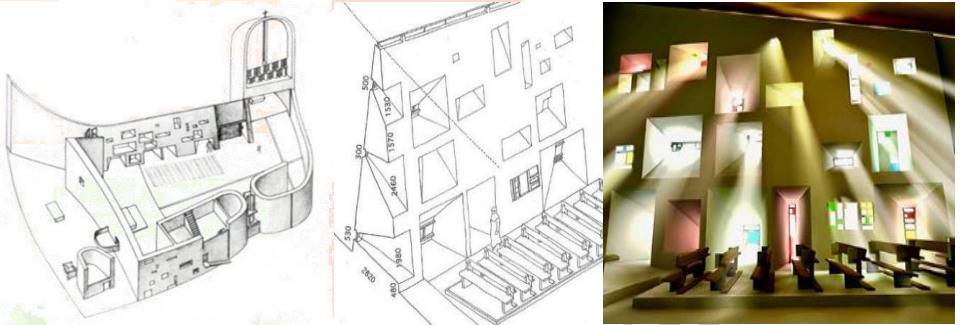
- a) **Building Form** - The building's curved shape creates peripheral areas, such as the back choir's, which extends the chapel's internal space onto the outdoor, often used for open-air religious events. Although the chapel's external appearance suggests a complicated layout, the interior is relatively simple in the plan.
- b) **Building Shape** – "The building's curved shape creates external areas, such as the back choir's, which extends the chapel's internal space onto the outdoor, often used for open-air religious events. Overall, the Ronchamp Chapel marks a discontinuity in Le Corbusier's architectural style, which, from then on, often moved towards somewhat more organic and sinuous shapes." (Archdaily, 2012)

- c) Building Colour /Texture - The colour and texture of reinforced concrete can be seen in the building with curved shapes on the roof or slightly slanting walls. Vibrant colours can only be seen in the tapered windows and pivotal doors through stained glass.
- d) Elements of the built form - Understanding the language and elements of design would help us understand how the abstraction style affects the essential elements or how they are used to create a new experience for the users - How can buildings convey ideas?
- 1) Walls - The chapel's primary structure consists of thick masonry walls curved to improve stability and provide structural support. Three thick white walls are seen to curl from the outside to create smaller chapels at the main space's sides. Two walls of them sit on either side of the north entrance and one in the south-east corner right next to the main entrance.
  - 2) Floor - The floor follows the site's slope towards the main altar and is covered with a concrete surface poured on-site and divided into a gridded pattern based on the architect's Modular system of proportions.
  - 3) Roof - The most astonishing part of Ronchamp is the curved roof that peels up towards the heavens. The curving roof seems to float above the building as it is supported by rooted columns in the walls, which creates a slight 10 cm gap between the roof and the walls, allowing for a sliver of clerestory light.
  - 4) Fenestration -
    - Windows- An irregular arrangement of variable-sized windows are scattered across the walls of the chapel. These are glazed with a mixture of coloured and clear glass elements.
    - Door - Internally, the chapel contains an ensemble of decorative elements and pieces of furniture also designed by Le Corbusier, including a large revolving pivotal door decorated on both sides with enamel steel tiles. The door itself has a painting by Le Corbusier. Door panels consist of an open hand, star, pyramid, meandering river, rain, and clouds.
- f) Light is highly appreciated with the use of fenestration elements made according to the cubist principles.
- g) The curving roof and walls are what define the chapel formally. It appears to be gradually growing directly from the hill itself as the roof's mere curve seems to mirror the curve (site) that the structure sits on.
- h) However, once one is inside the chapel, the curving walls and roof no longer define the project's pure aura and essence; instead, the light defines and gives meaning to the chapel experientially.



Plan of the Ronchamp Chapel: 1 - main entrance, 2 - nave, 3 - main altar, 4 - grand chapel, 5 - confessionals, 6 - evening chapel, 7 - morning chapel, 8 - sacristy, 9 - choir, 10 - the back choir external space

**Figure 5** 2D and 3D form of the chapel (Rocha, 2017)



**Figure 6** Sectional view of the cubist windows with stained glass for a spiritual light effect in the chapel (Blogspot, 2015)

## 6.2 Case 2: Vitra Fire Station, Weil am Rhein, Germany

“Vitra's name is associated with a new interpretation of architecture. Birsfelden, its headquarters (Switzerland), and the Vitra Campus in Weil am Rhein (Germany) have buildings designed by some of the world's most influential architects.” (wikiarquitectura, 2016)

The Vitra Fire Station was the first international design work of architect Zaha Hadid, and established her mixing polygons with triangular structures, getting a sense of movement distinguishing her designs. “The building's idea of obliquely intersecting concrete planes, which serve to shape and define the street running through the complex, represents the earliest attempt to translate Hadid's fantastical, powerful conceptual drawings into a functional architectural space.” (wikiarquitectura, 2016)

### 6.2.1 Reflection of an art movement (abstract style)

#### 6.2.1.1 Role of Lines in abstraction of the case

The idea of taking a segment from a tectonic and superimposing it in this building lets the lines float on a surface portraying the image of elements exploding into space. The fire station's oblique concrete planes and lines intersect following the Vitra Campus site's street pattern.

The basic principle of using tasteful geometric abstraction and non-figurative art and the idea of floating in a space explosion resembles the art movement – SUPREMATISM.

#### 6.2.1.2 Role of Shape in abstraction of the case

Zaha Hadid intends to make this, and most of her buildings with the idea of carving and floatation are highly inspired by the suprematist artist Kazimir Malevich. The concept of layering the obliquely intersecting concrete planes - horizontally and sliding vertically along with extended large shaped plans layered over on another is what Malevich always talked about in his composition of geometrical shapes with the layering.



The fragmentation with a maintained equilibrium and perceptible projections principle used in designing the building resembles that of the art movement – SUPREMATISM

### 6.2.1.3 Role of Colour in abstraction of the case

The building is designed according to the context, and in basic blocks of pale concrete, Color layered over on another, which is what the paintings such as – the black square of Malevich also portrays, i.e., the focus on a primary color with pure emotionalism without any figurative expression.

Hence, primary color shades without losing the surrounding area's context highly resemble the art movement – SUPREMATISM.



*Figure 7 Representation of the building by Zaha Hadid's Suprematist painting (Zaha Hadid Architects, 2019)*



*Figure 8 Basic natural color with Concrete texture matching the painting 'The black square' (Alluring World, 2016)*

### 6.2.1.4 Role of Texture in abstraction of the case

“Lightweight concrete with reinforced concrete in situ in the light, avoiding any added that distort the simplicity of its prismatic Form and the abstract quality of the architectural concept, paying particular attention to the edges' sharpness.” (wikiarquitectura, 2016)

The use of fundamental Texture with an overlaying of planes superimposed by one final Texture could be seen in many art movement paintings – SUPREMATISM.

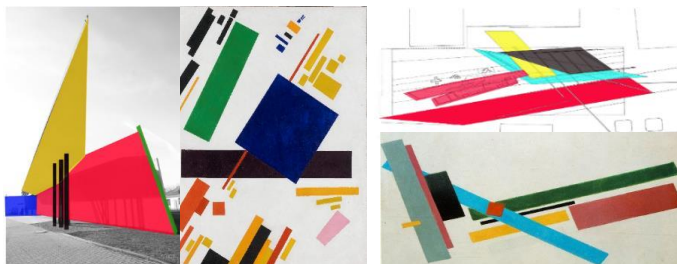
### 6.2.1.5 Role of Form in abstraction of the case

Zaha Hadid's Vitra fire station has a form that showcases the idea of an explosion in space, which somehow also matches the history of the blast in the Vitra campus that eventually led to the fire station's design. The building is designed in the form of layering that seems floating; a sense of dynamism and calligraphic flow could be seen in the building with every layer –plan, and elevation serving its functionality with a sense of motion. The whole building is in a movement, frozen. It expresses the mere tension of being on the alert and the budding potential to explode into action at any moment. The zagged Form and loss of sense of gravity lead to its resemblance with the free-floating idea of the art movement – SUPREMATISM.

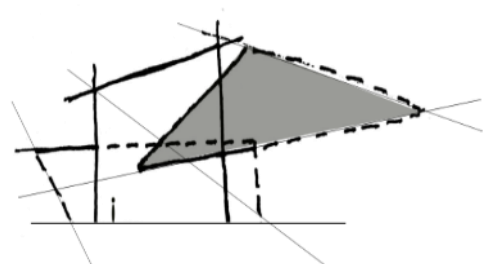
## 6.2.2 VITRA FIRE STATION AND SUPREMATISM – INFERENCES

After the study of the station based on the principles of the abstraction style of art, a very high resemblance of the

- Floating lines
- Zagged form
- Layered plan and elevation
- Primary Colour and layered Texture
- An idea of floatation and explosion in a fragmented manner but by maintaining the equilibrium to the composition with the loss of a sense of gravity.
- Tasteful geometric abstraction as weightless architons with pure emotionalism.
- Gravitational forces - not just 3D composition but also the recognition of a plan.



*Figure 9 Resemblance of suprematist characters in the fire Station (Author, 2021)*



*Figure 10 Folded sliding walls (Author, 2021)*

### 6.2.3 Qualitative Content Analysis –

- a) The building, as in Zaha Hadid's paintings, carries a powerful sensation of movement. The building's impression is said to change dramatically as one so moves past it.
- b) Building Form – “Zaha Hadid was initially tasked only to design the fire station itself. However, the project ultimately expanded to include boundary walls, a bicycle shed, and exercise space. These elements were to sit alongside a bend in the main road running through the very Vitra Campus.” (Winston, 2015)
- c) Building Shape - The fire station's shape was seen as the layering of sliding polygonal shapes on top of one another; the idea of an exploded form to look like it was frozen was applied. Fragmentation of polygonal shapes subject to the dynamism and a calligraphic flow can be seen in the museum. As-built on Suprematism principles, the idea of complete abstraction is incorporated with the Shape and Form.
- d) Building Color/Texture -  
Necessary use of colors for simplicity can be seen in the building, as per the art movement Suprematism, the minimum use of colors with just white, black, and red should the abstraction be presented.
- e) Elements of the built Form  
Understanding the language and design elements would help us know how the abstraction style affects the essential elements or how they are used to create a new experience for the users - How can buildings convey ideas?
  - 1) Walls – “The building itself is said to be composed of a series of linear concrete walls. The walls, which appear pure planar forms from the outside, are punctured, tilted, or folded to meet circulation and other activities' internal requirements. The planes that form the walls and roof are constructed from exposed, cast-in-situ concrete, which is visually impenetrable from the oblique angles, suddenly afford a view of the garage inside as one approaches a perpendicular angle.” (Architectuul, 2014)
  - 2) Floor - The fire station floors are divided with gliding lines and sliding partition walls; partitions make the floor a semi-open space with large functioning spaces. The second floor is rotated concerning the first/ground floor, and a stepladder independent access it.
  - 3) Fenestration –
    - Windows –  
The absence of detail was applied on the inside, polished aluminum sliding planes that close the garage area, rough opening frames, guard rails, or lighting design, maintaining a consistent language that gives meaning to the whole. The use of glazing curtain windows with bare minimum detail putting the focus on the sliding walls, which was the main idea.
    - Doors –  
The station's entrance is carved from the street-facing elevation, the otherwise open spaces station has just on entry, but the sliding walls themselves act as various entrance points into the station.

### 6.3 Case 3: Rietveld Schroder house, Utrecht, The Netherlands

“The Rietveld Schröder House in Utrecht, commissioned by Ms. Truus Schröder-Schräder and designed by the architect Gerrit Thomas Rietveld was built-in 1924. The small family house, with its interior, the flexible spatial arrangement, and the formal and visual qualities, was a manifesto of the principals of the art movement ‘De Stijl’ group of artists and architects in the country Netherlands in the 1920s and has been considered as one of the few icons of the Modern Movement in architecture.” (Fabrizi, 2014)

#### 6.3.1 Reflection of an art movement (abstract style)

##### 6.3.1.1 Role of Lines in abstraction of the case

The idea of clearly defined straight or sometimes diagonal lines being the same division of a picture plane is manifested in Rietveld's house. The division of lines hence creates a sense of feeling for rhythm. The idea of the most reduced form(ultimate abstraction) of an object in lines and divisions is correctly maintained throughout the project.

Such lines as the plane's divisions could be identified as the art movement principles – **DE STIJL**. A very swift exclusion of natural forms and replacing them with mere lines is what the movement was about.

##### 6.3.1.2 Role of Shape in abstraction of the case

The use of rectangles and squares formed by the division of horizontal and vertical lines is actively used in the house, not just the walls that are reduced to basic individual units acting as shapes floating in the air with a very proper positive and negative emphasis on the spaces but also the floor pattern, the collapsible walls, and the fenestrations are designed keeping in mind the division of lines into shapes of squares and rectangles.

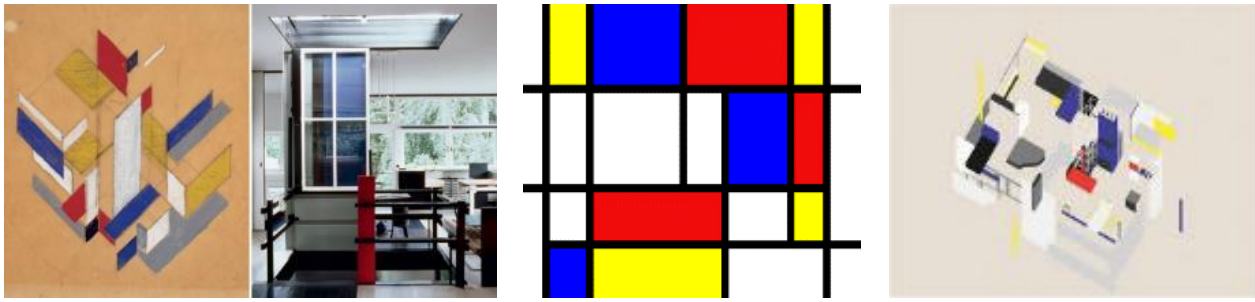
Such a composition of shapes formed by the division of lines could be identified as a case of the art movement's influence – **DE STIJL**.

##### 6.3.1.3 Role of Colour in abstraction of the case

Colour is known to be one of the essential features of this house and also something that makes it very different from the rest, the use of the basic primary colors – Red, yellow and blue along with black and white makes the building be reduced to the fundamental elements of life complying it to be the simplest form of all. A sense of balance and harmony is also being maintained at the house with a sensible distribution of colors on the façade and the interiors.

The use of such primary colors with black and white in the rectangular shapes due to the composition created by the division of lines on the canvas could be justified as inspired by the art movement – **DE STIJL**.





**Figure 11** Use of primary colors - Red, Blue and Yellow along with black and white compositions (wordpress, 2010)

#### 6.3.1.4 Role of Texture in abstraction of the case

The main structure of the house is built of reinforced concrete slabs and profiles of steel. Walls are made of brick and plaster; doors, window frames, and floors were made from wood. Hence very plane textures with the main focus laying on its durability and the aesthetic depending on solely the colors and space divisions.

#### 6.3.1.5 Role of Form in abstraction of the case

When built, the house was a very new design rejecting all the heavy norms of ornamentation in buildings, using basic shapes of rectangles and squares, resultant of the composition of lines on the façade.

### 6.3.2 RIETVELD SCHRODER HOUSE AND DE STIJL – INFERENCES

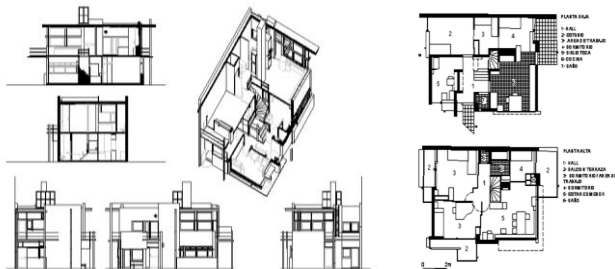
As a result, we can now understand the status of De Stijl's architectural presence in Modernism. Expanding Rietveld's notion of joining, which we observe in his prior furniture such as the Red and Blue Chair, the Schröder House connotes both conjunction and union of space and Color, but within the collaboration Truus Schröder. "The Schröder House is full of those inversions that continually pervert the functionalist ethic of *modernist architecture*'16, but it can equally be argued that functionalism was met in its purest form:

The house was designed with close cooperation with the intended resident, and therefore the building successfully achieves its purpose as both a sculptural masterpiece of De Stijl art-turned-architecture and a functional home explicitly designed for the needs of its inhabitants. With this, De Stijl became part of Modernism, a prosthetic that changed the relationship between space and person, and as an extension, person and the ground." (Zonaga, 2012)

#### 6.3.3 Qualitative Content Analysis –

The building's qualitative analysis has been done to analyze architectural elements and effects of the abstraction style in-depth to identify the factors supporting the art movement.

1. What makes the project an icon of the Modern Movement is its fundamental approach to design, space, colors, and the purity of its specific concepts and ideas represented in the art movement. Its transformational quality of evenly matched spaces, composed of independent planes, perfectly fits the De Stijl movement's goals.
2. Building Form – "The Schroder House is the only such building designed according to the De Stijl style, which was marked by primary colors and pure ideas. The use of rectangular and block shapes for the two-storied building elements is what made the Plan, and the elevation, look like a floating piece of architecture." (Zonaga, 2012)
3. Building Shape - The house has the most critical use of shapes in the design; getting inspired by De-Stijl Rietveld, tried to incorporate the principle of complete abstraction by reducing complex forms into the elemental composition of lines, shapes filled with the primary colors giving it a simple edge for less complexity. Hence, straight lines dividing the whole area and volume into many rectangular and block shapes were used as a designing strategy that led the building to look like a sensible composition of shapes and lines.



**Figure 12** 2D and 3D drawings of the Schroder House (Pinterest, 2019)



**Figure 13** Colors used in interiors (Dezzen, 2018)

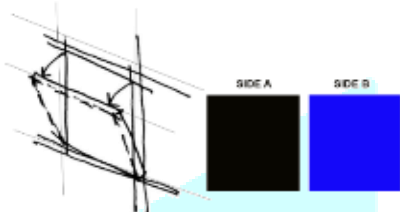
4. Building Color/Texture - The building is highlighted mostly because of its simple use of bold and primary colors – Red, yellow, blue, and black and white. Not just the walls defined by this color scheme, but its use on the floors, fenestrations, partitions, and furniture makes it stand out the most. The wide use of the primary colors highlighted by black and white at the edges lets the building define its Color and straight Texture.

## 5. Elements of the built Form –

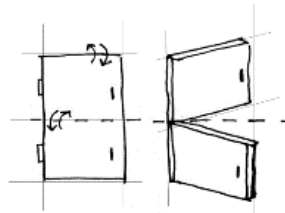
Understanding the language and design elements would help us know how the abstraction style affects the essential elements or how they are used to create a new experience for the users - How can buildings convey ideas?

- Walls - Rietveld's designed house was expansive, modest, and functional. He came up with all different kinds of innovative solutions to achieve them. One of such ideas involved sliding walls on the first floor. It was an open space by day, but the Schröder family could split it into three isolated rooms in the evening.
- Floor – “The two-story house contains a transformable dining /kitchen/living area, studio space, and reading room on the bottom floor, and the second floor had bedrooms and storage space, which are separated by portable partitions.” (Zonaga, 2012) It is designed and painted in a manner that the lines and color blocks divide space, and after the collapsible walls are opened for a big area, the spacious room, it acts as a De-Stijl painting canvas with the black horizontal and vertical lines along with the primary colors.
- Fenestration –
  - Windows –  
The introduction of wooden shutters painted double-faced so that it has a different view from each side and not forgetting the corner windows that open at 90 degrees to the other.
  - Doors –  
The double hinged door that allows free movement in both direction and halved as per convenience

6. The staircase acts as a center point around which all the divisions and circulations are carried out.



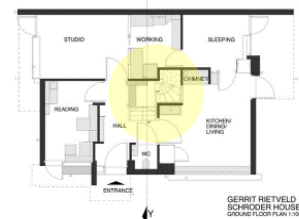
**Figure 14** Two faced colored wooden shutters (Author, 2021)



**Figure 15** Mid partitioned door (Author, 2021)



**Figure 16** Staircase placement was for a connection point as well as a private telephone corner (Archilovers, 2018) (Author, 2021)



## 6.4 Case 4: The Guggenheim museum, Bilbao, Spain

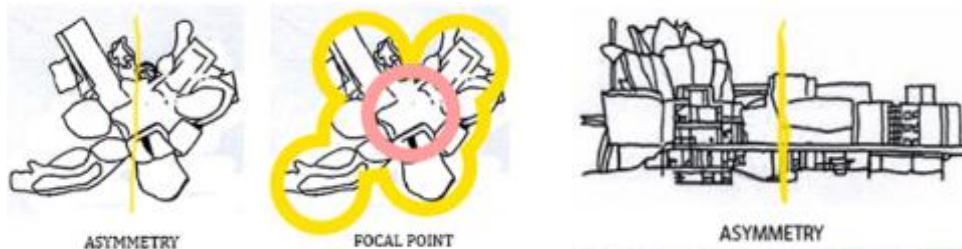
“The work of the American architect- Frank O. Gehry, the Guggenheim Museum plays a vital role in the urban transformation and revitalization of the area and becoming the symbol of Bilbao, Spain. The building is said to be a perfect example of the more avant-garde architecture of the twentieth century. Also, it represents a landmark for its innovative architectural design both domestically and abroad, forming the extravagant backdrop for a contemporary art exhibition.” (Fabrizi, 2014)

### 6.4.1 Reflection of an art movement (abstract style)

#### 6.4.1.1 Role of Lines in abstraction of the case

The era of abstract expressionism was mainly carried forward with an idea to paint using your subconscious mind by engaging it through psychic automatism. Hand gestures were common in all the movement artists, which were curved and free-flowing drips of paint with no symmetry or a defined focal point.

The same could be seen in the museum; the façade is made of curved lines free-flowing with a gesture to let go and express; there is no symmetry in the lines or a defined focal point. Hence the built could be related to the principles of the art movement – ABSTRACT EXPRESSIONISM.



**Figure 17** Role of lines in the museum (Mancuso, 2019)



**Figure 18** Abstract expressionist painting (Art Tate, 2018)

#### 6.4.1.2 Role of Shape in abstraction of the case

When we look at the museum, there are no defined shapes; the use of curved rectangles could be seen, but that too in the form of a flow. The same could be observed in the paintings by Jackson Pollock and Mark Rothko. Whereas one used free-flowing gestured drip paintings, the other concentrated on the effect of color and shapes on a human mind.

#### 6.4.1.3 Role of Colour in abstraction of the case

More than the hue of the color, the museum's primary focus is to convey the idea behind it; the structure lies before water; hence, using a reflective surface with a luster to it resembling fish scales is seen as the correct choice of color. The same property was seen in Jackson pollock paintings; the main focus was always on the gesture and scale of the painting.

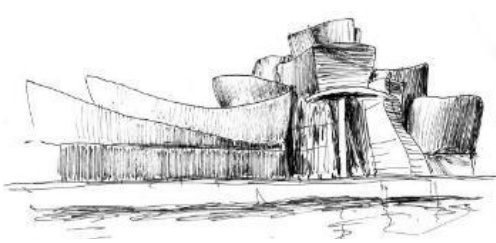


#### 6.4.1.4 Role of Texture in abstraction of the case

The museums' texture could be well seen due to its use of metalled sheets as a material and the grains. The high resemblance to the fish scale could be seen on the façade material that hence makes this resemble the use of texture as mere strokes of spontaneity in ABSTRACT EXPRESSIONISM; the museum could be well seen as layered strokes of sheets one top of another just like the drip paintings of Jackson Pollock.

#### 6.4.1.5 Role of Form in abstraction of the case

When built, the house was a very new design rejecting all the heavy norms of ornamentation in buildings, using basic shapes of rectangles and squares, resultant of the composition of lines on the façade.



**Figure 19** Fish scaled texture with a feeling of layered strokes (Author, 2021)



**Figure 20** Sketch by Frank O Gehry representing the action flow of the museum (Guggenheim Museum, 2019)

### 6.4.2 GUGGENHEIM MUSEUM, BILBAO AND ABSTRACT EXPRESSIONISM - INFERENCES

After the study of the station based on the principles of the abstraction style of art, a very high resemblance of the

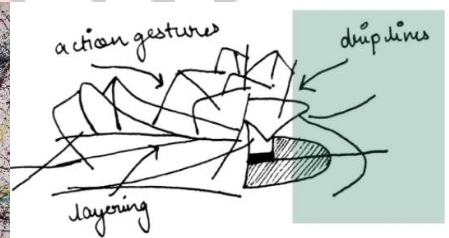
- Free-flowing lines in the form of the structure and shape pattern of the museum match the idea of gesture drip/action painting of the art movement
- The use of curvilinear shapes, deformed and deconstructive, is what the concept behind abstract expressionism was – to paint with your subconscious and thus to engage more attention and poetry behind the work.
- The museum's massive scale affects a viewer the most; the use of gigantic deformed shapes to create a form is also what the art movement discussed. Abstract expressionism was well known for the massive scale of paintings that many times even fitted in rooms.
- The museum's scale texture resembles the texture of drip paints played on one another on a big scale canvas.
- The most crucial point of conveying an idea open-ended for the viewer to have their perspective is what both the movement and the museum have in common.



**Figure 21** Choice of silver colour with a reflective quality and according to the context of the site. (The Guardian, 2017)



**Figure 22** Action/drip abstract expressionist painting (Art Tate, 2018)



**Figure 23** Similar characteristics of the abstract movement and the museum (Author, 2021)

#### 6.4.3 Qualitative Content Analysis –

The building's qualitative analysis has been done to analyze architectural elements and effects of the abstraction style in-depth to identify the factors supporting the art movement.

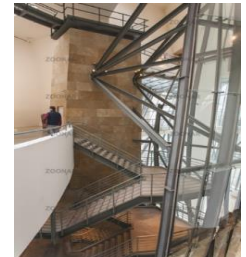
1. Building Form - Although the exterior's metallic form looks almost floral from above, the building more closely resembles a boat, evoking Bilbao's port's past industrial life. "Constructed titanium, limestone, and glass, the seemingly random curves of the exterior are designed to catch the light and react to the sun and the weather" (Guggenheim Museum, 2019).
2. Building Shape - "Because of their mathematical complexity, the sinuous curves were designed using a three-dimensional design software called Catia, which allowed designs and calculations that, years earlier, had not been possible" (Guggenheim Museum, 2019).
3. Building Color/Texture - "The design of the building follows the style of Frank Gehry. Inspired by the shapes and textures of a fish; it can be considered a sculpture, a work of art in itself." (slideshare, 2015)
4. Elements of the built Form –
 

Understanding the language and design elements would help us know how the abstraction style affects the essential elements or how they are used to create a new experience for the users - How can buildings convey ideas?

  - a) Walls - "The steel structure is made up of three structural frames. The primary steel girder frame supports the weight of the building" (Guggenheim Museum, 2019).



- b) Floor - “The building seems to be built around a central axis; the hall is a 50 meters high, monumental space topped by a metal dome. Around it, a system of glass elevators, curved bridges, and stair towers connecting the Nineteen galleries spread over three top floors, which combine classic rectangular space with many other unique forms and proportions, all lit by the dome (zenith). Temporary exhibitions and large-formatted works have a place in a gallery of about 30 m. wide and nearly 130 m—long, free of columns, located on the volume that passes under the La Salve Bridge on-site.” (Guggenheim Museum , 2019)
- c) Fenestration –
  - Windows –
    - . Large curtain walls allowing natural light to enter the building. The atrium is a very critical element of the building. It connects all the different galleries. It is an area somewhere halfway between the exterior and the interior of the museum.
  - Doors –
    - The large curtain wall designed entrance is situated right at the front of the river, with glass acting as a perfect reflective space and a mesmerizing view.
5. Staircase - The museum's exterior and interior have two different staircase types, while the outer staircase is made of stone with a low rise and more wide width matching the enormous scale of the museum itself. The interior staircase runs along the atrium, connecting to different galleries' pathways and lobbies in a zagged pattern with steel rails.
6. Roof- Seen from the river, the roof's form resembles a boat, but it resembles a flower from the other side. Hence there is no specific roof shape but a series of metal surfaces arranged in a pattern



**Figure 24** Resemblance to a flower from one side and boat from another (e-architect, 2020)

**Figure 25** Atrium comprising of the windows with staircases (Guggenheim Museum , 2019)

## 6.5 Case 5: Parc De La Villette (follies), Paris, France

“La Villette could be conceived of as one of the largest buildings ever constructed — a discontinuous building but a single structure nevertheless, overlapping the site’s existing features and articulating new activities” (Architectuur, 2014). The winning project of the 1982 competition, the entry by Bernard Tschumi, proposed distributing the built program into small elements scattered across the park’s whole surface and aligned onto an orthogonal grid where each point is 120 meters apart from the other. As Bernard Tschumi wrote, in the Park La Villette, the “Follies” become something else:

“The new meaning of Follie [replaces] the extravagant display of eclectic styles with the regulated juxtaposition of unprecedented programs. This operation aims to remove la folly from immersion in the historical object and relocate it on the broader abstraction level as an autonomous neutral object. Some of the red enameled steel Follies host park facilities, like a restaurant, a bar, a club, or a first-aid post; others are just sculptural elements” (Fabrizi, 2014).

### 6.5.1 Reflection of an art movement (abstract style)

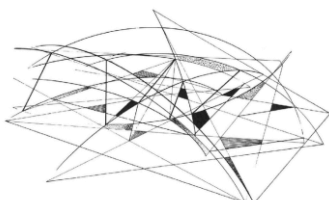
#### 6.5.1.1 Role of Lines in abstraction of the case

When noticed in the la Villette, the use of lines is highly evident. A sensible composition of lines is made unusually, developing various intersecting lines at various points.

Such qualities of the structure's linear composition also remind us of the problematic use of lines in the art movement – POP/COLLAGE ART. The abstract art movement incorporated the use of very intricate yet recognizable forms and then made a composition out of it, giving the structure a whole new meaning that is highly evident in the Parc La Villette Follies.

#### 6.5.1.2 Role of Shape in abstraction of the case

Shapes play a significant role in the case study as the lines intersecting at various points create profiles that modulate an unusual composition. Curvilinear, rectangular, and strip shapes make the structure stand out of its context of organic natural forms and shapes. These shapes then are composed in such a manner that they somehow create harmony with its nature.



**Figure 26** The tripartite strategy for the Parc de La Villette (Quici, 2016)

**Figure 27** Types of shape compositions used during the designs of the follies (Author, 2021)

### 6.5.1.3 Role of Colour in abstraction of the case

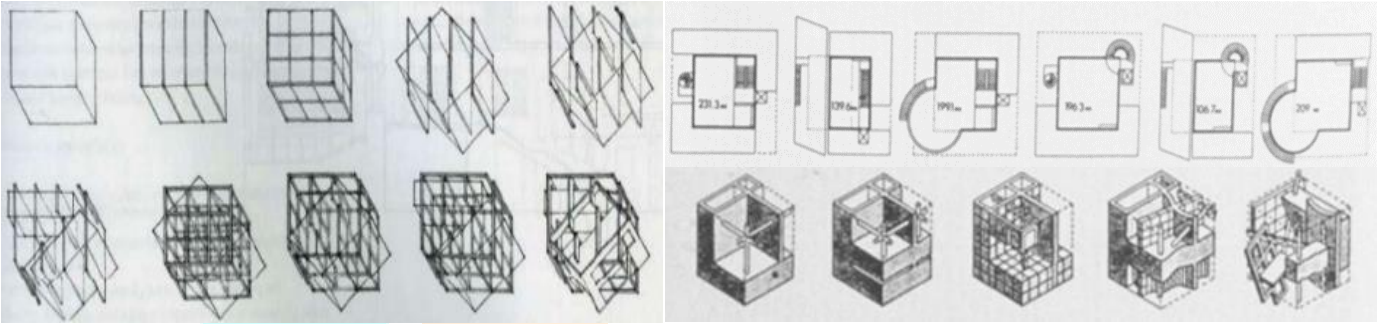
Color is the most crucial feature of the structure as this is what differentiates it from the backdrop of greenish nature. The use of color red makes the design noticeable with irony to its context and uses mixed media and collage methods to identify its layering. Recognizable imagery is what also highlights the use of the color red.

### 6.5.1.4 Role of Texture in abstraction of the case

The structure has a simple texture of paint with a clear reflective quality due to the enamel and the same kind of texture with layering, but no terrain could be seen in the abstract artworks of the movement POP/COLLAGES art movement.

### 6.5.1.5 Role of Form in abstraction of the case

“The five steps laid forward were - 1) to organize the significant programmatic elements in horizontal bands across the site, 2) to place kiosks, playgrounds, barbeque pits, and other facilities mathematically on grid points, 3) the addition of around forest as an architectural element, 4) to provide connections between the points, and finally, 5) to introduce superimpositions.” (Fabrizi, 2014) Hence 35 different forms of the grid points (follies) were made, each suitable for another purpose.



**Figure 28** Intersection, Qualification, Distortion, Repetition and fragmentation of the folly form development according to the collage techniques. (Neiman, 2005)

## 6.5.2 PARC DE LA VILLETTE (FOLLIES) AND POP/COLLAGES ART – INFERENCES

After the study of the station based on the principles of the abstraction style of art, a very high resemblance of -

- Most importantly, the bright color scheme identifies as a characteristic of the pop art culture. The color red is highly contrasting yet adds up a satire to the context of its surroundings filled with lush green trees of Paris.
- The use of elements as basic shapes and their layering in the form of a collage is seen in the times' pop-collage artworks.
- Big block and curvilinear forms are joining together to form 35 different patterns with the same concept. This kind of practice is frequently seen in pop art's repetitive artworks with recognizable imagery presented in many forms with different compositions and colors.
- The use of duplicating images in 35 different forms is what made pop culture different from any other abstract art movement and can be seen in this place.
- Relatable for the common public is the structure and abstract art movement aimed for and fulfilled.

Noticing all the points above, one could conclude that Parc De La Villette's designing principles highly resemble the abstract art movement principles –POP/COLLAGES ART.



**Figure 29** Influence and resemblance of the pop art characteristics in the follies of vibrant colors, recognizable imagery and fragmentation. (Fabrizi, 2014)



**Figure 30** Pop Art characteristics of vibrant colors (Artalistic, 2020)

### 6.5.3 Qualitative Content Analysis –

The building's qualitative analysis has been done to analyze architectural elements and effects of the abstraction style in-depth to identify the factors supporting the art movement.

1. Building Form - “Using the transformation rules (i.e., repetition, distortion, superimposition, and fragmentation), Tschumi has designed the follies without any functional considerations. Follies' only role is to create a matrix that works to organize the park and act as reference points to visitors within the park” (Papadakis, 1988)
2. Building Shape - No longer use a pure and crystallized form, but instead of red points called Follies, which constitute a dissociated series of “generating cells” whose transformations are not circumscribable. Hence the use of block and circular shapes were used as a composition in the park's follies.



3. Building Color/Texture - The follies that are the plan's grid points are red chosen to create a contrast with the lush green surroundings and create a better image of the park by breaking the park's dull walking monotony. The texture also contributes to satire with it being of the smooth reflective quality of enamel paint.
4. Elements of the built Form –  
Understanding the language and design elements would help us know how the abstraction style affects the essential elements or how they are used to create a new experience for the users - How can buildings convey ideas?
  - a) Walls - The follies are made of sheets of red-painted reflective material that acts as the building blocks of each segment of the folly, following the idea of deconstructive architecture and collage composition in architecture. No visible wall is present at the façade, just a nude framework of the vertical members divided by floors.
  - b) Floor - The follies are around the natural ground with them just acting as center points of different interaction points; hence the green grass around with an essential flooring inside the follies was given, with its abstract collage quality of the 35 follies has different patterns of the floors.
  - c) Frame –Follies are like architectural dice thrown out, and perhaps play will have to begin in earnest before someone can assess the venture's effectiveness. Hence different frames for every segment or element of the folly.
  - d) Fenestration –
    - Windows –  
There is no specific use of windows in the structure as they are mostly used as usable installations around the park, but a transparent region of air ventilation and openings are provided for the transparency and user accessibility of the design.
    - Doors –  
No specific entry point is provided; just a series of collages are formed using shapes to make access to the follies much easier.
  - e) Staircase - The use of staircases as decorative or in some even functional elements are provided. Some go in the curvilinear or spiral shape, while somewhere, essential ladders or wheels are used for the follies' connections.
5. The Parc de la Villette follies reveal themselves as reflections on time, the past, the present, the future, and relationships.
6. Parc de la Villette is often criticized as too large to be designed without considering a human scale.



**Figure 31** Follies placed as the intersecting points on a grid (Liboriussen, 2009)



**Figure 32** Different combinations of staircase styles (New Age Architecture, 2015)

## VII. RESULTS AND DISCUSSION

- At **Ronchamp (Notre dame haut)**, incorporating the cubist abstract style principles can be well seen with the idea of 'no single perspective' and hence effecting the architectural elements – walls, floor, fenestrations (doors and windows), and orientation. It has constant use of elements, mainly walls and fenestrations with various angles and viewpoints, rather than a single fixed position, resulting in natural light on the textured concrete walls creating a phenomenological effect. Hence, making the space and form look more spiritually inclined and at resonance with nature and the giant scale makes it look remarkable. The use of color and chiseled windows brings out cubism's main idea to include geometry and multiple painting perspectives.
- At the **Vitra fire station**, tectonic massing and in-action forms indicate the implementation of suprematist abstract art style principles. Like in Suprematism, the figures are said to be in action and an explosion out in the universe; the forms and shapes for the building can be seen in the same manner. It makes the spaces wider and angled with a sense of urgency and hence make such functions reside in the space and form requires attention and focus, like in this case – a fire station. The use of storefront windows and angled cuts show every architectural element to be affected, and elements like the staircase and entrance are focused on the center with spiked railings and floating steps showcasing the instant emotion.
- At **Schroder House**, rectilinear massing and golden ratio scale with square proportions can be seen. Matching the philosophies behind the de Stijl abstract art style, the building was taken under a spatial grid organization reflecting the idea and theory of the geometry of the rectangle, straight line, and the square, combined with a strong asymmetry. The use of sliding walls and transformable spaces is how the style affects the space. These principles could achieve a sense of transparency; the use of wooden shutter windows, two parted doors, grid painted floors, and central staircase space is what makes space and form seem to be floating and free. The main focus is also on using primary colors- red, blue, and yellow along with black and white lines making it less dull and more appealing to the eyes using primary vibrant colors.
- **The Guggenheim museum's** free-flowing form can be well observed as the inspired theory by abstract expressionism style. The use of curves and flowing lines leaves a loose interpretation of the resemblance of form from every perspective to be different. From one end, it seems like a flower, while from the other end a boat. A single source of light could also be used when talking of an open monumental scale structure. The atrium with the glass façade is the central point of movement and



light, resulting in a central spatial organization. Using more curvilinear and organic lines and forms may help sync with the surrounding nature and site. Repetition of the same effect elements in different directions and flow may cause a sense of subconscious designing of the structure. Like the expressionist paintings are open for the viewers' perspective, the museum's resemblance to a current form is an open-ended idea that affects the architectural elements like the walls, façade, windows, and staircases.

- At the **Park La Villette 'follies'**, the basic idea of historical background with vibrant and lively colors bringing modernity can be seen and matched with pop art abstract style. Based on a historical backdrop, the project is relatively conventional, and adding these follies of popped-out vibrant colors with a function to be the grid points on a large map of the park brings out the idea of contrast. More than the architectural elements like walls, floors, etc., the concept affects the designing principles of contrast and rhythm and adds a touch of sophistication to the transparent, open spaces and forms. The different staircase styles also break the historical monotony of the form and siting.

## VIII. CONCLUSIONS

The study has established that incorporating the concept of Abstraction in architecture could play a significant role in shaping up the user experience of a space or form, and it is just as effective as it is in art. Abstraction in art promotes the idea to evoke inner emotions and not just essence on replication, keeping in mind that each abstract style could have a different outcome depending on its emphasized element. Although, in the end, it is the 'open-ended' scenario that would direct the viewer to have their own perspective and storyline with a background of the primary suggested emotion (through elements) rather than portraying things realistically. In architecture, the concept of abstraction affects the emotion of a space by making it rich in experience, with the use of architectural elements arranged in spatial or formative organizations inspired by the theories of abstract styles of art movements – cubism, abstract expressionism, de Stijl, Suprematism, and pop art, would strike chords, particularly of certain emotions along with a freedom to the user of having their own storyline with the earlier suggested background element. This freedom would help the user connect visually and emotionally to space or form and have a theme of an 'abstraction' inspired building.

### 8.1 CONCLUSION BASED ON ELEMENTS OF ARCHITECTURE –

Abstraction as a concept in architecture could only be well judged after understanding its effect on architectural elements. Hence the study of each element's role in abstraction was observed through the five case studies, and the conclusions came as –

#### 8.1.1 WALLS –

- Walls in ronchamp play a role of gigantism and enlarged monumental scale with no such prominence to the chapel's function or abstraction concept.
- Walls in the Vitra fire station play a significant role in supporting abstraction as the tectonic planes sliding past and over each other create a sense of alertness and explosion. The walls in Vitra give a sense of angular direction to the spaces.
- Walls in Schroder house are transformable and adds the role of transparency with balanced private and open spaces. They act as the defining lines of abstraction floating in space.
- Walls in Guggenheim museum, Bilbao gives a message of open ended-ness with its free-flowing curves and layered planes, which has a different story from each perspective.
- Walls in Parc de la Villette play no such role in abstraction, but they act as the essential planar elements in an organization.

#### 8.1.2 FLOOR –

- The floor in ronchamp plays a significant role in abstraction as being built on a slope; the chapel is obeying the hill's structure with a multiple view perspective.
- The floor in the Vitra fire station plays the role of torching the direction via stripes and patterns on the floor in abstraction.
- Schroder's house floor can be seen playing a significant role in abstraction with the grid pattern of primary colors and black and white lines running perpendicular and across one another.
- The Guggenheim museum floor has no such prominence in abstraction as it is a mere result of the organization's curved walls.
- Parc de la Villette has floors just for a division of space and main staircase landing, so they have a supporting role in abstraction.

#### 8.1.3 ROOF –

- The roof of the ronchamp is the most striking element to play an essential role in abstraction with its heavy structure along with a slight slit for light and, most notably, the multiple viewpoints and perspective from a single position, all supporting abstraction.
- The Vitra fire station's roof results from the enormous tectonic walls sliding past each other and forming polygonal planes overlapping. Hence the roof has a significant role to play in abstraction but only due to the walls.
- Roofs in Schroder house have no role to play in abstraction.
- Roof in Guggenheim museum results from curved walls and has no individual role to play other than the open-ended quality of a different story from each side/perspective.
- Roof in Parc de la Villette has no such role in abstraction.

#### 8.1.4 STAIRCASE –

- There is no such prominent staircase present in ronchamp resulting in no role to play in abstraction.
- In Vitra, the staircase adds to abstraction's value with its floating steps and spiking one-sided railing.
- Schroder house has a minor but essential role in abstraction, with it being the central point connecting two-floor planes in a private space supporting the abstract idea.
- Staircases in the Guggenheim museum have two significant roles: the open and sweeping staircase and the other being the central atrium staircase supporting multiple storyline's abstract idea.
- Staircases in the Parc de la Villette follies have a significant role to play as they are the most noticeable features of the structure itself, changing and evolving in each of the 35 follies.

#### 8.1.5 COLOR+TEXTURE –

- The colour and texture of ronchamp add up the subtle idea type of abstraction with the promotion of purity and spirituality due to the white concrete texture allowing the form to be noticed better.
- Vitra fire station has no significant role in abstraction due to colour and texture as it the form that is captivating enough for the abstract idea of alertness.
- Schroder house is noticeable as a remarkable piece of abstraction because of the role of colour in it; the texture is not something the style is highlighted for. The use of primary colour with black and white has a prominent role to play in abstraction.
- More than the colour, the fish scaled metallic and reflective texture that has a role to play in the Guggenheim museum's abstraction.
- Parc de la Villette is an ensemble of abstraction only through vibrant red colour, although texture has no significant role in discussing abstraction.

#### 8.1.6 FENESTRATIONS –

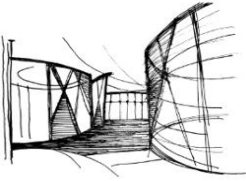

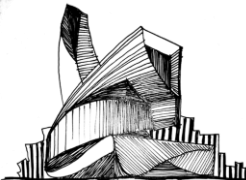
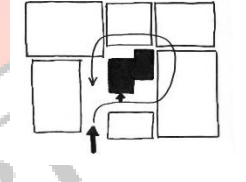
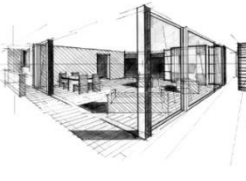
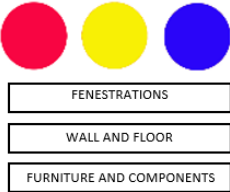

- Ronchamp has a noticeable set of chiselled multi-colored and multi-angled windows that play a role in abstraction. Whereas when talked about the doors, it is just the abstract painting that supports abstraction and no other functional quality.
- Windows and doors of Vitra fire stations have no such role to play in abstraction as they are merely the results of openings caused by sliding walls.
- A preeminent role has been played in abstraction by the windows and doors of the Schroder house with their double-sided ability and convertibility.
- There is just one role the open-to-sky fenestration in the atrium has to play as providing the light from that one single source supporting the concept of abstraction.
- Parc de la Villette follies have no other purpose than the aesthetic one when talking about play in abstraction.

#### 8.1.7 VOLUME AND ENCLOSURE –

- The volume of ronchamp plays a significant role in abstraction as it is what gives the space and form a sense of grandeur with its massive scale.
- The Vitra fire station volume causes a feeling of pickiness and angled tectonic spacing, which plays a significant role in abstraction.
- Spatial grid organization gives the Schroder house a sense of enclosed box with horizontal and vertical planes floating across each other, playing an essential role in abstraction.
- The sense of grandeur and sizeable massive scale can be noticed as the role the Guggenheim museum's volume has to play in abstraction.

## 8.2 COMPARATIVE CONCLUSIONS AND RECOMMENDATIONS

Table 2 Comparative analysis conclusion statements based on architectural element's role in abstraction

ARCHITECTURAL ELEMENT	COMPARATIVE CONCLUSION AND RECOMMENDATION (ROLE IN ABSTRACTION)	FIGURES (Author,2021)
WALL	<p>Walls in abstraction have a significant role to play as they result in forms and spaces. Either linear or curved, they show a sense of direction. When linear, they seem to follow stern spaces or formal and transparent spaces when used as convertible and sliding. The curved and free-flowing walls may add up to the vista and view of the space but have no other functional property besides adding a sense of grandeur.</p> <p>It is also unnecessary to have visible walls; they can be mere planar surfaces to showcase abstraction and paired with colors and staircases.</p>	
FLOOR	<p>The floor is merely the lower horizontal surface of any space in the building, it has no direct role to play in abstraction, but when paired up with colour and texture, it brings out a significant role of space division or the use of lines and patterns that end up adding value to the spatial organization of space.</p> <p>It primarily contributes to space division in abstraction.</p>	
ROOF	<p>Roofs in abstraction have a role to play, which is more than just being a covering; it adds up to the grandeur with an entry of light patterns and the structure's aesthetic value.</p> <p>Flat roofs have no such abstract significance, but curved and free-flowing roofs resulting from wall formations give a touch of massive scale and a hidden storyline, adding mystery to the structure. Roofs mostly play a supporting role as a result of the wall formations and not independently in abstraction.</p>	
STAIRCASE	<p>Staircases have more of an aesthetic role rather than a functional one in abstraction. The use of free-floating steps and one-sided railings gives the staircase a feeling of attention, whereas, in some places, they act as the central ground for the connections between floors resulting in them having private enclosed spaces dedicated to them. Either spiral, curved or linear, the staircases always add up an aesthetic angle to the concept of abstraction in architecture.</p>	
FENESTRATION	<p>Fenestrations act as the essential elements in abstraction as their use affects the whole space and lighting. When used as punctures with tinted glass, the windows add an angle of spirituality, while polygonal curtain walls give a space a touch of formality. The convertible and two-sided windows and doors sum up to the transparency of spaces, and a single inlet opening showcases the massive scale of the structure. Fenestrations could be well highlighted when used with vibrant and noticeable colors but most notably at the right locations for light entry.</p>	
COLOR+TEXTURE	<p>When talking about abstraction, it is the color and texture that promotes it to be abstract. The use of vibrant and attentive colors results in the structure's demanded focus, while subtle colors with grainy textures allow nature to be entirely reactive on its part. Sometimes the use of basic primary colors may also result in abstract compositions.</p> <p>Without the proper use of colors, be it just the primary or the basic subtle hues, a sense of abstraction could not be achieved through any style.</p>	
VOLUME + ENCLOSURE	<p>The volume of a space has a vital role to play in abstraction in terms of ergonomics. As the use of massive walls with high roofs and the single light source may result in a grandeur most suitable for large public buildings and colossal crowd, while on the other hand, the use of tectonic enclosures with sliding walls and polygonal openings result in stern and formal volumes for less and reserved crowds. Hence, human-scale dependency matters the most in abstraction in architecture, resulting in good volume and enclosures serving different functions.</p>	



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