

GLASS

"Glass is arguably the most **remarkable material** ever discovered by man!"

-Michael Wigginton, Glass in Architecture



THE DANCING HOUSE PRAGUE was designed by the Croatian-Czech architect Vlado Milunić in co-operation with the renowned Canadian-American architect Frank Gehry on a vacant riverfront plot. The building, which stretches over an area of 5,400 m², has been constructed of steel, glass and precast concrete. The dome is made of metal tubes and covered with a mesh of stainless steel.



THE LOUVRE PYRAMID is a large glass and metal pyramid, surrounded by three smaller pyramids, in the main courtyard of the Louvre Palace in Paris. The large pyramid serves as the main entrance to the Louvre Museum.

GLASS - THE THRESHOLD OF A JOURNEY

Deemed as the most astonishing and versatile element, the accidental invention of Glass has changed the way the world looks. Stepping ahead of the conventional use at windows and doors, glass has been playing a crucial role in performing various functions. Around the world, designers are using glass as the major element in façade, floorings, canopies, roofs to create some of the biggest masterpieces of the present time. Amalgamating Modern art with glass is the new mantra of such designers who believe in the material to substantiate their creations. Many are of the opinion that structures like Pyramide du Louvre Paris, The Dancing House Prague, The Shard London and National Grand Theatre China etc can merely hold up as a drop in the ocean when compared to the potential & possibilities with this material.

Today, Glass has become an integral part of the modern day architecture. Using glass in a building instantly adds a touch of modernity to the living space. Glass, in fact, is the only building material which can not only give see-through properties but also the desired structural strength to be used in facades. With the available technology, glass is relatively inexpensive and recyclable, which is an important factor in the current era of sustainability. Glass ensures that the building gets ample natural light – making interiors look

brighter and livelier, reducing the need for artificial lighting and saving energy, or in other words, reducing the electricity bill. "Ample light inside the home makes spaces look more spacious and roomy, an important factor to consider given today's shrinking living spaces in urban areas," comments **Somasundaram Senthilkumar, National Sales Head Projects, Asahi India Glass Ltd. (AIS).**



THE SHARD LONDON is a glass-clad pyramidal tower which has 72 habitable floors, with a viewing gallery and open-air observation deck – the UK's highest – on the 72nd floor, at a height of 244.3 metres (802 ft). It was designed by the Italian architect Renzo Piano and replaced Southwark Towers, a 24-storey office block built on the site in Southwark in 1975.



Burj Khalifa

Image Courtesy- www.flicker.com

BURJ KHALIFA

Place- Dubai
Height- 828 m
Floors- 160

Façade- Glass with matt silver appearance;
 Heat strengthened and Laminated Glass

Architect- SOM Architect

Burj Khalifa is world's tallest tower along with world's highest observation Deck that provides an awe-inspiring view of the city. Along with the deck, the building is clad with 26,000 glass panels particularly **Heat strengthened and Laminated Glass. Around 150.000 m² is the total amount of glass installed in the facade, 100.000 m² of them in the basement.**

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ONE MATERIAL, MANY FACETS

Globally, glass is well-known while India so far remained oblivious without many notable works with this material. The advent of Twenty- First Century has brought a sea change in the situation and now we are witnessing glass renaissance around us. Despite being a warm and humid environment, glass is inadvertently being used in the construction in India courtesy to the wide variety available these days.

Beginning from regular Float Glass, it has evolved to a large extent and now-a-days can be found in numerous varieties. Some of the major types of glass available today include, Toughened Glass, Heat Strengthened Glass, Laminated Glass, Tinted Glass, Solar Resistance Glass, Coated Float Glass, Insulated Glass, Bent Glass, Extra Clear Glass, Smart Glass, Frost Glass, Low E Glass, etc. Surfaces Reporter has segregated them under various headings for the purpose of better understanding.

GLASS AND STRENGTH

FLOAT GLASS/ ANNEALED GLASS: It is a perfectly flat, clear glass manufactured by the float process invented by Sir Alastair Pilkington in 1959. It is the most basic type of glass and forms the basis of fabricated glass. Some of its properties are that it is extremely fragile and shreds into bigger parts.

TOUGHENED GLASS/ TAMPERED GLASS: The process of manufacturing of Toughened Glass entails the extreme heating and rapid cooling of float glass panels in a controlled environment which makes the glass nearly five times stronger than the regular glass with an ability to withstand between 200° C and 300°C. It also makes it safer in a way that when this glass breaks, it yields small pebble-like fragments which are comparatively less harmful. However, the most important design limitation of this glass is that it cannot be cut, drilled, beveled, deep-etched or acid-etched.



National Grand Theatre, Beijing, China
 Built on the concept of a cultural island in the middle of a lake and designed by Paul Andreu Architect The National Centre for the Performing Arts - 219,400 sq mt. The building houses an opera house (2416 seats), a concert hall (2017 seats) and two theatres (one of 1040 seats) included in a titanium and glass shell which houses the public space. The glass opens the building like a curtain showing the interiors.

HEAT STRENGTHENED GLASS: Contrary to the toughened glass, the heated float glass is allowed to cool down gradually in a controlled environment. This way while the glass becomes twice as stronger as float glass, due to slow cooling, the stress formed in the heat strengthened glass is less than the tempered glass. During breakage it yields relatively larger shreds and the remaining glass remains attached to the glazing framework.

HEAT SOAKED GLASS: It is the fully tempered glass processed to reduce the probability of spontaneous breakage. The tests have proved that the glass has 98.5% reliability. While it contains the same properties as Toughened glass, it is considered rather safer.

Usage: Annealed Glass is the primitive glass and forms basis of many fabricated glass. The Tempered Glass, on the other hand is strong and hence used for windows, doors particularly where glass surface handles high wind loads, facades, sliding doors, fire knock-out panels etc. The heat strengthened glass is particularly popular for façade glazing applications like windows, vision panels, etc. It is also used as the base material for Laminated Glass.

GLASS & SECURITY

LAMINATED GLASS: Laminated Glass is a customized glass. This particular type of glass is formed by bonding two panels of glass under heat and pressure along with an interlayer material like **PVB (Polyvinyl Butyral)** sandwiched in between. Varied types of glass from float to toughened to heat strengthened are used to get the desired result and usage it needs to endure. Due to the presence of an interlayer, the Laminated Glass is considered the safest glass considering the fact that it cannot be broken easily.

Usage: Used as safety glazing in residential accommodations, banks, public buildings, commercial and retail structures, overhead glazing and large façade. It can also be used for sound control and hence used extensively in recording studios. Other application include flooring, canopy etc.

GLASS & THERMAL RESISTANCE

TINTED GLASS: An inclusion of added colorants during the manufacture process gives a tint to the normal float glass and increases its solar radiation absorption properties. Such tint reduces heat and light penetration in the building as compared with normal glass.

Due to the presence of an interlayer, the Laminated Glass is considered as one of the safest glasses considering the fact that it cannot be broken easily.



Somasundaram Senthilkumar,
National Sales Head -
Projects, AIS

AIS is one of India's largest integrated glass company with a wide range of international quality glass to suit various applications across multiple industries. Certified as an ISO 9001 and ISO 14001 company, AIS continues to innovate and add to its portfolio of comprehensive glass solutions which include Clear & Tinted, Heat Reflective, Frosted and Lacquered, Mirrors, High Performance, Processed - all of them designed to change the way we see and use glass. *Surfaces Reporter* in an informative conversation with Somasundaram Senthilkumar, National Sales Head - Projects, Asahi India Glass Limited (AIS).

Glass that has maximum demand:

Until a few years back energy efficiency was neither a practice nor a fad in the country. However with the launch of the *Energy Conservation Building Codes (ECBC)*, concurrently accompanied by the gain in popularity of the Green Building practices, users alike, builders & architects

started looking at ways to reduce energy consumption in buildings. Both ECBC & Green Buildings are taking small steps in that direction.

These days, clients prefer high-performance solar control glass for facades. Glass, as a transparent material, allows sunlight into the building reducing the need for artificial lighting - which contributes to around 25% of energy consumed in buildings today. Furthermore, the range of solar-control glass such as *Ecosense* from AIS provides the benefit of reducing the heat gain in buildings due to its excellent energy saving properties without compromising on the natural light coming inside the building or the brilliant aesthetics that add value to the façade. And in winter, they ensure solar gain. So that no matter what the season, people inside stay comfortable at all times. Using energy-efficient glass also helps in ensuring that the interiors - and the occupants of the home - feel more comfortable.

Typically, the heat gained or lost through Glazing in a normal building in India is anywhere between 40~50% and using the right type of glass can bring down the energy consumption by 30~40% (only Glazing). The incremental cost for high performance glazing can be recovered in a time span of 3-4 years.

Innovation in terms of sustainability and making glass suitable for Indian climatic condition:

AIS has come up with a range of High Performance glasses under the brand name of "Ecosense". These glasses provide the benefit of reducing the heat gain in buildings due to its excellent energy saving properties without compromising on the natural light coming inside the building or the brilliant aesthetics that add value to the façade. And in winter, they ensure solar gain. So that no matter what the season, people inside stay comfortable at all times. Using energy-efficient glass also helps in ensuring that the interiors - and the occupants of the home - feel more comfortable.

Ecosense comes in three ranges - Enhance (Solar Control), Exceed (Solar Control Low-E) and Essence (Low-E) high performance Glasses. Ideal for solar and thermal insulating parameters, Ecosense combines aesthetics with environmental sensibility and conforms to all International and National Green Standards, making it the natural choice as a Green Building solution. Ecosense performance parameters like Visual Light Transmission, Solar Factor, U-Value and Internal Reflection make buildings more efficient and ecologically viable.

COATED FLOAT GLASS: A better successor of Tinted glass, here either float or tinted glass is coated to reflect solar heat gain. A Low Emissive coating can also be used to enhance the thermal resistance performance. It enhances the visual appeal as well.

INSULATED GLASS (IG): Often known as Double Glazing, insulating glass units are assembled with two or more layers of glass that are separated by sealed gaps filled with air or gas. Insulating glass units can be assembled with many fabricated glass products to offer enhanced solar, optical and acoustical performance, while providing a thermal insulation barrier between the outdoor and indoor environments.

Usage: By combining Low-E coatings, tinted glasses, reflective coatings, silk-screened patterns, laminated glass products and more, a wide variety of insulating glass configurations are available to satisfy a wide range of performance and aesthetic requirements. IG units can be fabricated to meet state energy codes, sound control requirements, seismic requirements, impact resistance, bullet resistance, and hurricane and blast resistance. IG units can be designed to reduce heat loss and solar heat gain entering the building, with a minimal reduction of visible light transmittance.

"The disadvantages of glass can be offset with many passive heat mitigation measures like plan form orientation, Self Shading, and performance glass specifications for applications requiring the justifiable use as an exterior facade material. More recently we are exploring the use of built in solar panels for generative facades."

- Ar. Aashish V. Karode & Ar. Sushil L.
Karer- Principal Architects, Design Atelier

The Crystal, Copenhagen, Denmark

The structure is designed by schmidt hammer lassen architects and consists of multi-faceted glass façade. Freestanding on the site, the geometrical, glazed form which, resting only on a single point and a single line, floats as a visually light, crystalline structure above the plaza. The double-glazing also features an integrated sun screen that allows the building to adapt to changing light conditions.



Image
Courtesy-
www.shl.dk

On performance of Glass facade in India:



Ar. Nilabh Nagar
Senior Associate, Architect Hafeez
Contractor, Mumbai

"Presently, due to the whopping increase in the number of glass structures, there are many glazing techniques being used depending upon the design and construction of the building like Cable net glazing, Curtain Wall glazing etc. Considering the various glass façade and glazing technologies, **DOUBLE SKIN FAÇADE** is one technology that can be helpful in Indian context. One of its many advantages is that it reduces a major part of the climatic effects that would otherwise fall on the building. Other than that, shading & canopying are another solutions that improve the performance of a glass façade to a greater extent."

GLASS & TRANSPARENCY

ANTI-REFLECTIVE GLASS: Normal float glass comes with a special coating that allows a very little reflection of light offering maximum clarity and transparency.

EXTRA CLEAR GLASS: This type of glass contains little amount of iron which is otherwise higher in other kinds of glass giving it a remarkably clear look. It has the property of high light transmission with minimum colours, resulting in brilliant optical clarity.

SMART GLASS: Smart Glass poses a cutting edge technology that can make it opaque or transparent only at a click of a button. Smart Glass technology basically means controlling the transmission of light through glass by using electrical power. By applying variable voltage to the glass, the amount of transmitted light can be controlled. Switching speed and the consistency of a tint change are among the most important attributes to potential users of smart glass technology. Some of the variants of smart glass are Electrochromic and liquid crystal glass.

Usage: While anti reflective and extra clear glass come with a set of limitations as they are not deemed fit for hot environments and primarily used for decorative purpose, Smart Glass as its name suggests, can be smartly used in any type of environment and provide privacy and connectivity to the surroundings at the same time.

GLASS & AESTHETICS

Myth: 'Glass can be molded only in traditional sense'.

ETCHED GLASS: Creating art on the glass surface by the means of applying chemicals, caustic or abrasive substance is referred as Etching. The carving leaves a white, frosted finish on the surface of the glass. The skill of the artisan etching on the glass determines the quality and detail of the resulting piece. There are three types of etching done i.e., Sand-blasting, Acid-etching and Chemical etching.

BENT GLASS: Bent or Curved Glass secures a great advantage over the traditional architectural glass as it gives designers

the freedom to carry out unconventional designs. It comes in various forms and shapes. Other than regular Float Glass, Bent Glass can be made up of Laminated Glass as well.

The moulding process of Bent Glass results in significant reduction of thickness of the glass which reduces the overall weight of the structure and thus its cost. It is really helpful in designing skylights.

LACQUERED GLASS: The Lacquered Glass is made by depositing and then baking a coat of durable and resistant lacquer on one side of the glass surface. It leaves a moisture-resistance, highly aesthetic surface shine, while making the glass opaque.

CERAMIC FRIT GLASS: A fine amalgamation of art and technology, Ceramic Frit Glass is printed using a silk screen with ceramic ink before it is tempered or heat strengthened. The coating thus becomes permanent and cannot come off by scrubbing or cleaning. While it can be used for both, i.e., interior and exterior parts of the building, while using it for the latter, it must be noted that the silk-screened surface should not come in direct contact with the environment and hence normally found in the insulated unites. Usually, the size, density and colour determine the opacity & shading of the glass. The Ceramic Frit Glass comes in many patterns like dots, checks and squares that are combined to ensure the desired effect.

ENAMELED GLASS: Enamel is the compound of soft, ground glass mixed with oxides. They are painted on the surface of the glass before it is tempered or heat strengthened. When heated, they get fused with the original surface of glass, colouring it and making it opaque. In addition to its aesthetic quality, the glass also absorbs solar rays and hence used as the heat controller.

Usage: Etched glass can be found in a wide variety of decorative contexts, including glass doors and windows, furniture, wine bottles, and serving dishes. Lacquered Glass has a high interior use particularly in the high humid areas like kitchen and bathrooms where the requirement of durability coincides with aesthetic. Enameled Glass and Ceramic Frit Glasses can be both used for canopies, Facades and roofs. The difference lies in the effects their design, colours and patterns forms.

Designed by schmidt hammer lassen architects, the new library of University of Aberdeen (fifth oldest English-language University in the world), Scotland s designed to minimise long term running costs and energy use. Consisting of an irregular pattern of insulated panels and high performance glazing, the façade shimmers during the day and glows softly at night, creating a luminous landmark for the city.

Image Courtesy- www.shl.dk

New Library, University Of Aberdeen, Scotland





CTS Headquarters, Thoraipakkam, Chennai by CRN Architects

GLASS AND GLAZING

There are numerous ways to fix glass on a building. The glazing and cladding techniques available these days can be opted considering the choice and preference of the design and building.

CABLE NET GLAZING- Cable supported glazing uses high strength cables to transfer the load to the main structure.

STRUCTURED GLAZING- It utilizes the adhesive qualities of high-strength, high-performance silicone sealant to fix the glass to its support, without the requirement of any beads, clips or bolt fixings.

BOLT GLAZING/ SPIDER GLAZING- It holds the glass by means of visible metal parts, sometimes countersunk and embedded in the glass itself, which cover a small part of the glass surface.

FIN GLAZING- This type of glazing uses glass fins instead of frames or mullions.

SUSPENDED GLAZING- It creates a frameless glazing façade by fixing together a matrix of toughened glass lites, hung from the building structure like a glass curtain.

CURTAIN WALLING- Glass curtain wall often provides the appearance of being all glass. Some are glass with metal spandrel covers and some incorporate granite facing panels in the spandrel frames.

DOUBLE SKIN GLAZING- Formed by two glass walls separated by a cavity on south-facing elevations and used to reduce the energy consumption of a building. Shading devices are usually mounted in the cavity and, depending on its width, walkways for access and cleaning.

SOLAR SHADING SYSTEM- A canopy or shade is strategically constructed in order to provide shade to the glass façade of the building. This enhances the performance of the glass to a great extent as it provides a shield to the direct sunlight falling upon the glass.

“The exploration of the possibilities of form, remain an enigmatic play of architects and glass as a material continuously help develop those possibilities with the potential inclusion of light, views, and outdoor elements included.”



Ar. Sushil L. Karer & Ar. Aashish V. Karode, Principal Architects, Design Atelier, New Delhi

Design Atelier is a well known architecture firm based in New Delhi. Spanning across Architecture, Campus Design and Master planning, Housing, Hospitality, Retail and Workplace Design, the firm has developed around 250 projects till date. Their most notable glass projects include Indian Oil Refinery, Panipat, Athena, Gurgaon, Bhai Twins Corporate Tower, Noida and Lohia Group Corporate Tower. Aashish Karode & Sushil Karer, Principal Architects, Design Atelier shared their experiences of working with Glass:

YOUR EXPERIENCE WITH GLASS:

Our design has always endeavored to work with craft, light, air, water, natural environment and technology as if they are materials in the construction of space. The use of glass to delineate the inside allows the exterior or outdoors to seamlessly penetrate the inside spaces becoming one aspect of the “whole” thing. The user are always able to register this as the major move by the architects, that actually enliven the spaces to be more than just rooms, and the form to be way more than just building construction.

CHALLENGES FACED WITH GLASS:

The use of glass comes with multiple challenges in practice and these are not just about fragility as a material. Constraints of size and transportation, lack of highly specialized converters for operations involving combinations of glass. Lack of specialists with application and process knowledge, Weather resistance, Conversions in specialized applications like underwater, Safety, Deflection and Performance in solar applications are the major challenges we face in practice.

YOUR MESSAGE TO GLASS MANUFACTURERS:

Glass manufacturers could provide clear graphical and numerical information and samples kits for architectural practices. They also need to develop *local Application centres* where special sizes and special applications can be methodically developed for architectural applications with reasonable costs and time bound project deliveries.



Sufi IT Park, Chandigarh by Design Atelier, New Delhi

B.L. Glass Concept Pvt. Ltd is one of the prominent manufacturers and suppliers of a wide range of bend glass, float glass, looking glass, and allied glass products.

Manoj Kumar Gupta, Director, BL Glass talks to Surfaces Reporter about the demand and innovation in Glass :

IN TERMS OF ARCHITECTURE AND CONSTRUCTION, WHAT KIND OF GLASS HAS MAXIMUM DEMAND?

The glass that has seen the maximum demand in architecture and building construction is Double Glazed Unit (DUG) + Tempered Glass. In building construction DGU is used with a combination of toughened glass and should not be used alone for safety purposes.

IN TERMS OF YOUR PRODUCT, WHAT INNOVATIONS HAVE YOU BROUGHT IN?

We are Lifestyle Glass products developer. Our motto is to develop products that become a part of people's life for years to come. Our agenda is to take mirror away from being seen just as an architectural product to a lifestyle product that is used by every strata of the society. We are developing mirrors based on space, style and needs of people. We are doing innovation in terms of developing user centric mirrors.



Nitin Bhatia
Façade Design Consultant
Facet Constructions

"When a building doesn't perform well, we blame the extensive use of glass for the complexity of the situation which is not appropriate"

GLASS AND ENERGY

LOW EMISSION GLASS - Low-E coating stands for **Low-emittance coating** which is an extremely thin, nearly invisible film of metal or metal oxide layers deposited on a window or skylight. Covering a glass surface with a low-emittance element and placing that coating into the gap between the layers of glass impedes this radiant heat transfer significantly, thus reducing the overall flow of heat through the window.

PHOTOVOLTAIC GLASS - Photovoltaic glass is a **special glass with integrated solar cells** that convert solar energy into electricity. This means that the power for an entire building can be produced within the roof and façade areas. The solar cells are embedded between two glass panes and a special resin is filled between the panes, securely wrapping the solar cells on all sides. Each individual cell has two electrical connections, which are linked to other cells in the module, to form a system which generates a direct electrical current.

"The Building envelope is the interface between building and the outdoor environment, the walls, roofs and glass. Building envelope is one of the major contributors of the heat gaining a building; hence, for reduction of HVAC (Heating Ventilation and Air Conditioning) loads, it is crucial to optimize the envelope. Total heat gain through envelope is due to conduction gains from roofs, wall and windows and solar gains from window glass. **Generally recommended WWR (Window-to-wall ratio) in building is 40%. However, today due to aesthetical reasons, the WWR can even go upto 75% making glass a crucial element of building envelope. Hence, glass should be appropriately selected to**



Building by CRN Architects



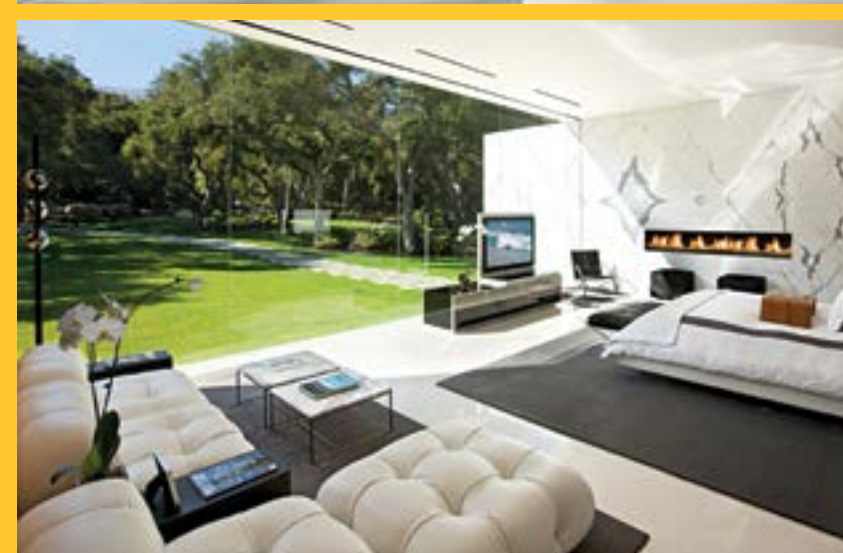
The Glass Pavilion, Frontal view

reduce HVAC loads." **Ashish Rakheja, Regional Managing Director, Building Engineering, India, AECOM** said during the sideline of an event.

"Energy is a crucial aspect that has to be stressed on while working with glass. There is a perception that glass is against building energy conservation, which is not true. Today, glass and coating technologies are much advanced in successfully developing various high performance glazings, and are making positive impact on building designs."

We believe glass application on buildings will enhance the building value and energy efficiency with a right balance of design, functional and aesthetics."

Rajan Govind, Director, Façade Specialist, BES Consultants Pvt Ltd., Mumbai



Interiors of the Structure

THE GLASS PAVILION

Place: Montecito, California

Specification: Floor to Roof Glass walls; Starphire glass

Architect: Steve Harmann

Designed by Steve Harmann, the Glass Pavillion is a unique property nestled in the beautiful oak grove. **The entire house is cantilevered over the grass which makes it look as if it's floating on air** and has come from space. While it is not a part of the neighbourhood yet the *elegant glass enables the structures to seamlessly blend it completely into the surrounding landscapes.* He says "The Glass Pavilion is a study in minimalism. When it comes to modernism, Mies van der Rohe is the most important person ever. Today's best architects just try to keep pace with what he did over 70 years ago. His influence on my work is significant. I designed The Glass Pavilion with his Farnsworth House in mind. I asked myself, How would Mies design a glass house if today's technology was available to him back then?"



L'Ourse Library, Exterior view

L'OURSE LIBRARY

Place: Dinard City, France

Specification: Frost Glass and stone structure

Architect: Ricardo Bofill Taller de Arquitectura

The sleek design by RBTA seeks to maximize daylight penetration through generous wall openings that frame the views of the 19th century buildings surrounding the facility site. The structure is inclusive of a large roof wing-shaped, frosted glass frontage and a bright vertical signal.

*“Central part of the overall composition is its architectural counterpoint with its environment. Some simple lines, a large roof wing-shaped, frosted glass frontage and a bright vertical signal are the core of the new district. With a gross floor area of 1,500 m², all its functions are grouped on one level ground floor with a floor space of 1200 m². Crossed by an internal street, acting as the hall, it is divided into three areas, a bright and generous reading room, a consultation room and an open living room of conviviality. The main entrance, located at the intersection of Rue des Mimosas and extended by the internal street connects the Library and cultural plaza treated as an amphitheater. This provision allows to extend outdoor the the Library’s activities and make performances with the building’s backdrop stage,” says **Jean-Pierre Carniaux, Project Director, L'Ourse Library.***

THE HOLISTIC APPROACH

Working with glass has its own challenges. *Architects from Design Atelier, New Delhi say, “The use of glass comes with multiple challenges in practice and these are not just about fragility as a material. Constraints of Size and transportation, Lack of highly specialized converters for operations involving combinations of glass. Lack of specialists with application and process knowledge, Weather resistance, Conversions in specialized applications like underwater, Safety, Deflection and Performance in solar applications are some of the major challenges we face in practice while working with glass.”*

Every era holds some specifications in terms of architecture and its buildings reflect the same. Despite a number of criticisms, **experts believe that the current era belongs to glass and nothing holds a match when it comes to aesthetics and innovation.** *“People believe in the fact that less glass is better which, however is a holistic approach. When a building doesn’t perform well, we pose blame on the unsighted use of glass for the complexity of the situation even so the discrepancy in design has led to the inefficiency of the glass and ultimately the failure of the building. An appropriate design is very much necessary for a structure to work out. People related to the construction like developers, architects, designers, have to understand that design holds the key and a correct design is probably the most important factor for the success of any structure. Being a façade consultant, I also advocate the need of a proper regulatory system to ensure the right use of glass in the construction,” concludes **Nitin Bhatia, Façade Design Consultant, Facet Constructions.***