

STUDY OF MODERN FAÇADE

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Abstract:

The study of modern facades has become increasingly important in recent years as buildings play an increasingly significant role in shaping our urban environments. Modern facades are characterized by their innovative design, use of new materials and technologies, and their emphasis on environmental sustainability. Architects and engineers face various challenges in designing modern facades, such as balancing aesthetics and functionality, ensuring structural integrity, and meeting regulatory requirements. Advances in materials and technologies have helped to address these challenges, resulting in facades that are more efficient, flexible, durable, safe, and sustainable.

Key words. modern facades , materials , technologies , sustainability , aesthetics , functionality

1. INTRODUCTION

The façade forms the outer envelope of a building and serves various purposes. Primarily, the façade protects the interior from environmental conditions such as wind, rain, and sun, and it also separates the often-intimate interior from views from the 'public' outside. Another key aspect of a modern façade design is to generate a unique appearance for the building, sometimes even creating a landmark that is well known in public.

A façade system usually consists of the façade cladding, a two-dimensional element that is supported by a primary and / or secondary structure. Various materials for the cladding have been used in architecture ranging from more traditional envelope materials such as glass, metal, stone, timber, concrete, etc. to materials that have been developed during the last decades such as glass fiber reinforced plastic (GRP), glass fiber reinforced concrete (GRC) just to mention a few. It is obvious that the use of textile membranes and foils as part of the building envelope is becoming more and more popular and several striking examples have been realized during the last years

AIM

To study various modern trends in development of façade.

OBJECTIVES

To study basic visual elements of a façade.

To understand the facade system and its technologies, To seek interest in vertical surface treatments of a building.

To study the range of materials in treating facade.

LIMITATION

It is limited from the perspective of architectural design research.

METHODOLOGY

To reach the necessary aim it is necessary to study the different types of Facades in present, to make literature reviews on different types of the facade, collecting photographs, examining articles, the library works, and books.

SCOPE OF MODERN FACADE

predominantly emphasize the different types of facades, explore the advantages of facade treatment in a building. project seek to address the environmental concern as well.

Research question

What are the most common challenges architects face when designing modern facades, and how do architects create balance between aesthetics and functionality ?

Modern facade

Modern facade design in architecture takes up in the early decades of the 20th century. The standard principles of all these designs are simplicity, efficiency, and elegance. The modern look can be famed by its creative and bold design and you can always expect surprises in it. Features of this style are the use of vertical, horizontal, and angular rhythms and the use of new materials and technologies. Innovation in this style is the key. The following are the titles of some of these types of building facade materials

1. Curtain Wall
2. HPL
3. Thermowood
4. Ceramic
5. Aluminum Composite
6. Louvre
7. Steel facade
8. Panel frame
9. Homeostatic
10. Double-skin
11. Solar shading
12. Glazing
13. Insulated wall
14. Self-cleaning
15. Steel and glass

TYPES OF MODERN FAÇADE:

1 The ceramic facade:

also known as terra-cotta, has seen a renewal in its use as a building facade. The entire process of manufacturing, construction, operation, and deconstruction for terra-cotta is unexpectedly sustainable. It also helps provide an additional shell for buildings, proving favorable in terms of energy efficiency. Ceramic cladding is most attractive to customers who want a distinct and attractive facade that can withstand both time and weather while being low maintenance

2 . **Stone composite panels:** the stone composites facade is made of natural stone with a thin stone cover. The coating is reinforced with a layer of thin aluminum. Stone design composites may be made of any type of stone. This stone may be marble, limestone or any other type of stone. Their pre-cut formation allows them to be of variable dimensions and offer very little wastage. It is easy to install any time of year with minimal maintenance requirement. They can be cleaned with common household materials, while their durability makes them impact-, frost-, and water-resistant.

3. Precast concrete panels

Precast concrete panels are known for their quick and easy installation, durable in any weather, and as an affordable, sustainable option in new builds. It is a form of concrete that is prepared, cast, and cured off-site, usually in a controlled factory environment, using reusable molds. Precast concrete elements can be joined to other elements on site to form a complete cladding structure.

4. Natural stone panels

Natural stone cladding is the use of a thin layer of stone as a cladding for the outside of a structure. Natural stone panels aim to be an affordable, sustainable, lightweight, durable, cost-effective, and versatile in design.

5. Closed cavity facades

A variant of the traditional curtain wall system, closed cavity facades (CCFs) are a type of facade made with two types of glass for the exterior and interior with a cavity between them to block condensation. Inside the cavity, solar shading devices and controls monitor exterior conditions, control the shade, and regulate the flow of dry air into the cavity.

6. Green facades

Green facades idea can give life to any space or structure. Vertical trellis panel and planter combinations can divide spaces and provide a planted substitute to plastic and concrete barricades, plexiglass, or other hard surfaces. The “tree” and column wrap from greenscreen can create shade, filter light, and cool the surrounding air

Case studies

1. **The Louvre, Abu Dhabi:** This structure has a modern glass and metal dome ceiling that allows natural light to enter the galleries.

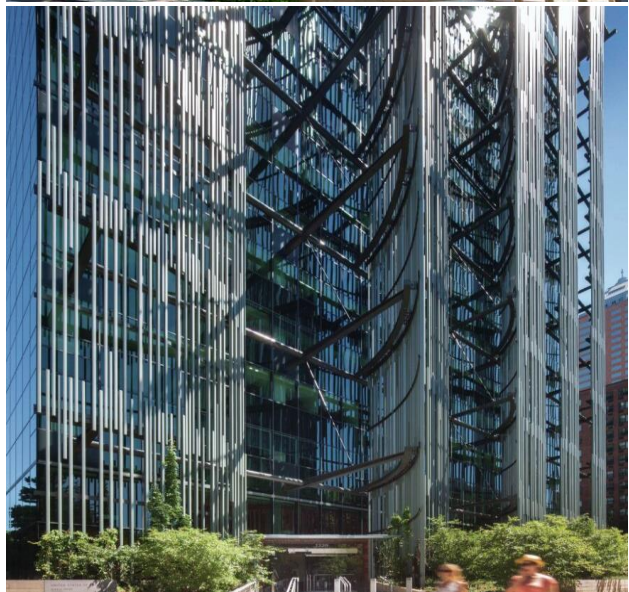


The Gherkin: This London-based structure's remarkable curving glass exterior reflects the surrounding sky and skyscrapers, giving it a dynamic and constantly-changing aspect.



The Edith Green-Wendell Wyatt Federal Building:

In Portland, Oregon, this is a LEED Platinum-certified building that features a modern facade design that uses sustainable materials. The steel framework to which the aluminum "reeds" on the west façade securely attach shades the curtainwall to reduce heat input. In order to cover the frame, vegetation is being cultivated to reach the third-floor height.



Designing modern facades presents several challenges for architects, including:

1. **Balancing aesthetics with functionality:** Modern facades often prioritize aesthetics over functionality, which can compromise energy efficiency and sustainability. Architects and engineers need to find a balance between aesthetics and functionality to ensure that the building is both visually appealing and environmentally responsible.
2. **Integration with building systems:** Modern facades often involve complex systems, such as lighting and ventilation, which need to be integrated seamlessly with the building's overall design. This requires close collaboration between architects, engineers, and other stakeholders to ensure that all systems work together efficiently.
3. **Meeting safety requirements:** Building codes and safety regulations are constantly evolving, and architects and engineers need to ensure that their designs meet these requirements while also achieving the desired aesthetic and functional goals.
4. **Managing costs:** Modern facades can be expensive to design, fabricate, and install, and architects and engineers need to balance cost considerations with other design factors to ensure that the project is economically feasible.

In recent years, architects have addressed these challenges in several ways. For example, they have developed new materials and technologies that improve energy efficiency and sustainability, such as high-performance glazing and shading systems. They have also used digital tools and software to optimize the design and performance of modern facades, reducing costs and improving safety. Overall, the continued evolution of technology and design practices is helping architects to address these challenges and create modern facades that are both visually stunning and functionally effective.

When designing a modern facade, architects must balance aesthetics with functionality in several ways. Here are some examples:

Material selection:

The choice of materials for a modern facade can

significantly impact both its aesthetic appeal and its functionality. For example, glass facades can provide a sleek and modern look, but may require more maintenance and may not be as energy-efficient as other materials. On the other hand, metal facades can be durable and low-maintenance, but may not be as visually striking. Modern facade materials that are both aesthetically appealing and functional include metal cladding, ceramic tiles, glass, stone, and composite materials. Additionally, some modern facade materials are designed to be energy-efficient and to reduce the need for maintenance.

Form and shape:

The form and shape of a modern facade can also impact both its aesthetics and functionality. For example, a facade with irregular angles and shapes may look unique and eye-catching, but may also be more challenging to maintain and can create interior spaces that are difficult to use. A more straightforward, rectilinear facade may be less visually striking, but can be more practical and functional.

Integration of technology:

Modern facades can incorporate technology to enhance both their aesthetics and functionality. For example, digital screens can be integrated into the facade to provide dynamic visual displays, while shading systems can be incorporated to regulate natural light and temperature.

Sustainability:

Sustainability is an increasingly important consideration in modern facade design, and can impact both aesthetics and functionality. There are several sustainable materials that can be used in modern facade design. Here are some examples:

1. **Wood:** Wood is a renewable resource that can be sustainably harvested and used in facade design. It has a natural and warm appearance that can enhance the aesthetic appeal of a building.
2. **Recycled materials:** Using recycled materials like glass, metal, and plastic in facade design can reduce waste and conserve natural resources. Recycled materials can also add an interesting texture and character to the facade.
3. **Natural stone:** Natural stone, such as granite or limestone, can be durable and long-lasting, and can be sourced sustainably from quarries that use environmentally friendly practices.
4. **Plant-based materials:** Plant-based materials, such as bamboo or straw, can be used to create a unique and sustainable facade. These materials are renewable and biodegradable.

5. **High-performance glass:** High-performance glass can be used in facade design to improve energy efficiency and reduce the building's carbon footprint. It can also provide natural light and views while minimizing heat gain and loss.

Conclusion: In conclusion, there are a variety of difficulties that architects must overcome while studying modern facades, including issues with energy efficiency, structural integrity, maintenance and durability, and visual effect. But in recent years, architects have created innovative approaches to deal with these difficulties, including integrated facade systems, lightweight materials, high-performance glass, and digital modelling tools. These techniques allow architects to design modern facades that are not just useful and sustainable but also aesthetically appealing, functional and stand out. As technology advances, new solutions are expected to emerge, allowing architects to push the limits of what is feasible in modern facade design.

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