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WINDOW& FACADE
MAGAZINE

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November - December 2018

FAÇADES OF THE FUTURE

Materials & Technologies Revolutionising the New-Generation Façades

Cover Courtesy: DSP Design Associates

Tech Talk
Sustainable Green Façade for Better Performing Buildings in India

Face to Face
Ar. Nilesh Dongre
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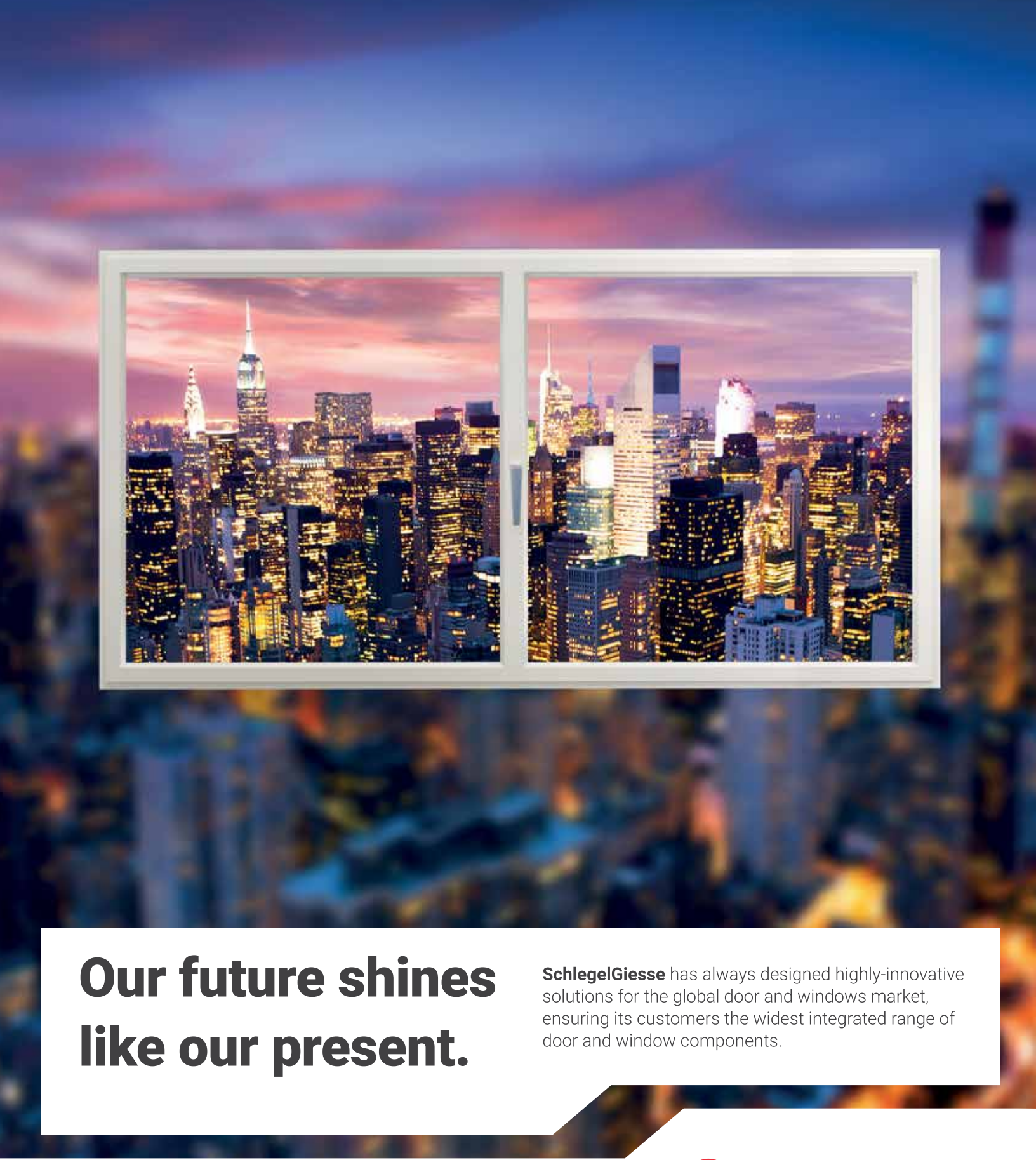

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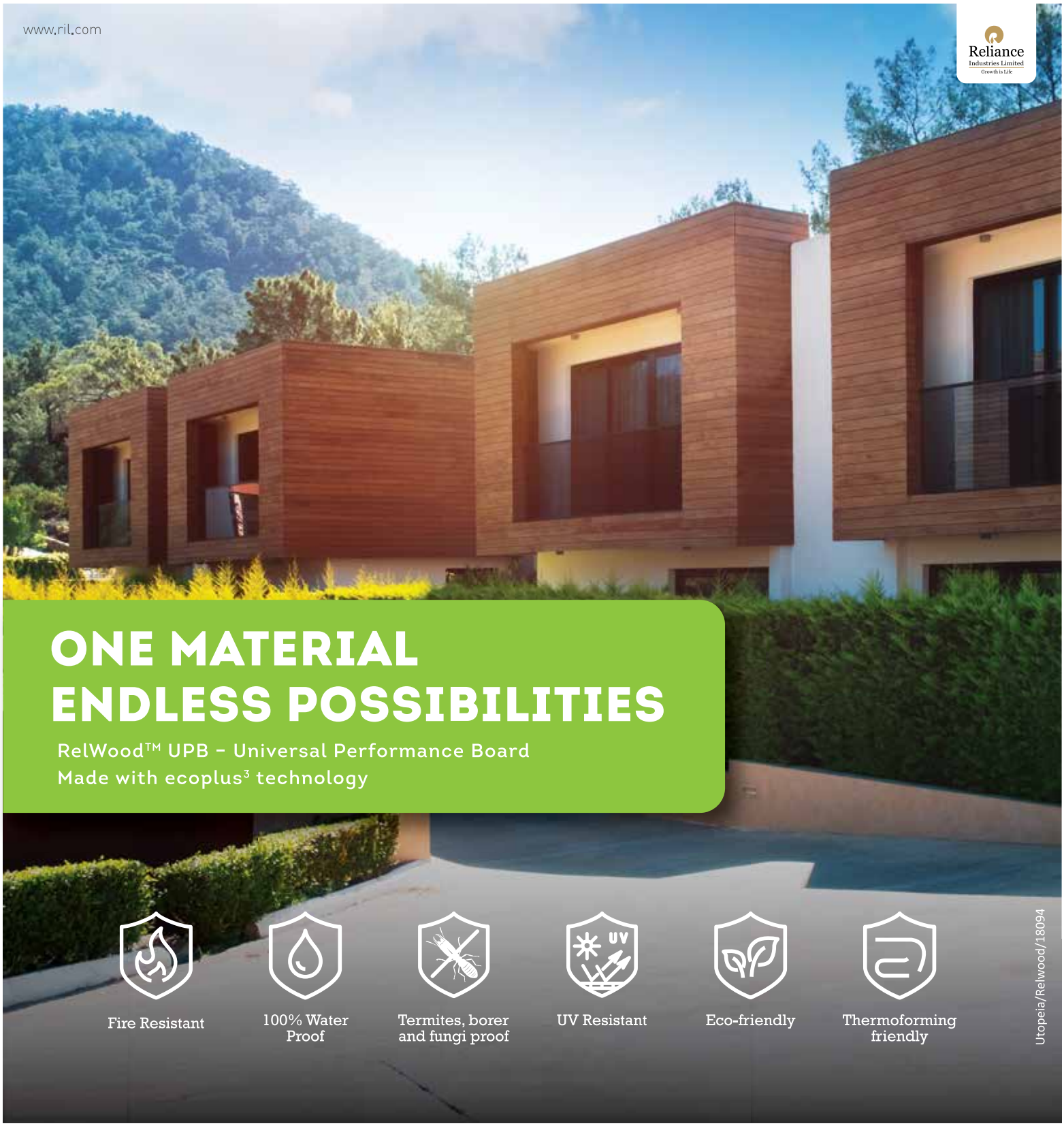

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EDITOR'S NOTE

Building skin or façade has a significant impact on the environmental and economic performance of buildings. The impact of building facade has become more important than ever in determining the operational and economic performance of construction projects. The façade accounts for anything between 15 and 25 percent of the total construction costs and represents a substantial part of the technical and commercial risk on any given project.

In India and around the world, the role of façade is intensified by evolving energy performance standards and regulations. Most of the developed countries are very serious and stringent on the building norms, especially those for facades. Many companies are introducing curtain-wall technologies ranging from double-wall systems to integrated solar to specialty coatings and films, triple insulating glass units and dynamic glass products to reduce energy consumption and to build more sustainable buildings. The cover story of this edition throws light on several advanced façade technologies and materials which have made a splash in the recent past in the industry and those we will see in the future facades. The cover story also gives an insight on the tools and metrics used to gauge and build these smart facades. It discusses the technological developments transforming the facade performance too.

This edition also brings reports on the 10th edition of Zak Aluminium Extrusions Expo, the 14th edition of Zak Doors & Windows Expo, and the 16th edition of Zak Glass Technology Expo, all of which were held in December '18 at Mumbai.

Besides elaborate coverage of these events, this edition presents a few interesting articles by experts on technologies and materials that goes in building intelligent façades, passive designs and tools for designing smart facades.

As 2018 comes to a close, it is time to look back at achievements, analyse failures and missed targets and move towards the future with a renewed realisation of possibilities, expectations and hope. May the new year begin with the warmest of aspirations. Cheers to a better 2019 ahead with incalculable possibilities and hope. May it be filled with immense happiness, success, health, prosperity and luck. It is the quintessential time of the year to make necessary and beneficial changes in life – not eschew resolutions.

As we embark on the year 2019, let's build a better, sustainable world for ourselves. It is a good time to look at how we can make a difference.

As we ring in the New Year, the WFM team wishes the very best to all our readers and advertisers.

Renu Rajaram
renu@wfm.co.in

Glazing into the Future

How Media Facades Will Change Our Cityscapes

Our cityscapes and how we work, live and relax within both the buildings and the surrounding urban spaces are set to change beyond all recognition in the next 20 years. One of the key drivers of this change will be the continuing digital revolution and the evolution of what many are calling the 'smart city'. A multiplicity of powerful and connected systems will be generating data on the health, status and well-being of not only our Smart Cities and all that which physically comprise e.g., transport, lighting, footfall, energy consumption etc., but also of us - their citizens. However, the generation of information is only part of the smart city story. The gathering of data is not beneficial in its own right; it will only become meaningful and have commercial value if it, the data or information is processed and presented in a relevant and timely manner. If it is done properly then the businesses, local governing bodies and citizens should be able to respond to the data in such a way that will add value and improve their own lives. Inevitably much of this data will be available through mobile devices and these will doubtlessly be the mainstay of communicating within the smart, digital city.

Whilst it may be possible to send a message to numerous individual devices using an alternative means of communication with large numbers on a 'live' basis may be with large media façades. These additions to public and commercial buildings will provide a powerful new way of communicating relevant and pertinent information. Manufactured from an architectural grade glass that is durable and resilient, but also fully transparent with full, rich media capabilities, these facades have the potential to change the cityscape as we know it. They are not only the channels for 21st century communication, but they will also provide opportunities for entertainment, new interactive leisure and will be a key influence on how both new and existing urban spaces which are used, enjoyed and developed in the city of the future.

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Future Façades

ET Land, Seoul, South Korea

THE ROLE OF GLASS IN THE SMART CITY

When you think of a media façade, the first image that comes to mind is probably a Ridley Scott's iconic depiction of the Coca Cola advert on the side of a building in “Blade Runner”. Whilst advertising is doubtlessly going to be a feature of these media facades, it will not be the only or most important feature, and any advertising that is done will be far more experiential and creative than just displaying a logo and product image, which is what we are familiar with today. These new and much larger façades will facilitate far more creativity and we should be prepared to expect the unexpected. Even at this early stage in the uptake of this technology architects, designers, app-developers and organisations are coming together and developing ideas that, if they come to fruition then it will truly transform the digital cityscape. They include:

Interactivity & Integration:

This can work on several levels. For Chinese New Year 2016, an app for mobile devices was created that allowed people to 'throw' digital fireworks onto the side of a building. However, there are other things that can be done with this technology; we are able to react to sound, movement, weather and amend the displayed content accordingly e.g., transport information, weather warnings and emergency services advice, which could be life-saving in the case of a major incident. With ubiquitous mobile app penetration, it is not unfeasible to foresee a time when the media façade or screen could even react to the presence of individuals enabling them to receive a personalised message.

Architectural gaming, with the game taking place on the side of a building could breathe new life into run down or deserted areas. Imagine a square or plaza that falls dead and becomes a 'no-go zone' after office hours. Then install a glass façade upon which teams of players could interact and play games. This would drive regeneration as food and retail outlets would pop up to support the new game playing visitors to the neighbourhood, creating new energy and a new hub, for a different audience within a city.

Digital Signage:

Whilst these new glass façades obviously lend themselves to the latest, classical forms of advertising where the quality of the highest end products can be reflected and replicated on a huge screen there is scope for far more dynamic forms of advertising. Imagine the launch of a new car where it could be seen to be 'driving' around a city, using these media facades not only on buildings, but may be smaller, pop up installations that have been temporarily installed for the duration of the campaign. Target audiences could be encouraged to "take a photo of the car at a particular site and could win a prize".

Architectural Design:

A sophisticated media façade allows an architect to create an aesthetically beautiful design using both the physical form and the additional medium of light. The building may change colour throughout the day, or by playing with the perspectives, they would be able to create stunning visual illusions and merge the structure seamlessly into its environment. With clever use an outdated, 'ugly' building could be rendered far more pleasing and acceptable; a fix for failing architecture. It also gives the building the power to share experiences externally, which were previously only been accessible to those inside the building; e.g., whilst an original work of art may be being created in a museum or

Another image of ET Land, Seoul, South Korea

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studio, its actual creation could be shared on the exterior for all those outside to witness. Not only does this generate wonder and engagement with a wider audience, but it gives the building a new energy.

THE TECHNOLOGY BEHIND THE CREATIVITY

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The media display's resolution is determined by the:

- Spacing of the LEDs
- Coverage of the glass façade
- Distance from which the screen is viewed

Although still to be installed externally for the first time in the UK, the glass has already been used in Asia for:

Architectural: Large scale media facades

Interiors: Interior G-WALL products for board room walls

Events: G-Tainer, a modular G-Glass product has the size of a shipping container, suitable for both indoor and outdoor events.

Whilst at first glance glass would not be thought of as the material of the future, the capability and functionality of the façades really could transform buildings into grand canvasses and the smart cities of the future will no longer be restricted to our imaginations.

(Visit https://www.g-smatteurope.com/ for more information and videos)

Urban Alice, Seoul, South Korea

SANMUKH BAWA
Director of Engineering,
G-SMATT Europe

ABOUT THE AUTHOR:

Sanmukh Bawa joined G-Smatt Europe as Director of Engineering in 2017 with his extensive technical background in structural glass. He has been involved in the exercise to place G-Smatt media glass on the market primarily in Europe and USA with appropriate technical compliances. Prior to this, he worked with Eckersley O'Callaghan in London as a structural glass and façade engineer. He had been primarily responsible for the facade design and structural design of complex glass structures, including the Apple HQ in Cupertino and Apple flagship retails stores worldwide. He is currently a member of the prestigious Institute of Engineering and Technology in London since 2015 along with other global professional institutions.

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Intelligent Glass Façades For Sustainable Buildings

Sustainable. That's perhaps the most spoken buzzword in architectural circles today. With climate change trending all social media, an increasing world population, resulting in limited resources being shared by a larger consumption pool and energy generation, increasing at a faster rate than its replenishment, developers and architects are entrusted, both logically and morally, With an important responsibility to ensure that the carbon footprint from their construction is either ideally zero or as close to this magic number as possible.

So, what makes a building sustainable? At a very fundamental level - the materials used for its construction. Of course, its design and layout are the foundational philosophy which dictates its sustainable intent, but without the right choice of material, even the best design will yield little or no results.

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Hence it becomes imperative that architects and consultants work with material suppliers at the very concept design stage to find the most optimum material fit.

Enter Glass - Unarguably, the most indispensable building material for all modern constructions, transgressing all usage types, whether it is residential, commercial, hospitality or mixed use. The benefits justifying its ubiquitous appeal are several and well known, but out of the scope of this article. However, it is important to point out, in the context of what is to follow, that the wrong choice and usage of glass can be hugely detrimental to the building's 'sustainable quotient'. Hence, in no uncertain terms, I wish to point out that use of glass in sustainable buildings has to be carefully mapped and implemented, especially in tropical climates like India's.

To understand the meaning of intelligent glass façades, let's step back around two decades when *spectrally selective* coatings were introduced and thus paved the way for energy efficient façades. With time, coatings became more advanced and resulted in its increased use in sustainable constructions, the external climatic conditions notwithstanding. The intent of this article is to highlight the next wave, and if I may say – revolution, in the sustainable glass. The slow but steady shift from *energy efficient* glass to *intelligent* glass.

What makes an intelligent glass? Simply put, its ability to intelligently adapt itself to external and internal climatic conditions. Some might confuse this with *dynamic* façades, however, there are some glass types that I will highlight that can behave intelligently without changing form.

DYNAMICALLY TINTING GLASS

One of the most promising new technologies in the field of intelligent glass are electrochromic glasses or dynamically switchable glasses. These glass types use electronic control to vary their light and heat transmission, either manually or through pre-programmed control logic. These glasses have a significantly higher range of light and heat-transmission that starts with

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almost zero and stretches to the high fifties. This means that buildings enjoy the flexibility of both low light consumption as well as low HVAC expenses.

One of the most promising and emerging technologies in this field is the Licrivision™ glass from Merck. Manufactured in the Netherlands, Licrivision™ is a switchable Liquid Crystal Window (LCW) glass that uses liquid crystals sandwiched between two glass lites to create an 'on demand' dynamically tinting façade. These units are haze-free, require almost negligible power to change states and unlike coated electrochromic glasses, switch between different light transmission states in less than a second. From a sustainability perspective, these glasses are an ideal fit, since periods with high heat and light transmission can be countered with dark state, and early morning or late evening periods can be complemented with lighter switching states. While it's comparatively high cost is currently a limiting factor to its mass proliferation, it remains a matter of time when this technology will become affordable and widely available.

AEROGEL INFILLED GLASS

Daylighting is a powerful design element, one that is not only desirable but also an important nature-gifted tool to ensure high productivity and happiness levels for the occupants. However, it comes with one unwanted feature: glare. Glare can be highly disturbing and results in most windows and glass walls being blocked from the remaining architecture by the use of curtains or blinds.

An exciting new development to help address the glare problem is aerogel infilled glasses. Developed in the laboratories of Canada by Advanced Glazings, Solera® aerogel glasses are wide angle light diffusers which help to scatter light evenly across the interior space, in comparison with regular glass which transmits light in straight lines. To understand better, consider the figures below.

As shown, conventional glass windows are not light diffusing and allow light to pass in straight lines. This results in high glare levels, inconsistent lighting within the interior space and also thermal discomfort.

In contrast, Solera aerogel infilled glasses scatter the light flowing through it evenly across the room. This completely eliminates glare, creates pleasingly lit interiors and has extremely low heat flow rates as well, with U-Values as low as 0.31 W/m^{2}K. Solera glass, however, is translucent in appearance and needs to be used smartly in architectural spaces to create truly intelligent façades.

Conventional glass windows are not light diffusing and allow light to pass in straight lines

Solera aerogel infilled glasses scatter the light flowing through it evenly across the room

DIGITALLY PRINTED GLASS

Another increasingly popular development in the field of glass glazing is digitally printed glass. Conventional ceramic

The Affaires, Navi Mumbai

printing deposits ceramic-based inks through a silk screen and every new design require a new screen. This limits the design and functional flexibility. Also, there is a limitation in the number of colours possible. In contrast, digitally-printed glasses are produced on a printing machine that looks and performs similarly to a conventional inkjet paper printer. The advantages of digitally printed glass are several: limitless design possibilities, almost infinite colour reproductions, no setup costs and ease of replacements.

Another view of the Motilal Oswal building, Mumbai: Glass is combined with external shading elements to be able to perform at their peak level

Digitally printed glass can also be used to create stunning intelligent façades. With options like dual colour frits possible, façades can have a unique design and colour when seen from the outside and internally it could be painted neutral black. This results in extremely neutrally looking façades when viewed from inside, and when smartly designed (for instance, reproduction of gradients and images with extremely small diameter dots), the print becomes almost invisible! Digitally printed façades also help cut down on the solar heat gain and in some cases can act as an effective light diffuser.

IN CONCLUSION

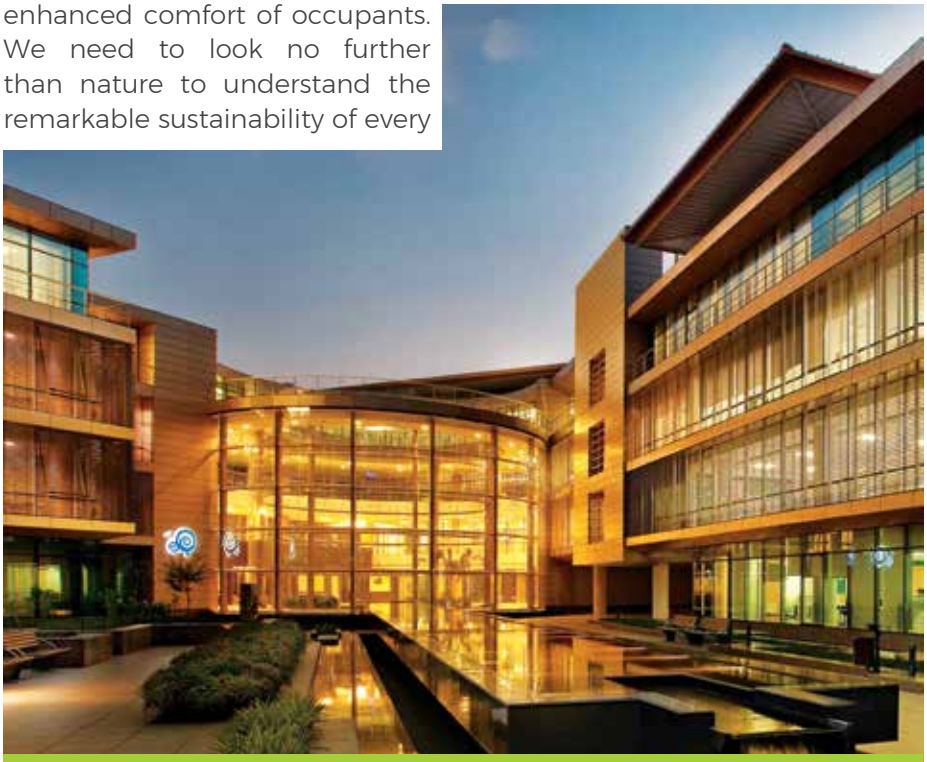
Apart from the above-mentioned glass types, there are several other existing and under-development glasses that find use in creating sustainable façades. Amongst these, mesh infilled glasses, Sefar fabric infilled glasses and increasingly higher performance coatings are some examples.

It is important to note however that not all intelligent glass can create truly sustainable façades. Glass, as with other building elements are simply tools at the disposal of designers to help them create façades that not only aesthetically conform to their design intent but are also functionally effective. And in more instances than not, glass needs to be combined with other elements such as external shading elements to be able to perform at their peak level. Intelligent façades also imply other important characteristics such as safety, post-breakage characteristics and acoustic comfort to name a few and its selection in the right combination is critical for a holistic performance.

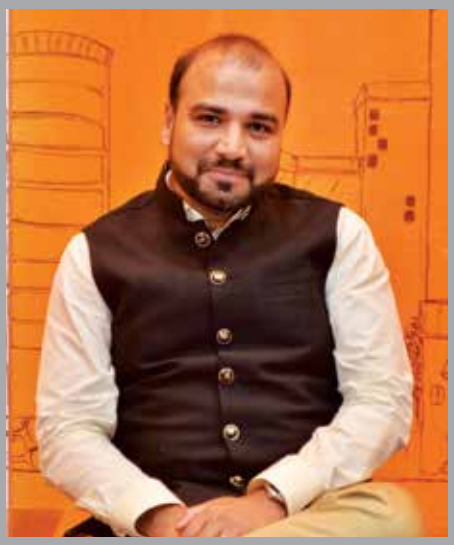
Considering the fact that

Park Hyatt, Hyderabad

buildings are the number one contributors in increasing the global carbon footprint, all stake-holders in the construction space should responsibly contribute in making buildings sustainable – both for reducing its impact on global warming and for enhanced comfort of occupants. We need to look no further than nature to understand the remarkable sustainability of every creature and every element that exists. "Those who look for the laws of nature as a support for their new works collaborate with the creator", once said the famous Spanish architect, Antoni Gaudi. I couldn't agree more.



Suzlon One Earth Corporate Headquarters, Pune (by Christopher Benninger Architects photo)



SUHEL KACHWALA
Managing Director,
FG Glass

ABOUT THE AUTHOR:

An MBA from Boston, USA, Suhel Kachwala has been in charge of FG Glass since its inception. Suhel has brought both his educational and business knowledge into FG Glass to build it into an efficient organisation. His strong personality and effective communication skills have been instrumental in getting sales to feed the company's exponentially increasing production capacity. With his excellent PR skills, Suhel has made strong associations with key architects, consultants, builders and fabricators.

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BIM The Smart Way

Business Information Modelling (BIM) is a perfect example of how technology can help the construction industry to convert an architect's dream into reality. BIM helps in proper planning and execution of projects, and is of great help to construction managers. It is the perfect example of team collaboration right from designing to executing.

BIM is being fast adopted by the façade industry. It enables an effective way to programme, develop, design, build and effectively manage the project. Use of BIM allows planners, designers, and construction managers to better coordinate details and information.

BIM helps construction managers in careful planning and project tracking whether it is a skyscraper or a smaller house. It is one of the most important key tools in achieving significant improvements in construction costs, value and carbon performance. It also helps in the use of open, shareable asset information throughout a project and a building's life cycle – from initial design and construction to operation, maintenance, dismantling and recycling.

The BIM software allows all design data to be organised in one place rather than many separate drawings, and uses 3D constructions to improve building design productivity. This includes the object details, specifications and performance information, such as size, colour and materials.

BIM is introducing a dynamic capability for construction projects, especially intricate envelopes and facades. Teams are able to accomplish far more than merely interrogate models from a design perspective, but align collaboration with performance and cost objectives.

Balancing sustainability against cost and efficiency can be an overwhelming pressure for envelope and façade projects, particularly from a collaboration perspective. When you consider the number of stakeholders involved and the varied roles they play throughout the course of a project, there is little room for delays – be it re-designs, supply chain gaps or lack of communication.

The primary benefits of using BIM during the programming

Business Information Modelling (BIM) is a perfect example of how technology can help the construction industry

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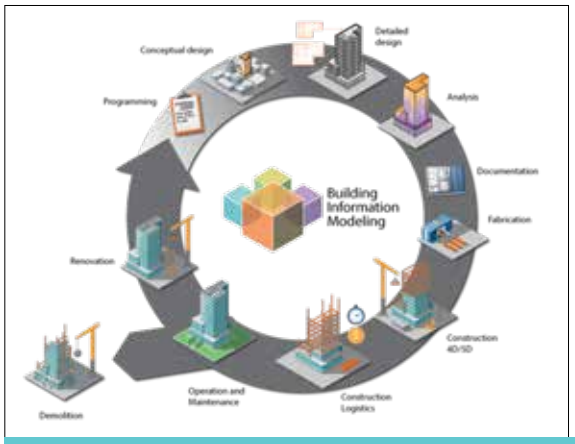


The BIM software allows all design data to be organised in one place rather than many separate drawings

BIM by Aludecor Systems: a first such technology in India that enables rainscreen facades.

efforts on healthcare projects are:

- Design and planning
- Quantity estimation
- Clash detection
- Productivity
- Prefabrication
- Quality management
- Facility management

Building material manufacturers are getting ready and making their products available for BIM by creating a library which will help construction engineers to use their products in BIM easily.

As BIM evolves and gets connected with other technologies like virtual reality or artificial intelligence, the future is looking very bright and its journey to the new era has just begun.

Hotel Sharda Inn

Deoghar, Jharkhand

The Hotel Sharda Inn is a hospitality project located at Deoghar in Jharkhand. The owner Uttam Kumar approached us to take care of the design aspect of the project. Our design assist team worked out the design layout meticulously as per the parameters of the building. The client was receptive of our design concept, and executed the design on site by fabricator Rafiq. He appreciated the design ideas and patterns, which were successfully executed, adding an interesting character into the project. He followed the process Rout & Return method with aluminium framing 25mm X 50mm in size with router blade of 10mm and groove size 12 mm fixed.

QUICK FACTS:

Project: Hotel Sharda Inn

Location: Deoghar (Jharkhand)

Owner: Uttam Kumar

Colour Code: SH 2010 (Sparkling White)

SD 6007 (Old Wine)

TI 25 (Plush Walnut)

MT 5003 (Beige)

SD 6002 (Shadow Grey)

SAURAV KABRA
Manager – Design & Application, Aludecor

ABOUT THE AUTHOR:

Saurav Kabra leads the Design & Application department in Aludecor. The department provides customised 3D design support for fabricator and architect's projects, and has been instrumental in creating a major difference in the industry. Under his supervision, the projects by the Design Assist department are progressing well and are getting executed better. Although Kabra is an MCA, he developed a special interest in facades and has been in research and development of new façade technologies. He has spearheaded the introduction of Aludecor Systems, a first such technology in India that enables rainscreen façades.

Sustainable Green Façade for Better Performing Buildings in India

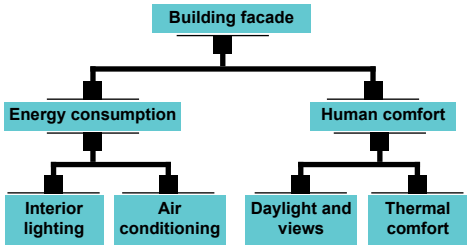
Far more than an aesthetic cover, building façade plays a major role in reducing building energy consumption and improve occupants' comfort and well-being. This makes sense in the construction industry to look at more holistic approach when it comes to façade design and deployment. A thoughtful façade can meet high expectation of performance for evolving green construction industry, owners and occupants. But equally important is to know what factors contribute to the façade design.

The dominant factors while designing sustainable façade are location, site condition, climatic condition, orientation, sun path, function, building application, design and materials. These factors are not new to our building design; however, adopting such factors coupled with strategic use of daylight, glare control, shading, high-performance glazing and super windows improvise performance of a building overall and offers great opportunity to improve human comfort too.

A good façade can act as a deciding factor of the overall performance of the building.

KEY CONSIDERATIONS FOR A SUSTAINABLE FAÇADE DESIGN:

Façade can typically influence the building energy consumption and the human interaction with the environment.



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As depicted in the flow chart, façade has to be designed keeping in both human comfort and the influence of the energy consumption.

ENERGY CONSUMPTION

Façade can play a role in influencing interior lighting design and air conditioning load.

Interior lighting load: A façade designed to bring in optimum daylight into the building can significantly reduce the artificial lighting load. Again the interior design should support the intent. Typically window to wall ratio, window assembly design, glazing properties and interior design should all work in unison to provide adequate daylight into the building. Over illumination is also an issue resulting in glare and excessive heat leading to increase in HVAC load and occupants discomfort. A balance has to be struck between heat and light in the design.

Air conditioning load: The main energy guzzler can be tamed with a good façade design. The conduction heat gain analysis of different façade components enables us to know the best combination of the materials that can bring in less heat into the building.

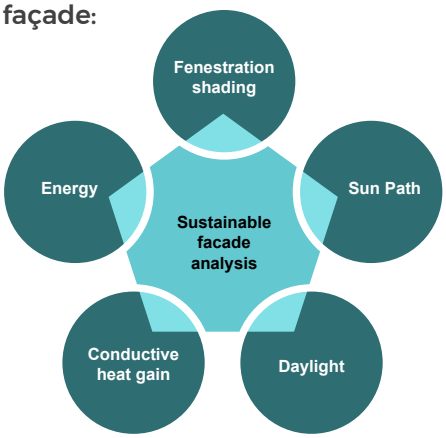
Heat gain from wall + Heat gain from Roof + Heat gain from Glazing assembly = Conductive heat gain through facade

Sun path analysis, shading analysis and orientation determines the amount of heat getting into the building. Further, the neighbouring buildings and permanent structures also play a role in façade design.

HUMAN COMFORT

The occupants in the building should have direct benefit from the façade. Even though intangible, the views to exterior, glare free daylight can influence the health of occupants. Further, cross ventilation design would encourage mixed mode operation of the building during favourable weather condition. People can opt for outdoor air than air conditioning.

Analysis required for a sustainable façade:



Façade Lighting:

What LEED Green Building Rating systems say?

LEED

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LPD should maintained below the LPD prescribed by ASHRAE 90.1 2010

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Mobile – 8800596885 | Email Id – navi.ahuja@siegenia.com

Building Façade LPD				
Zone 0	Zone 1	Zone 2	Zone 3	Zone 4
No allowance	No allowance	0.1 W/ft^2 for each illuminated wall or surface or 2.5 W/lin.foot for each illuminated wall or surface length	0.15 W/ft^2 for each illuminated wall or surface or 3.75 W/lin.foot for each illuminated wall or surface length	0.2 W/ft^2 for each illuminated wall or surface or 5 W/lin.foot for each illuminated wall or surface length

Lighting Zone	Description
1	Developed areas of national parks, state parks, forest land and rural areas
2	Areas predominantly consisting of residential zoning, neighbourhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas
4	High-activity commercial districts in major metropolitan areas as designated by the local jurisdiction

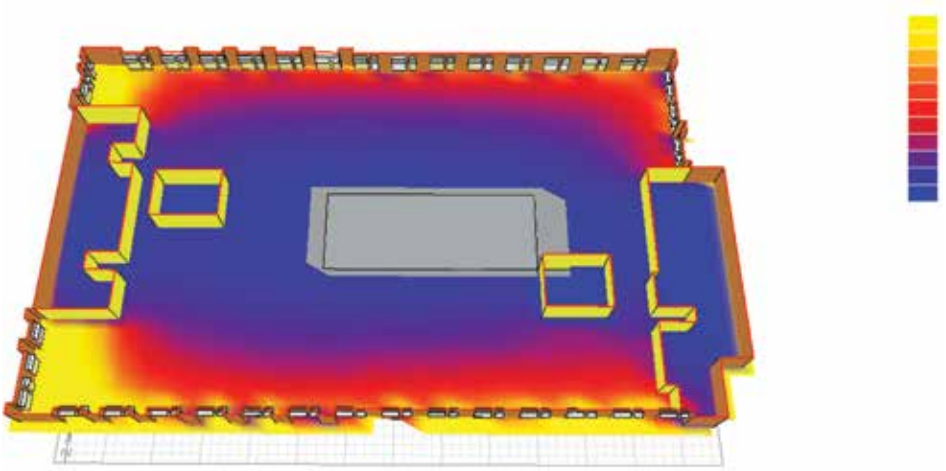
HDFC Bank, Bhubaneswar

Aveda Meta, Bengaluru - IGBC Gold pre certified contemporary corporate office spaces

VR mall, Chennai

UL - Cyber Park, Kerala

Day Lighting



Day lighting penetration image with lux level in work plan of interior

Day lighting is a controlled admission of natural light into a building to reduce electric lighting load and energy load. It helps create productive environment for building occupants, while reducing building energy costs. A day lighting system coupled with a daylight-responsive lighting control system when there is adequate ambient lighting provided from daylight alone, reduces electric lighting power. Further, the fenestration/location of windows in a building are designed to avoid the admittance of direct sun to avoid glares by providing shade. The day analysis simulation showed building is sufficiently day lit with light ingress from South and West. The Lux levels at the perimeter areas is also restricted to around 500 Lux because of Light shelves.

Below mentioned are suggestion which proved beneficial in a commercial building while addressing daylight in a building

- Use DGU with lower SHGC < 0.2 , relax for North
- Maximise the benefit of day lighting by choosing higher VLT>0.3
- Plan separate day lighting controls design overhangs directly located above the window head
- Use separate controls for lighting in areas near windows
- Use automatic controls to turn off lights when not in use
- Use two-layer glazing; day light window and view window
- Maximise the benefit of day lighting by choosing higher VLT>0.45 for North
- More day light realised if we use light colour ceiling and flooring system
- Preferred window to wall ratio is 20% to 30%

SHADING

The principle behind shading is to mitigate solar heat gain by reducing the amount of sunlight transmitted into the building. This can reduce maximum peak demand power for cooling equipped with manually controlled blinds, light shelves, overhangs and lighting controls.

To understand how shading plays crucial role in optimizing solar gains, shading analysis has to be carried out. Higher depth shading devices may not be required in few cases. Shading optimisation is possible by doing shading analysis in the design stage itself.

The east side glazing is critical

Outer glass name	Outer glass thick-ness	Space size	Space medi-um	Inner glass name	Inner glass thick-ness	Col-our	Light trans-mis-sion (%)	Light reflec-tion external (%)	Light reflec-tion inter-nal (%)	Solar fac-tor/ Solor heat gain co-effi-cient (SF/ SHGC)	Shad-ing co-ef-ficient (SC)	U Value (W/ sqm K)	Relative heat gain (RHG-W/ sqm)
SKN 154 II	6	12	Air	Plani-lux	6	Neu-tral	50	18	26	0.26	0.3	1.5	214
SKN 154 III	6	12	Air	Plani-lux	6	Neu-tral	67	10	12	0.38	0.44	1.6	308
St 120	6	12	Air	Plani-lux	6	Me-tallic	18	32	30	0.22	0.25	2.6	190

Table 1: Heat gain to interior space due to glazing

at morning hours. Low SHGC low VLT glass coupled with shading device is a good option for the east façade to reduce the solar gains and direct solar radiation. West façade, post 3:00 P.M. is difficult to shade fully, hence low SHGC low VLT glass coupled with shading device is a good option to reduce the solar gains and direct solar radiation. North façade is generally self shaded and no exterior shading is required for the glazing.

GLAZING

The simplest method to maximise daylight within a space is to increase the glazing area. However, three glass characteristics need to be understood to optimise a fenestration system [Table 4]

- U value
- Shading coefficient and
- Visual transmittance

Summary of general façade specification:

Building gets overheated during the day due to solar heat gain. Below are recommended parameters to enhance occupant comfort and reduce cooling load:

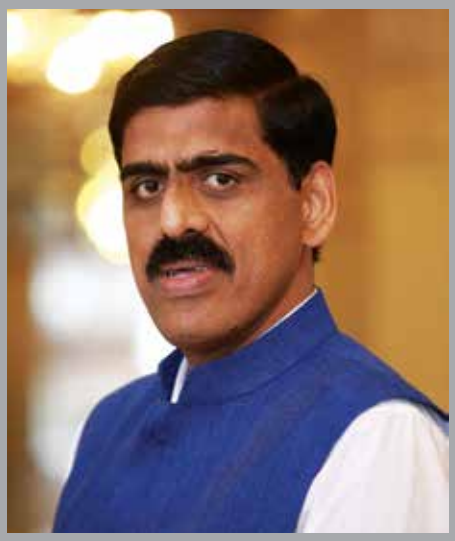
- Glazing <30% non north & <50% north
- >60% day lit areas
- 90% views with proper placing of interiors
- Open office culture
- Closed cabins on the interior space
- Day lighting and view glazing
- Shading to minimise glare – Non North
- Light shelves to distribute day lighting deep in the interior spaces
- Roof with over deck insulation and high reflective paints / tiles
- Heat gain from building skin <1.0 watt/sq ft
- EPI <100 units/sq m/year

NetApp, Bengaluru - innovative office spaces

CONCLUSION:

To optimise overall building operating cost, there is need to have proper strategies to reduce conductive heat gain (unit measures in watts/sq ft) and later work on optimising active energy component such as HVAC, lighting, elevators and escalators, computers and other equipment in the building. Many high performance projects demonstrated EPI of <90 units/sq mt/year with improved strategies on both the façade and building materials and equipment. Day light percentage, shading factor, light shelves and types of glazing are the features in façade design capable of responding to building energy consumption in economical means, besides wall and roof options coupled with insulation.

An ideal case scenario in the Indian context climate, north façade can have a maximum benefit of daylight, with little higher SHGC minus shading. South facade features with lower SHGC glass of north adding shading. However, east and west façade require high performance glass, shading and minimum window to wall ratio. These are some of the ways in building design which contributes towards sustainable façade design.



M SELVARASU
Managing Director
LEAD Consultancy & Engineering Services (India) Pvt. Ltd.

ABOUT THE AUTHOR:

M Selvarasu, Managing Director – LEAD Consultancy & Engineering Services (India) Pvt. Ltd., is one of the market leaders in India for MEP and green design. He is a renowned sustainable consultant having more than 26 years of rich experience in the industry. Selvarasu is one of the founding members of World GBC & Indian GBC, and has performed energy audit for more than 200 industries and buildings. LEAD Consultancy is a leading firm in providing MEP design services and green building consultancy for major corporate in India and abroad. He has delivered more than 400 milestone sustainable projects in the country and provides technical advice to both the IGBC & USGBC.

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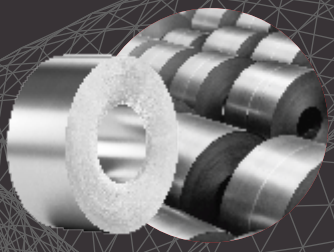

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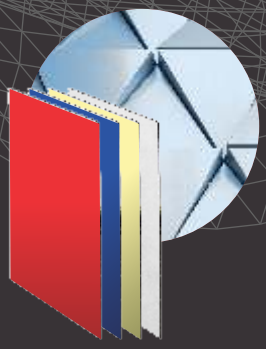

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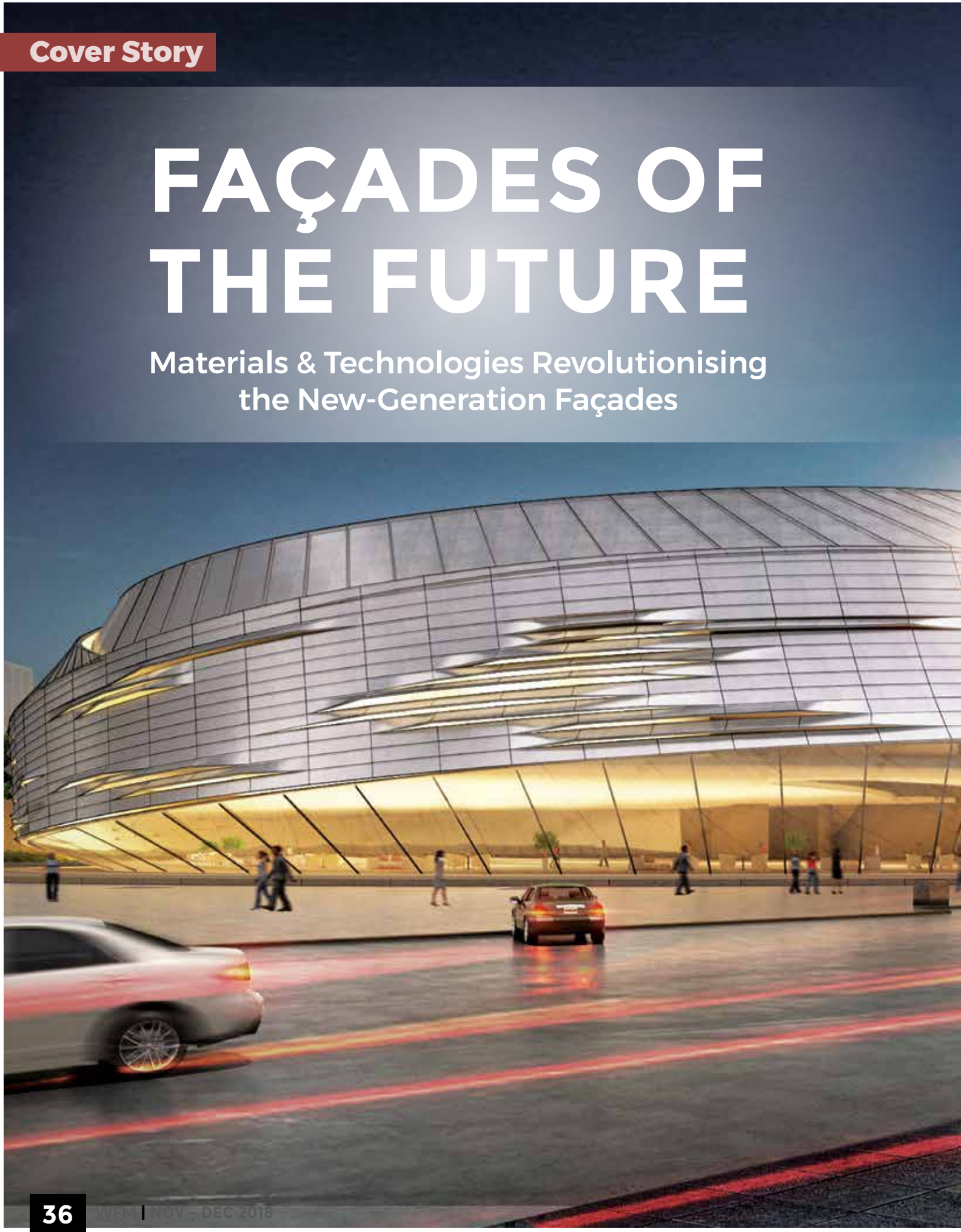
FAÇADES OF THE FUTURE

Materials & Technologies Revolutionising the New-Generation Façades



No doubt, façades are the most important building element from both the users and the architect's point of view. They are the most difficult to design too since the perception of iconic and technologically advanced facades is changing frequently. Designers are researching and experimenting with new and complex façade forms and patterns. The glass-aluminium facades are bygones now as we see a lot more new materials in the market such as rusted iron panels, zinc, copper and steel, even high pressure laminates.

Along with the materials that furnishes the look and feel of a building, technologies applied to facades are also changing. The leading-edge technologies play a crucial role in terms of sustainability and operational cost-effectiveness. Truly successful facades do far more than merely projecting an iconic image, they play a vital role in driving or transforming building performance, engaging with the external environment, significantly enhancing durability and reducing energy consumption.

But how smart can a facade truly be? To what extent are technological developments transforming the facade performance? And do we have the tools and metrics in place to truly gauge and build these smart facades? This edition's cover story throws light into all these aspects which would help building flawless 'future facades'.

The Mobitorium designed for a training and research institute at Bengaluru by DSP Design

AR. VIVEK GUPTA
Principal Architect,
Arvind Vivek, Associates

AR. YATIN PATEL
Founder, Principal Designer,
DSP Design Associates

AR. ZUBIN ZAINUDDIN
Principal Architect,
ZZ Architects

AR. KRUPA ZUBIN
Principal Architect,
ZZ Architects

Façade in Perspective – Experts Envisage

In architecture and construction, nothing summarises the dual qualities of performance and appearance like the building façades. In alignment with these two key components of building, notes **Ar. Vivek Gupta, Principal Architect, Arvind Vivek & Associates**, a façade must contribute positively to its performance while still ensuring an aesthetically-pleasing form. Innovations in façade technology and building solutions are potential advancements in the green building movement, contributing to the creation of greener, healthier places for people.

Ar. Yatin Patel, Founder & Principal Designer, DSP Design Associates too agrees with Ar. Gupta on the need for innovations in façade materials and technologies. "We can anticipate research to be aggressive, innovating on façade that responds to macro public elements as well - for example, transport/logistics," says Patel.

Ar. Zubin Zainuddin and Ar. Krupa Zubin, Principal Architects, ZZ Architects points out that façades have to be more than just elevations skins on buildings. A lot of research is being done on harnessing the surface area of the façade to help in generating energy. The façade also has to ensure that the optimal lighting and comfort is sealed within the building premise, considering the imperative role played by building façades in reducing building's energy consumption, improving natural lighting and offering better airflow within the building.

Thrusting on the need for "Out of the Box" research and experimentation, **Ash A. Parekh, Principal Architect, The Opus D'Sign Studio** is hopeful that façades reacting to dynamic weather conditions and those using sustainable building materials will gain momentum. He is sure that architect's aesthetic vision and "excitement factor" as well as the ever-changing customer requirement will

Aspee house -A commercial building at Malad, Mumbai. Resin with natural clay flexible tile cladding. By Vivek Bhole Architects Pvt. Ltd.

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Principal Architect,
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AR. KARL WADIA
Senior Associate, Architect
Hafeez Contractor

AR. VIVEK BHOLE
Principal architect, Vivek
Bhole Architects Pvt. Ltd.

AR. DHURGHAI KUMARAN
Director - Studio,
FHD Group, Hyderabad

25 South Residential at Prabhadevi, Mumbai by Architect Hafeez Contractor

drive the development of a "techno-holistic" design. Initially, façades were formulated using two distinct strategies, namely technology and market (or customer driven).

Ar. Karl Wadia, Senior Associate, Architect Hafeez Contractor has no doubt that the façades of the future are going to react to the climatic condition around them - façade that will change during the day and night; façade that will let the natural air in the early hours of the morning and close themselves down by late morning; façade which will protect the building from the sharp westerly sun and then open up towards the evening to bring in more light and natural air, are futuristic.

Ar. Vivek Bhole, Principal architect, Vivek Bhole Architects Pvt. Ltd says that in the past, the façade methodology remained complimentary to the structural systems along with other factors like climate and aesthetical preferences. With the inception of framed structures, precast and prefabricated façades are going to define the future façades.

Ar. Gupta too agrees with Ar. Bhole and is sure that prefabrication and modularisation strategies are being adopted as mainstream construction practices, which will ultimately bring great change to the building design. Along with it, robotics, digital printing, augmented virtual reality, artificial intelligence and other advanced digital processes will shape the future of construction and the building skin, adds Gupta.

According to **Piyush Srivastava, National Façade Manager, Schueco India Private Limited**, the future of façade includes an increase in opacity and energy efficiency, and widely accepted aluminium system's

A commercial project by ZZ Architects

Building façades of the future will develop in two different trajectories.

- **Human centric:** Façades could begin to mimic human skin in its property to breathe, allow necessary daylight, and take sustainability to an all new level. Sustainability will hold the key to future façades.
- **Technology driven:** Façades could become digital platforms for presenting identity. It opens façades as a dynamic element rather than static cover. We are already seeing LCD screens becoming façades in commercial buildings.

(Dhurghai Kumaran, Director - Studio, FHD Group, Hyderabad)

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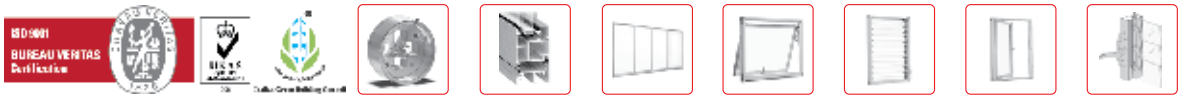

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PIYUSH SRIVASTAVA
National Facade Manager, Schueco India Pvt. Ltd.

façade product rather than a bespoke system which decide the future construction. Also, new materials are flooding the marketplace at an exponential rate. However, incorporating these materials into existing systems often pose a unique set of issues: performance, tolerance, compatibility, warranty and waterproofing.

It is imperative that, in the future, buildings will become smarter, façades will become more complex, dynamic, and interactive, making the building/user interface far more intimate and individualized, predicts Gupta. While it can be challenging even to get users to adjust blinds in response to changing exterior lighting conditions, emerging automated technologies will tune basic workspace conditions to each user, Gupta is optimistic. At the same time, users will be able to interact with individual workspace conditions very similar to how they

"The uPVC Windows' Growth Would be from 20 to 25 % in the Coming Years"

FARID KHAN
Director and CEO, profine India Window Technology Pvt. Ltd.

India is experiencing construction boom in terms of the growing economy and it is accelerating the growth of window & façade industry. Today, the windows & doors segment is standing approximately at 2 billion Euros which makes it a good sizable market. With mass and low cost housings coming into the picture, the windows from good players at affordable prices with descent quality will have demand in the market. I believe that the windows & facades industry is going to grow manifolds.

India has best international claimed architects and they can replicate the best façade around the world in Indian buildings. Now in India, a lot of new materials are coming in the construction market. Performance windows are the trend and the best available option for such windows are uPVC as well as the aluminium windows. The glass is evolving day by day and it will play a very important part in the facade systems in the coming years.

I see a lot of changes happening in the window industry like double glazing. With increased urbanisation *and purchasing power of the population, people will go for the quality materials. I foresee that the uPVC windows' growth would be from 20 to 25 per cent in coming 3-4 years. The aluminium windows would transform from non-thermal to thermal and the growth rate will be same as that of uPVC windows (20-25 per cent).*

(Farid Khan, Director and CEO, profine India Window Technology Pvt. Ltd.)

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"In Future, All Fenestrations Will Have A Minimum Carbon Foot Print"

AVANISH SINGH VISEN
CEO,
Encraft India Pvt. Ltd.

A residential project at Pune by Encraft

What is your view on façades of the future?

Latest state-of-the-art fenestration is proven and durable. In future, all fenestration will have a minimum carbon foot print when processed and/or manufactured. The steps for the same are: use of renewable energy; minimum or no wastage of raw material resources; should have a similar life cycle as the whole building envelope; should be fully recyclable and contribute towards energy and CO_2 reduction. In addition, they should be ergonomic in operation, especially for the ageing population; safe and secure to use; should offer for traditional or modern designs and should be cost effective. Complying with these desired attributes is a tall order for any of the known fenestration materials. Industry has not found the 'perfect' frame material yet that ticks all those boxes.

Selection of the appropriate or most suitable fenestration solution in terms of frame material and glass will always depend upon the actual application. Knowledge of some of the inherent material deficiencies is essential. Architects and fenestration designers can successfully overcome those by changing design parameters to play to the strength of their chosen material combination.

What are the key characters of a high-performance façades?

Rather than serving as a static enclosure, the building skin has the potential to redirect and filter daylight, provide natural ventilation, manage heat transfer, enhance occupant well-being, and create visual and physical connections between inside and outside.

Brief on the advancement in façade technology and materials?

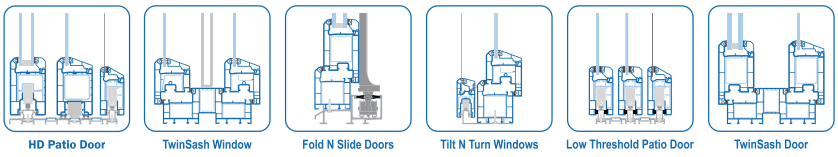
Advancement in façade technology would involves façade which is environmentally dynamic, self-cleaning, information sensitive and communicating. Accordingly, material will be chosen by architects and fenestration designers.

Tell us about energy harvesting façades?

Energy harvesting façades are the latest innovation in façade industry where a larger amount of energy can be harvested with the help of solar panels fitted on façades, However, this may result in unsatisfactory lighting conditions inside the room. Solar power is a renewable source of energy and CO_2 emission free, hence energy harvesting façade is an environment-friendly dynamic innovation.

What is the role of CAD, software technologies and AI in designing and building futuristic façades?

Fenestration providers utilise dedicated fabrication computer systems that can cover wind loading, accidental loading, frame weights, U-values, sales order



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processing, production planning, pricing, stock control, fabrication cutting sheets, links to machining centers and accounting. Other software is mainly used by the systems provider for R&D and support purpose like U-value simulation, gasket simulation, static and stress calculations, sound reduction programmes, etc.

What are the advancements in automation in façades and fenestration?

High volume, streamlined product range and excellent production planning are pre-requisites for automated frame production lines. The required factory space, the high investment level and the occasional, unpredictable order intake have deterred most fabricators to make the big step change. It is not surprising that cutting/machining centers, flat bed multi-head welder and corner cleaner combinations are chosen as the first step in automation, but the automation technology stops when the sashes are merged into the outer frames or when frames require factory glazing. Nevertheless, every operation in fabrication can be made more efficient by simple means like introducing positioning and drill jigs, utilising dedicated hardware tables, upright glazing frames, transportation and storage racks etc. Those relative, small investments get easily overlooked, although they are sometimes more effective than most sophisticated multi-head welder.

Plaadium, Pune by Encraft

It can be argued that automation is only meaningful in high labour cost economies, but the inherent manufacturing quality and the consistent output per hour/per day/per week may be of interest in new, emerging fenestration markets like India.

What do you mean by Interactive façades and what are its advantages and disadvantages?

There are no known disadvantages besides the initial investment cost and ongoing maintenance fees. Interactive or smart glazing is electrically switchable glazing. The principle of smart glazing can be best described as a dynamic environment i.e., by pressing a button the glass can be tinted to keep heat and glare out whilst the best conventional double-glazing unit with low-e coating provides a static environment i.e., fixed solar gain, fixed light transmission and fixed thermal transmission (U-value). There are numerous benefits like no need for shading or blinds, reduced heating and cooling requirement, shading on the demand,etc. There are downsides like high material and installation costs. At present, mainly commercial buildings with glass façades or prestigious architectural developments are using this new double-glazing technology, but the whole principle can be effectively applied into all market segments.

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engage with their smart devices, through graphic, motion and voice which will be integrated into those very devices.

We have seen passive and active façades in contemporary architecture. Parekh believes that we will see an emergence and acceleration in the use of cognitive or intellectual building façades. The intellectual façade will respond to internal and external conditions, seamlessly coordinating with the building's MEP systems to create a network of cognitive solutions. Variables such as non-predictive weather conditions and micro-climate influences by adjacent structures will create a "pro-active" building skin.

Bio-climatic façade design is a raging trend internationally that caters to the seasons of the local area controlling the summer sun, winter chills while also making the interiors and exteriors

Various projects designed by Arvind Vivek Associates

thermally and visually well performing, says Ar. Patel. Stainless steel has been yet another material choice in the case of bioclimatic projects globally, given their durability and low maintenance costs.

Besides technology, materials like glass, concrete etc., used for the building skin are an integral yet singular aspect of the façade design, points out Gupta. Durable, malleable and scalable materials like copper, concrete, etc., are the choice for architects who innovate in designing functional cladding.

Earth's climate, health and safety, lifestyle and rapid urbanisation will result into super tall and smart buildings. The buildings will have complex but efficient structural systems like diagrids, exo-skeleton, space trusses etc. and façades would follow the process, says Ar. Bhole. In the next few decades, we will witness multiple options and experiments in automated or electronically controlled dynamic façades with dynamic property changing glass for improved energy efficiency, indoor comfort and overall environmental quality, he adds.

Key Characters of High Performance Façades

A high performance façade is a façade that not just envelopes your building, but works with your building to give you optimum daylight, comfort, no glare and reduction of heat gain, explains Ar. Karl Wadia. An optimum high performance façade is always going to be one that shields you from the external harsh atmosphere, while at the same time not demanding you to turn on many high levels of air conditioning.

High performance façades effectively ensure a better working environment and can add immense value to the end user, adds Ar. Zainuddin and Ar.Bhole. It gives flexibility not only in design and design expression along with execution of façades in factory and on site but also facilitates cleaning, maintenance and replacements subsequently. Ar. Krupa Zubin gives an example - double-skin façade buildings were first built during the first energy crisis as an attempt to improve building performance. The recent resurgence of efficient building design has renewed interest in this concept, she observes. Since the Green Building Council offered reward points for reduction in energy consumption, this strategy has been used to optimise energy performance of buildings.

Ar. Yatin Patel and Ar. Parekh agrees that façade systems should address the management of glare and light, solar gains, acoustical considerations, ventilation, energy harvesting and more. Integration between the façade as a building skin being elevated to other building systems adds to the intelligence in building management technology. Façades that integrate electrical and plumbing services through closed-cavity systems or automated shading devices driven by sensory controls for electric and mechanical applications efficaciously widen the performance spectrum for building skin. Ar. Parekh believes that the façade can also reduce operating costs via daylighting, minimised lighting and cooling. They are developed to respect the limits of latitude, location, solar orientation, acoustics, earthquake and fire safety, etc.

Parikh further reveals that computer simulations assist greatly in understanding the building behavioural patterns, limitations and performance capabilities. The building skin

A competition entry by Ar.Vivek Bhole, Vivek Bhole Architects

also needs to comply with a host of industry concerns, namely, capex cost, maintenance and constructability. It is critical that all the building skin components work seamlessly together to create a technically coherent solution, giving the designer a unique opportunity to display their concept, form, functionality and technological prowess.

Kumaran too opines that in Indian market, low cost solutions in high performance façades will be a key criteria. High performance, in terms of energy efficiency and sustainability, will be the key driver in façade technology. He agrees that in additional to modularity in façade technology, ease of production, installation and maintenance are essential characteristics of a high performance façade. In terms of key façade performance, it should be pre-tested and certified, especially against structural, air permeability, water tightness, and thermal, acoustic, seismic if required, adds Srivastava.

According to Ar. Gupta, passive design strategies possess fundamental advantages to develop low-energy buildings.

Two major types of façades exist: curtain walls and double façades. Both can contribute to a more optimal thermal comfort, says Gupta. The rising trend, however, is adaptive façades - an envelope that uses flexibility to actively regulate the indoor conditions and helps in increasing the energy efficiency of a building. Extrinsic control of these adaptive systems possesses the quality to combine (central) automated strategies with local control and individual user needs. Adaptive systems are most suited for the moderate climate zone, as a consequence of the seasonal variation between the need for heating and the protection against overheating.

Advancement in Façade Technology and Materials

Façade methodology has always remained complimentary to the structural systems along with other factors like climate and aesthetical preferences. With the inception of framed structures, precast and prefabricated façades came into the picture. The same factors are going to define the future façades, says Ar. Bhole. The material choice and the combination would derive creative character of the façades - Steel, aluminium, zinc, tile, stone, extruded resin, ETFE and so on, the list is endless.

Ar. Wadia and Ar. Parekh observes that aluminium and glass façade concept is now changing and a lot of ceramic, cotton steel, stone, thin stone cladding and other new materials are being used on façades. The material palate is available is so wide, adds Wadia – from high pressure laminate to solid aluminium core; there is aluminium foil on which one can paste just 2-3mm stone instead of using 20-25 or 40-45mm stone depending upon what kind of stone it is. "We are using less stone, putting less weight on the building. With these recent R&D in façade technology, a lot of this material originally started off in aeronautics and in vehicle manufacturing and now they are making their way into façade engineering", says Wadia. Today one can get more and more robust hardware from the best companies all over Europe, China and India that can take additional weight to get various types of window systems that are automatically or manually operated.

Kinetic façades are dynamic and ever-changing, rather than static. Building skin elements can be programmed to respond to climatic factors, impacting energy efficiency or solar heat, or for aesthetic reasons, such as an art installation, says Ar. Parekh. The Al Bahr Towers in Abu Dhabi uses a computer-controlled façade made of umbrella-like panels which open and close in response to the sun's

Choosing the Right Façade Material

While there are many factors which require consideration in building façade, one of the most daunting one is – Choosing the right material. Also, the decision on the right façade material needs to be made after considering a range of factors like:

- Water-resistant
- Aesthetics and texture
- Durability
- Energy efficiency
- Eco-friendly
- Cost

(Ar. Zubin Zainuddin and Ar. Krupa Zubin, Principal Architects, ZZ Architects)

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the wind movement to achieve optimal shading and light.

Kumaran too agrees that there has been tremendous growth in technology over the last two decades and interactive façades, green façades, dynamic façades are a reality today. But availability, affordability and constructability need to improve to make them usable across product typologies.

Energy Harvesting Façades

The next gen façades should be able to generate and even store renewable energy. According to Ar. Zainuddin, energy harvesting façades would be the ideal solution, where façades should help the building to generate sufficient energy. This could ensure that the buildings of the future can stay off the pier grid and can truly be self sustainable. However, these are still too expensive to be considered for projects in India in their current formats. We need to encourage better planning and design principles based on the natural resources and orientating the building as per ideal directions, he notes.

Advanced embedded photovoltaic cells, micro wind mills and heat filter membranes in façades will take care of more than 50 per cent of the energy needs of the buildings, predicts Ar. Bhole. He quotes an example: the light dam panels on façades would be used with two-way fibre optic cables to illuminate the dark interior of the buildings in the day time and illuminating the façade in the night with reverse flow of light thus resulting in lot of saving.

Ar. Parekh defines energy harvesting as the process of collecting ambient energy from sources such as heat, wind, etc., which are typically wasted, and convert them into electric energy. This process is also known as power scavenging or energy scavenging. The use of Double Skin

Al Bahr Towers, Dubai: & Technorama Swiss Science Centre, Winterthur

Adaptive Façades

The conventional envelope is based on static designs that do not possess the flexibility to adapt and react to changing conditions. However, both the building's environment and the occupants' wishes are changing over time. This reason for advancement in adaptive façades. The building envelope is no longer seen as just a shield, but as a surface that can control efficiently the energy balances. Adaptive façades add the fourth dimension of time - by implementing dynamic features in copper. Dynamic copper façades enable modern buildings to interact with their environment, and can limit the use of artificial lighting and heating, regulate aeration, light or transparency, and create unprecedented visual effects.

Ar. Vivek Gupta, Principal Architect, Arvind Vivek & Associates

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Comunity Hospital at Shirur by The Opus D'Sign Studio

Façade (DSF) is increasingly being used as a means to harvest wind energy, notes Parekh. The system employs a series of small-scale wind turbines strategically located within the Cavity Wall to capture wind energy and use it towards the built environment.

Ar. Patel and Ar. Gupta observes that photovoltaic façades have the potential to generate clean energy to full capacity, which is also CO_2 emission free and plentiful. While photovoltaic installations for energy generation over roof tops of buildings are limited, building façades that occupy large vertical surfaces of the structure can produce more energy, making building self-sustained to energy requirements.

In any standard G+4 Architectural Built form, the area of the façades

Celestial Convergence - Pune by DSP Design

is almost four times the area of the roof. If the whole available area of such building was used for solar panels, the total annual electricity harvested would be three times that of the roof, observes Ar. Gupta. Furthermore, the use of Building Integrated Photovoltaics (BIPV) proposes interesting opportunities by replacing conventional building materials while creating a harmonious architecture by blending into building design. The overall use of such façades not only brings us closer to design a net zero building, but reduce the commercial pressure off the investors, explains Ar. Gupta.

Cultural & Social Hub at Ahemdabad by DSP Design

Role of CAD, Software Technologies & AI in Designing & Building Futuristic Façades

Computers and software's are helping us design more and more interesting façades that we couldn't do in the past - such as parametric façades. "I am fond of using computer aided technology which helps us design intelligent façade that react to the external climatic conditions," says Ar. Karl Wadia. Ar.

Solar-Powered Façades

Solar energy farms typically need large open land, while photovoltaic panels placed on the building roofs are rarely able to generate energy to meet full demand. A unique design opportunity has been initiated at the Hanwa Tower in the middle of Seoul. The renovation will be one of the world's largest solar-powered façades — cladding the entire tower in photovoltaic cells and an illuminated LED system that will become an eye-catching animated display at night. The buildings will receive a new system of windows and shading to increase natural daylight inside the building and reduce energy costs. The LEDs will flash through scenes found in nature to emphasize its environmental-friendliness.

Hanwha Tower/ 63 Building, Seoul

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Krupa Zubin too agrees with the increased use of CAD for all aspects of building design, mainly structural and efficient environmental planning. "The façades can also be optimised by running various programs on the building models. This helps in generation of the most cost effective and energy efficient solution for projects," she says.

The recent progress in computation technology and the availability of diverse software, plug-ins and coding platforms have provided the tools to identify problems and develop unique design solutions, points out Ar. Parekh. Emerging technologies using complex algorithms and AI will assist designers to understand complex design challenges so as to offer comprehensive distinctive resolutions.

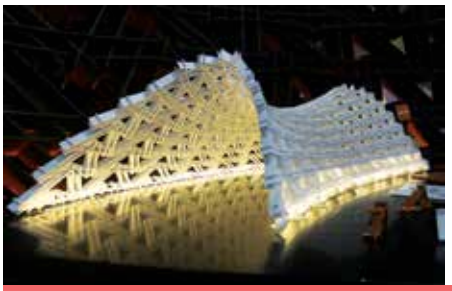
"We use plugins like honeybee in Rhino to interact with software like Daysim and Radiance to calculate the light, glare and artificial lighting requirements, and Energy Plus to calculate the solar heat gain. The interactive simulation, right from the form finding methods to shop drawings through the parametric software, give flexibility to the extent that you can imagine, evaluate, rationalise and execute innovative designs with high performance façades", notes Ar. Bhole. The computational software generates parametric façades, including designing and execution drawings for CNC machines. The software like Generative Component in Ecosim, Dynamo in Revit and Grasshopper in Rhino are powerful tools to achieve unimaginable forms, he adds.

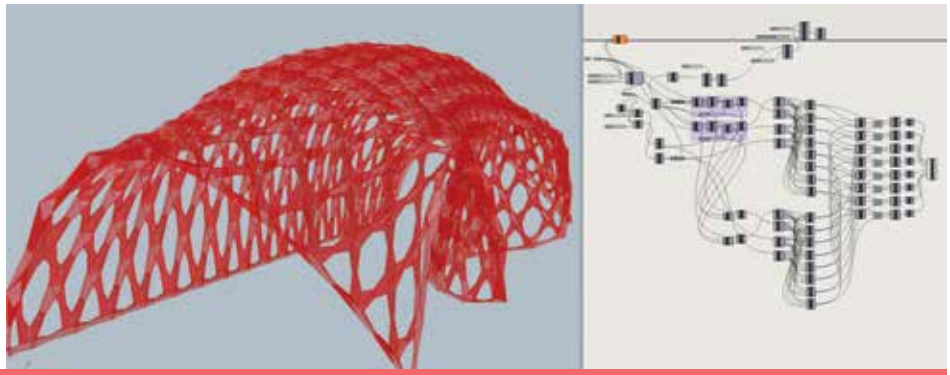
Tokyu Plaza Ginza, Seoul: The façade of this Tokyu Plaza Ginza Building consists of three dimensional glass planes, which creates a delicate phenomenon of light reflection and transmission. The unitized glass assembly is comprised of both low iron glass and heat reflective coated glass, treated with a 1mm ceramic dot pattern of gradient density.

Ar. Bhole uses Geometry Gym and Interface Plugin for Archicad in Rhino to connect computational parametric software with BIM (building information modelling). "We are going to witness the use of this technology going multiple folds in the near future," says Ar. Bhole.

Kumaran too agrees that softwares like Rhino and Grasshopper enable more complex form development, and detailed research and analysis. Parametric software can enable designing complex forms and solutions at rapid speed, based on defined parameters such as climatic needs, shading requirements, solar radiations, wind resistance and more.

According to Ar. Parekh, CAD was a way of automating existing methods of production for speed and precision. Consequently, tools provided manoeuvrability. The "craft" of CAD will assist with complex site issues related to traffic flow, micro-climatic concerns, seismic abnormalities and resultant impact on façade behavioural patterns and will take building design towards a new dimension. These software tools will be vital for evaluating material deflection, building massing/form and sway of shade and light. Software technologies will offer designers





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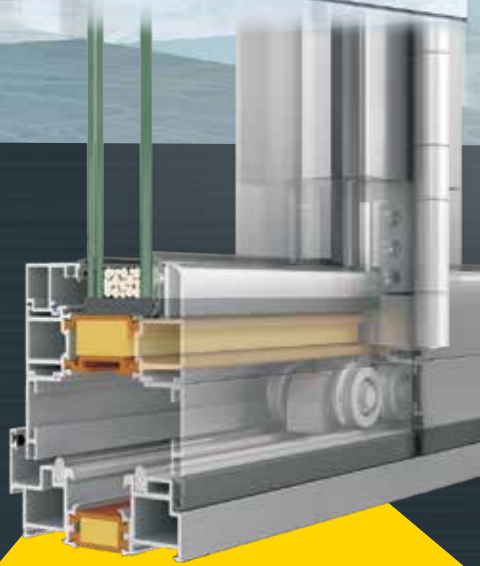

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Infinity Pool - Sheraton Grand, Chennai by FHD Group

the opportunities to monitor site changes, conflicts with building services and allow integration with IBMS (Intelligent Building Management Systems). Technology will allow us to envision 'futuristic kinetic façades' using multi-faceted forms using diverse materials, textures, colours, etc. using real time weather information, adds Parekh.

Ar. Patel believes that investing in technologies like BIM allows designers distil options down to a set of criteria that meet the aesthetic ambitions of the project and its tactical requirements, ensuring that these are met with optimised environmental parameters. These tools also enable designers to explore the forms, real-time and derive key insights into the thermal, daylight and solar performance informing decisions pertaining to the building orientation, solar shading, glazing etc and also saves the cost. According to Ar. Patel, a strong basis to drive AI can be marked with the data fed by BIM applications. Not only façades but from materials to architectural/mechanical elements to every fitting, including the smallest screw- the data is saved and computed to inform anticipated design/construction glitches for seamlessness.

Architecture is dominated by software, from pre-concept to construction. This is doubly so with sustainability – only with the advent of whole building simulation and BIM, could energy modelling, computational fluid dynamics, and daylight analysis be rigorously forecasted, says Ar. Gupta. These predictive simulations provide the necessary data to determine everything from indoor comfort to energy cost savings to potential glare on computer screens. The emerging technology uses algorithms to generate every possible permutation of a design solution. The designer simply enters a set of parameters and then chooses the best outcome generated by the software. AI promises to save time in the design process, save material by creating the most efficient structures and save money by working out the most cost-effective way to manufacture them.

Advancement in Automation in Façades & Fenestration

The automation in façades can be primarily categorised into three sections - lighting, sun shading and fire safety, explains Ar. Bhole. The entire façade lighting scheme can be controlled through a single automation controller to give imagery on the façade or highlight key elements of the façades. With new fixtures, it is possible to create multiple lighting schemes with minimum light pollution. Ar. Zainuddin too agrees to this. Through automation systems, one can control the heat gain, thus saving on the cooling load considerably. The National Building Code requires certain percentage of the façade area openable for various user types of the buildings. Most of the times, this becomes a hurdle in the design flexibility. Automation can remove this constraint by adding openable windows and fresh air. All these systems can get activated along with the fire alarm connected with fire and smoke detection systems.

According to Ar. Wadia automation can be used in two ways: one is for extremely high rise building where you have large size of windows and very often these windows are difficult to manually operate because of the sheer weight. The other area that we used automated façade are for access by fire department in the building, you can program certain aspect of the façade to work with BMS.

Ar. Parekh too observes that designers have become increasingly reliant on technology as a means to create "smart homes". Computerised HVAC systems, home security, lighting systems and virtual assistants using artificial intelligence, all controllable through a centralised hub. Automation continues to play a larger role to advocate cost efficiencies; to monitor automated glass tinting for responsiveness to dynamic climatic conditions, blind automation for privacy concerns and even a safe façade cleaning automated mechanism.

Automation can monitor the heat extraction from double-skin façade consisting of a single exterior layer of heat-strengthened or laminated safety glass, with exterior air inlets and outlet openings controlled with automatic throttling flaps. A second layer, the interior façade, consists of fixed or operable, double- or single-pane, casement or hopper windows. The concept is similar to exterior shading systems - solar radiation loads are blocked before entering the building - but the heat absorbed by the between-pane shading system is released within the intermediate space and drawn off through the exterior skin by automated mechanical ventilated means.

There are façades, which can mechanically move to control daylight, climate, aesthetics,

"Tensile Fabric shall Play an Important Role in Façades of the Future"

ARUN MADAPPALLATH
Country Manager - South Asia, Serge Ferrari India Pvt Ltd

The future of façade has been already started to evolve now and tensile fabric shall play an important role in shaping the evolution of façades in the future. Façades have moved beyond acting as a barrier between the outdoor climate and the interiors of building. It enhances the appearance of the building and the performance of the façade depending on the correct specification, design and implementation of plethora of components and systems. The tensile fabric will act as the catalyst for providing realistic solutions to allow the building to breathe while keeping it safe from adverse outside impact.

In architectural terms, high performance façades should provide immense opportunities for designers to express their design vision and aesthetic intent. As the boundary between inside and outside, the façade has tremendous implications for climate regulation, daylight levels, energy consumption and the building's overall carbon intensity. High performing façade should balance the aesthetic part with maintaining good daylight levels, minimising glare, and reducing energy use. The high performing tensile fabric facades can be used in offices, mixed-use buildings, shopping malls, residential projects, public buildings, hospitals, schools, car parks, etc. The micro-perforated composite membranes can be used along with other materials.

The tensile fabric as one of the application for façade technology, has seen phenomenal advancement. They can be moulded into any form or shape, can perhaps change the complete building elevation and the skyline of the new developments wherein aesthetics beyond

Eva mall - Day and night pictures; Bentel Associates Architects have chosen Serge Ferrari's Soltis FT 381 for the creative facade of Eva Mall

imagination could be visualised and made into reality. This material has tremendous potential in creating additional safety barriers which can be an add on as a structural member and an envelope in high-rise structures to protect the building from unfortunate disasters.

We are using computer aided technologies/ software in the design and simulation of tensile façades which are used worldwide for creating algorithms for finding the shape (form finding) and developing the flat panels to create that shape (panelling). Computer aided technologies allow designers more freedom to try different designs, and helps to have more confidence in the results. Currently these are expensive softwares and are not available to everyone who aspires to use them. In future, Artificial Intelligence based BOT systems will develop more complex calculations which will provide more robust results based on different replication models and will be available to the mass market at an affordable cost.

Automatic window actuators responding to CO_2 and temperature sensors can ensure the purging of CO_2. Motorised Solar shading louvres linked to sun direction can keep solar gain under control. These 'intelligent' façades are now being specified making our public and private building more sustainable. Some of the fabrics have intrinsic solar control properties and when used with these automated systems will contribute additionally to the sustainability of the building.

Modern buildings can not only be functionally illuminated with a custom light solution, but can also be displayed from outside in an attractive way. Light is used to accentuate architectural details and to place the focus on complete buildings and objects. This transforms the façade, particularly at night, to an attractive business card for the company that can be seen from afar. An important branch trend with façade illumination is lighting solutions enabling flexible, individual colour accents according to the occasion or event. Tensile fabric coupled with intelligent lighting will create a visually breathtaking effect during the night. The textile façades can preserve outward visibility and can create a magnificent effect with appropriate lighting apart from providing the advantage of reducing the heat inside the building.

The next generation façades shall be intelligent and durable. Intelligent in the context of aiding the sustainability to the environment by its solar control and light transmission properties, there by cutting the carbon footprints. Of course, we have similar products now, but in the future these products will be far more efficient and affordable. Durability is the next biggest factor for next generation façade application. Developing technologies assure great dimensional stability of the fabric in both warp and weft directions and thus maintain the durability of the fabric façade.

The Y Boutique Hotel, Mysore - Day and night views; The Serge Ferrari's Frontside solutions used are a source of inspiration for all bioclimatic façades

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Heydar Aliyev Center, Azerbaijan: Glass fibre reinforced concrete (GFRC) and glass fibre reinforced polyester (GFRP) were chosen as ideal cladding materials, as they allow for the powerful plasticity of the building's design while responding to very different functional demands.

lighting, etc., using built-in sensors, says Kumaran. But they are still in experimental stages. They need to be mainstreamed, across geographies and markets. The dynamic range of outdoor luminance and irradiance is orders of magnitude greater than the desired indoor range, says Ar. Gupta.

Ar. Patel states that structures can now be their own intelligent architectural statements, with possibilities to keep up and auto-upgrade with time! From accumulating data on the exterior environmental factors surrounding the building to programming it to create interior environments to suit the occupant's needs - smart technology in building material has already made its break-in. Through such technologies, the interior environments can be adapted to impact and create ambient temperatures, manage humidity, colour, density and conditions of use through the entire span of the day. What remains to be seen is how concepts like Google Home extend to breathe into an entire building infrastructure with an ultimate sense of individualised performance adaptations.

Interactive Façades: Advantages & Disadvantages

With the smart façade technology and various software, the interactive simulations can give both performance and flexibility in design expression, says Ar. Bhole. The high performance façades and glass can eliminate many climatic restrictions like need of sun shading devices, darker shades of glass to reduce heat gain, increase visual light transmission and fire safety needs, he explains. The further evolution should make the façades think, behave and perform. The advantages are many like improvement of visual experience from outside as well as from inside and sustainability.

But according to Ar. Zainuddin interactive façades are a bit too gimmicky for the Indian market and are more relevant within internal spaces. The skyline needs to be more conducive for a range of interactive façades, these are relevant for cities of developed countries, he opines.

Interactive façade connect and communicate with the users based on preferences and environmental conditions, says Ar. Kumaran.

The current philosophy is to design the building envelope with responsive, interactive systems, also often called "intelligent envelopes", says Ar. Gupta. According to Ar. Gupta, building envelope systems should react sensibly to the changes in the exterior climate and adjust in solar gain, day lighting, heat loss, ventilation, and venting to the changing needs of the occupants and the building. The interactive façade concept is thus an effective starting point both to actively manage the changing `incident` climatic conditions and the occupants interior needs based on both changing tasks and variable preferences. This starts with better utilisation of energy flows associated with day lighting and useful solar gain. It can also include wind and buoyancy driven natural ventilation, and building integrated photovoltaic systems, (BIPV). Inevitably, these new functions potentially add complexity and cost to the envelope, both in hardware and in "process". These systems will be widely used if their overall lifecycle benefits, measurable and perceived, exceed their costs and potential liabilities.

Latest Trends & Technologies in Façade Lighting

In the current times, says Ar. Bhole, architectural designs require lighting solutions that have good lighting performance as well as good quality that can minimise the cost and time needed for maintenance. Today, designers are not only making the structure innovative but are also using materials that are sustainable. Some of the latest variants are Dynamic LED lighting wherein programmable LED luminaires are used in a creative manner to enhance façades. Both colour-changing, as well as colour-temperature-changing (warm white to cool white) products, are available. Being long lasting, easy to install and maintenance-free, LED luminaires have become a must-have for every lighting designer. Ar. Patel talks about an array of façade lighting solutions, including Led Floodlights, Pixel/Point Lights, Interactive Video Sections, Underground LEDs, LED Linear Lights, LED Wall Washers and more.

Ar. Parekh has no doubt that façade lighting adds glamour and beauty by highlighting the subtle features of the architecture, without impairing them. Recent advancements in façade lighting include the development of responsive external shading systems with built in blinds and other powered solutions. The challenge for designers will be to be able to use these advancements without electricity. "Research on photochromic and thermochromic glass that naturally adapt to the

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Tower facade development by FHD Group

environment has been ongoing, but I understand, it may not still be commercially viable", says Ar. Parekh. According to Kumaran, colour accents, dynamic lighting and programmed lighting are becoming more popular now. Ar. Patel says that architectural lighting solutions need to be planned to bring out the best in the building's architectural details, making it stand out, expressive and communicative.

Architectural lighting solutions need to be planned to bring out the best in the building's architectural details, making it stand out, express and communicate. In terms of what's been around within the domain is an array of façade lighting solutions that include Led Floodlights, Pixel/ Point Lights, Interactive Video Sections, Underground LEDs, LED Linear Lights, LED Wall Washers and more.

Ar. Gupta adds that intelligent lighting is also becoming increasingly necessary for providing aesthetically elegant façades, nocturnal landscapes as well as to be sensitive towards the creatures that are active at night, such as insects and migrating birds and save resources. Façade lighting, besides being used as a marketing factor via media screens, is also seeing a rise in monumental façade lighting with the use of textile-based building materials.

Revolutionising Future Material & Technology

Most of the current materials used for façades have certain wastage due to the difference in standard sizes of manufacturing and in the actual usages of the same. This wastage can range from 15 to 50 per cent sometimes, observes Ar. Bhole. Various resin based products will dominate the cladding technologies. Resin with clay, resin with stone particles, and the options are infinite. "If I have to say just one material, then glass reinforced resin panels customised and manufactured to the final level of execution should be the next gen material and self-cleaning façades is the need of the future", says Ar. Bhole.

Ar. Zainuddin and Ar. Krupa Zubin clearly sees the need for better efficiencies in glass with larger sizes and less tinted variety of glass to truly experience the natural quality of the light around. They also look forward to self maintaining façade systems.

Ar. Parekh is also eager to find self-cleaning claddings and finishes that can help improve notoriously challenging upkeep, protecting from dirt and smog. Self-cleaning technology is not only useful for the upkeep of large structures but can also be used for smaller buildings. This Nano Technology is now used on claddings that are coated with a mixture of nanoparticles that allow the material to repel water, oil, and dirt. Besides, the obvious advantage of recurring costs and water savings, the general dilapidated appearance of our urban spaces will be a great benefit for such emerging technologies.

Ar. Wadia wishes to see façades made out of waste material such as plastics, bottles and others; but fire resistant and endurable considering the life span of façade, i.e., about 25-30 years. "It should be discounted by the Government and should be heavily promoted so that we can utilize a waste in a good way in the construction industry," he adds.

Ar. Kumaran wants to explore and experiment with Electronic Glasses and Photo-Voltaic Glasses on façade systems in India to achieve Net-Zero performance.

Ar. Patel wishes for material upgrades like pollution absorbing bricks, self-healing concrete, translucent wood, sulphur-based concrete, etc., which have found cognisance in the western world of architecture and construction.

Ar. Gupta says, "I have been recently introduced to façade made from pollutants. These black façade panels are Made of Air – part of Berlin-based manufacturer – are made from biochar". Biochar is a waste product produced when trees are burned in pyrolysis kilns for energy; while 50 per cent becomes heat energy, the rest becomes biochar.

We clearly have issues with buildings we live in and how cities work. So we can work out with a competent method that could radically improve the environment.

Tseries Studio cum commercial building of T-series super cassettes by Vivek Bhole Architects LED Lights with dichroic glass fin

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Geze
Wins the Award
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GEZE door technology solutions has been awarded with two new awards from the German Design Council. The TS 5000 SoftClose door closer has been declared the winner in the 'Building fixtures' category at the ICONIC Awards 2019: Innovative Interior. Besides, the FA GC 170 wireless extension for hold-open systems received a special mention in the 'Building & Elements' category at the German Design Awards.

The TS 5000 has a high final closing force, it helps doors close exceptionally securely and quietly, even in the face of wind or suction – for instance on underground garage access doors or stairwells. TS 5000 Softclose is the perfect solution for customers who want their doors to close quietly and securely, e.g. in hospitals, hotels and apartment buildings.

The expert jury have also honoured the new GEZE FA GC 170 wireless extension for hold-open systems with a 'special mention' in the 'Building & elements' category. This distinction is designed to honour work whose design includes exceptionally successful aspects or solutions.

Fire protection doors need to close securely and automatically when the smoke switch is activated in case of an emergency; hold-open systems make them more accessible. FA GC 170 is a much-welcomed retro-fitting solution that enables ceiling-mounted smoke detectors and manual trigger switches on GEZE hold-open systems to connect wirelessly to the wireless module on the lintel-mounted detector. This makes the door system an optimal solution if structural changes are undesirable or impossible, such as in listed buildings, because they allow the design to remain unchanged.

The German Design Awards is a well-known premium international prize. The award is given on the basis of the design quality.

GEZE FA GC 170

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New Villa Windows by Aparna Venster

Aparna Venster, one of the market leaders in providing end-to-end solutions in uPVC windows and doors, has announced the launch of Villa Windows for the Indian market. Villa Windows by Aparna Venster is a unique combination of elegance and design offering premium yet most advanced safety features. The windows comes with iron grill and double sash which act as a dual seal to control noise intrusion and temperature change or loss. The newly launched Villa windows are sturdy because of the multi-chambered design and the high wall thickness which is around 2.2 mm makes them even tougher. Additionally, the extra wide reinforcement makes them next to impossible to break and helps bear high wind loads as well. These windows also come in 'wide' options of upto three frames and are also available with a mesh option. One can choose from a range of colours to suit their interest and taste. The windows can also be customised as per individual requirements. The price range starts from Rs 1200-1400 per sq feet for a basic model and goes as high as Rs 1800-2000 per Sq feet. The new villa windows are weather resistant, sturdy and secure, insects and mosquito resistant, energy efficient, and have high quality. It protects from dust, rain and pollution too. The product is available in Andhra Pradesh, Telangana, Karnataka, Tamil Nadu and New Delhi.

For more details on the product, visit: www.aparnavenster.com

Stonex Launches

Semi-precious Natural Stones

Stonex India Private Limited, a renowned name for exquisite marble and natural stones in India, has introduced their semi-precious natural stones. The newly launched stones are perfect example of how nature's beauty and man's highly skilled craftsmanship are able to produce true works of art. This new collection has the gem-like splendor of semi-precious stones in bold colors and interesting patterns. They have features like exquisite colours, eye popping glaze and dazzling textures, which makes it one of the most beautiful stones. These Semi precious stone tiles can make your swimming pool area, the vanity mirrors or your dining look more beautiful. These stones not only beautify your houses or offices but they will also help you to save energy. These semi-precious natural stones catches daylight perfectly and with a backlit solution, it becomes a luminescent source to light for a quaint evening. One can get attracted towards the beauty of this collection of stones by Stonex India. Every stone features a extravagance and bold design, and are truly a work of art. The range will add an edge, the modern tweak with the depth, imparting your interiors a completely new entity of its own and at the same time mingling into the hues and colours of your house like part and parcel, creating a luxuriating haven. Semi-precious stone counter tops are made from natural and selected semi-precious stones bound with resin to create a visually appealing solid surface. The stones can be used in residential as well as in commercial projects.

Stonex offers a prized collection of premium grade marble, semi-precious stones, granite, travertino, onyx, limestone and composites that have been responsibly sourced from all over the world; namely, Italy, Spain, Greece, Brazil & Turkey. Established in the year 2001, the brand is headquartered in Delhi with an ultra-modern factory in Kishangarh, and display showroom in Ahmadabad. Apart from that, the brand also has a leading presence in major cities like Mumbai, Pune, Bangalore, Hyderabad, Kolkata, Kanpur and Punjab to name a few. The product is up for viewing at Stonex India Pvt Ltd, WZ-29, Mansarovar Garden, Ring Road, Marble Market, New Delhi.

For more details on product, visit: www.stonexindia.in

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Fixscreen Solar for retrofitting

Renson, the industry trendsetter, is equipping its own Fixscreen 100 EVO with solar technology, delivering professional screen quality for a cable-free retrofit, for the very first time. The new Fixscreen Solar is wind tight and available in many fabric qualities and colours up to a maximum size of 10.8 Sq m. The self-contained system in a modern linear design is fitted with a solar cell and operated by remote control. Professional maintenance is also provided. As well as the drive unit, the battery is easily accessible too and can be replaced when necessary. Robust, convenient and versatile: The vertical sunscreen made of solid extruded aluminium profiles featuring Fixscreen-technology is available in all RAL colours up to a maximum width of four metres and a maximum height of three and a half metres. The square box on which the solar cell can be installed on the left or on the right appeals to discerning architects and modern developers. The fabrics also meet the highest standards. Fibreglass and polyester fabrics, PVC-free fabrics or blackout fabric in many structures and colours are available, as well as fabrics specially designed to give protection against the sun and overheating. Cool, comfortable and colourful: The sun's rays are blocked out with the external sunprotection before they reach the glass, thus creating a pleasant indoor climate. Even the decorative impact of the fabrics, particular colour and the effect this has on the luminous colour in the room can be set and adjusted professionally. In addition, vertical sunscreens protect against insects in the closed position. Professional quality, professional solution: External sunscreens without electrical wiring are a good option for renovation projects. With this new Fixscreen Solar, even demanding customers will now find the right solution. The cassette can be fitted into the window recess without compromising the glass surface.

For more details on the product, visit: www.renson.be

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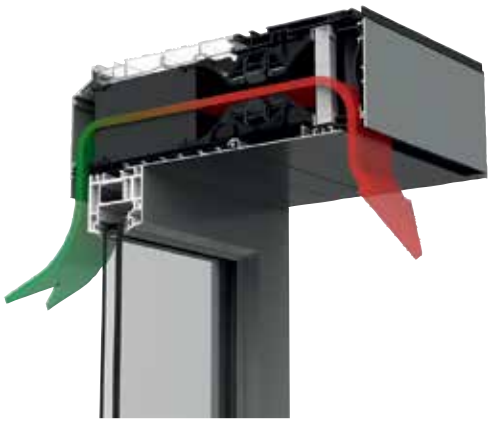

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Tata Housing 'Serein', at Thane – manifesting the notion of a vertical neighbourhood through its facade

"Façade Design Goes a Long Way in Creating the Right Image & Impression"

Power One, Vijaywada

AR. NILESH DONGRE
Vertical Head: Developer Spaces,
Edifice Consultants Pvt. Ltd.

An architect with over 18 years of experience, Ar. Nilesh Dongre has been leading the Developer Spaces Vertical at Edifice Consultants Pvt. Ltd. (ECPL) for the better part of the decade. Hands-on and detail oriented, Nilesh specialises in the design and execution of large-scale corporate buildings and complexes. With his architectural expertise and a keen understanding of commercial viability of built environments, Nilesh's projects consistently exceed performance and sustainability benchmarks and actualising their commercial potential.

A part of ECPL for over a decade, he has been instrumental to the growth of the organization, especially with his work on award-winning projects such as Tata Tritvam at Kochi, the Ascendas-V Park redevelopment at Hyderabad, Incor One City at Hyderabad, the Samsara Residential Township at Vijaywada, and the World Trade Centre Development at Abuja, Nigeria. His projects, such as the Ascendas Campus at IT Park, Bengaluru, have further received widespread coverage in national media for their 'green' features.

WFM had a long and candid conversation with Ar. Nilesh Dongre about his projects, vision, inspirations and more. Here are excerpts of the interview.

Syntel Global Development Centre in Chennai - The building footprint of each block assumed the shape of a pod with elliptical courtyards, into which the main office spaces open. Stone and glass were used in conjunction with aluminium composite Panels, to highlight the façade edges and form overhangs

Please tell us about your practice and your ongoing projects?

Ar. Nilesh Dongre (ND): Edifice Consultants Pvt. Ltd. is one of India's premiere design consultancies. Founded in 1989 by Ravi Sarangan and Sanjay Srinivasan, it emerged out of a desire to practice architecture by questioning norms and encouraging collaboration and contribution. Today, 28 years and more than 1200 projects later, we are one of the largest design practices in the country.

Envisaged as a collaborative, integrated practice, Edifice has as many design philosophies as it has designers – sensitivity being the common quality underpinning this diversity of thought and approach. Utilsing design as a tool to optimise and transform the built environment, we have tried through each of our projects to move beyond mere green certifications and achieve inherent sustainability in terms of context, culture as well as climate.

While we handle projects of varied scale and scope – from interior design to architecture and urban design, across diverse typologies – we have striven to keep our idealism untarnished through them all.

Presently, we are working on multiple projects for Tata Consultancy Services, IT Parks for Ascendas, Bhartiya City and Syntel – which range from master planning and architecture to workspace interiors as well as housing projects for Tata Housing Development Company and the Vatika Group. In the institutional realm, we have recently completed work on the Headquarters for the Insurance Regulatory and Development Authority (IRDA) in Hyderabad, and are currently working on the Atal Akshaya Urja Bhavan for the Ministry of New and Renewable Energy. We are also looking forward to the completion of our three hospital campuses for AIIMS in Guntur, Nagpur and Kalyani (W.B.).

What inspired you to become an architect?

As a student, I didn't initially plan on pursuing architecture – I was far more inclined towards engineering; iconic structures appealed to me immensely, and I was interested in exploring the role that engineering played in creating these marvels. However, while I was in college, I came across an article in a newspaper – Times of India, if I remember correctly – which spoke about Charles Correa and Le Corbusier.

Reading about these maestros was a pivotal moment for me; as I dug deeper and learn more about the far-reaching impact architecture can have on all facets of life – and the all-encompassing, immersive quality that it possesses – I became increasingly interested in this career path. This was the beginning of my foray into architecture.

Could you please talk about a few of your projects featuring innovative façade and fenestration design?

Façade design encompasses a vast range of issues. Broadly speaking, a building façade is the interface between a structure and the user and casts an indelible visual impression. The façade must correspond to the requirements of the client, the vision of the architect, as well as demands of iconicity – or, in some cases, the need to blend in – for the building.

One such project of ours – where the façade design complemented and reinforced the design intent

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– is Syntel Global Development Centre in Chennai. The building footprint of each block assumed the shape of a pod with elliptical courtyards, into which the main office spaces opened. The façade in this case, adapted to the shape of the building and emphasised its scale. Stone and glass were used in conjunction with Aluminium Composite Panels, to highlight the edges and form overhangs; the latter in particular, shaded the façade glazing and reduced heat gain.

The overall effect is very striking, with alternating stone bands on the building façade creating an iconic visual and highlighting the dynamic form of the structure with their uninterrupted lines.

Another such project is Tata Consultancy Services (TCS) Synergy Park in Hyderabad. This particular project consists of three phases, each with their specific design brief and corresponding occupancy requirements. For TCS – particularly in Phase 2 – we developed a high-density built format that consisted of several interlocking floorplates arranged in a lattice-like pattern, creating multiple shaded courtyards and terraces within.

Given the porous character of the built-mass, we designed a façade that would wrap around the form to create a cohesive whole. In this case, the façade was an architectural aid of sorts, representing the design intent in its truest form.

The third project is a Multi-tenanted building at International Tech Park (ITPB), Whitefield in Bengaluru. Developed for Ascendas, this MTB (Multi Tenanted Building) stands in a 9-acre campus, in a vicinity that houses several other commercial buildings of this kind – given this context, we wanted to develop a design schematic that would challenge the conception of typical IT buildings, and create a façade that would not only be cost-effective and energy-efficient, but also capable of asserting a distinct visual identity for itself.

With coloured fritt-glass and a modular approach to fenestration, we created staggered bands of glazing that wrapped around the floor plates; the result has been both attractive and effective, with high saleability across all floor plates due to the consistent ingress of daylight and a playful external appearance that heightens the imageability of the development.

Façades and cladding industry in India has gone through a sea change in the past decade. Tell us about the latest façade & cladding material and technologies available in Indian market and those used in your projects?

The key drivers of design innovation are visibility, sustainability and materiality – façade design in India

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An increasing sensitivity towards environmental sustainability is also responsible for the increased use of electromagnetic glass façades, which change visual transmission to turn semi-opaque from a clear state. These aid go greatly with interior lighting regulation, and help maintain privacy as well.

Other important developments include the optimization of commonly used materials – ten years ago, glass, stone and aluminium constituted the limited choice of material for façade systems, but now the palette has been diversified through diligent R&D. Back-painted glass and acid-treated glass are particularly in vogue, and so is polyester powder-coated aluminium cladding.

is evolving by leaps and bounds on all three fronts.

One example of such technological interventions would be media walls and visual surfaces that are overtaking business districts and commercial centres. In our own project Ramanujan I.T. City in Chennai, media walls are serving as an urban icon for the campus. An extension of this feature, which is also gaining favour with designers and clients, are interactive façades – media walls that are contextually sensitive and offer a dynamic and engaging experience to the user are no longer limited to the Times Squares of the world!

MTB-6 Ascendas Atria, Hyderabad

MTB-3 Ascendas Victor, Bengaluru – asserting a unique visual identity for itself through its façade design

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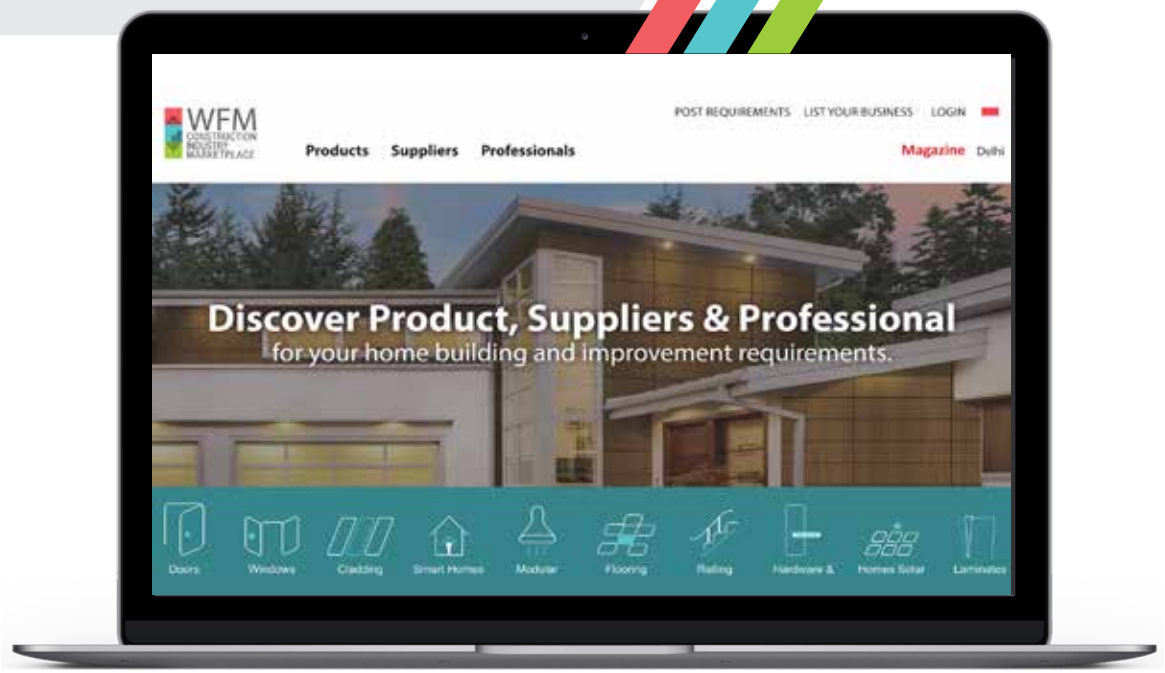

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Enamelled glass and fritt-patterned glass are also particularly popular entrants in the market; we've used them latter in Ascendas Victor to create a dynamic interior lighting experience. Fritt glass, in particular, provides the option of adding visual density and texture to typical full-glazing structures. The use of Zinc cladding and perforated metal screens in façades is also on the rise in the domestic market. From a technical perspective, we are also proponents of unitized glazing systems, which provide the largest scope of optimisation and quality control compared to their alternatives available in India today.

What are the key factors to consider while designing and installing façades & fenestration?

The first factor would be the design brief: buildings are the embodiments of our collective aspirations, and it is necessary that a façade – the 'face' of the building, essentially – represent and fulfil these aspirations as well. It is the architect's duty to strike a balance between the client's wishes and one's own creative vision for the project, and the façade must reflect this delicate equilibrium. Whether it is a commercial building that must stand out in its neighbourhood to attract the right footfall or an institutional building that must assert its ethos and stature through its appearance – façade design goes a long way in creating the right image and impression.

Equally important would be climate control: the façade must correspond to the configuration of the building, the local climatic conditions, and the expected usage patterns to ensure that post-construction energy requirements are minimised. In particular, efficient façade design should correspond to solar radiation typical to an area, and optimize daylighting and heat gain to the built environment.

The third factor is budget: the choice of material and technology for any façade system will greatly impact its cost of installation, upkeep and performance. Budgetary constraints need to be kept in mind while making these choices to ensure that a project is financially feasible not only during the stage of construction but also for the years of occupancy and usage to follow.

Lastly, façade systems – like all design choices – must be able to stand the test of time. It is imperative that the chosen façade strategy continue to fulfil its intended function and aid the design intent two, five, or even ten years down the line.

142, Rashbehari Avenue, Kolkata

Please brief on the technical benefits of a well-managed façade and how it helps the building to be energy efficient at the same time provide better interior environment.

A well-designed façade ensures optimal user experience. Especially in the context of India, façade strategies can help reduce dependence on mechanical means of climate control immensely, which is crucial for a tropical climate like ours. There has also been an increased effort towards taking buildings 'off

the grid' – by lowering energy requirements and managing essential demands through on-site solutions – and façade design is an important component of this strategy. Be it through the use of high performance glass or photovoltaic panels, façade design plays a large part in diminishing the carbon footprint of a building, which is the need of the hour.

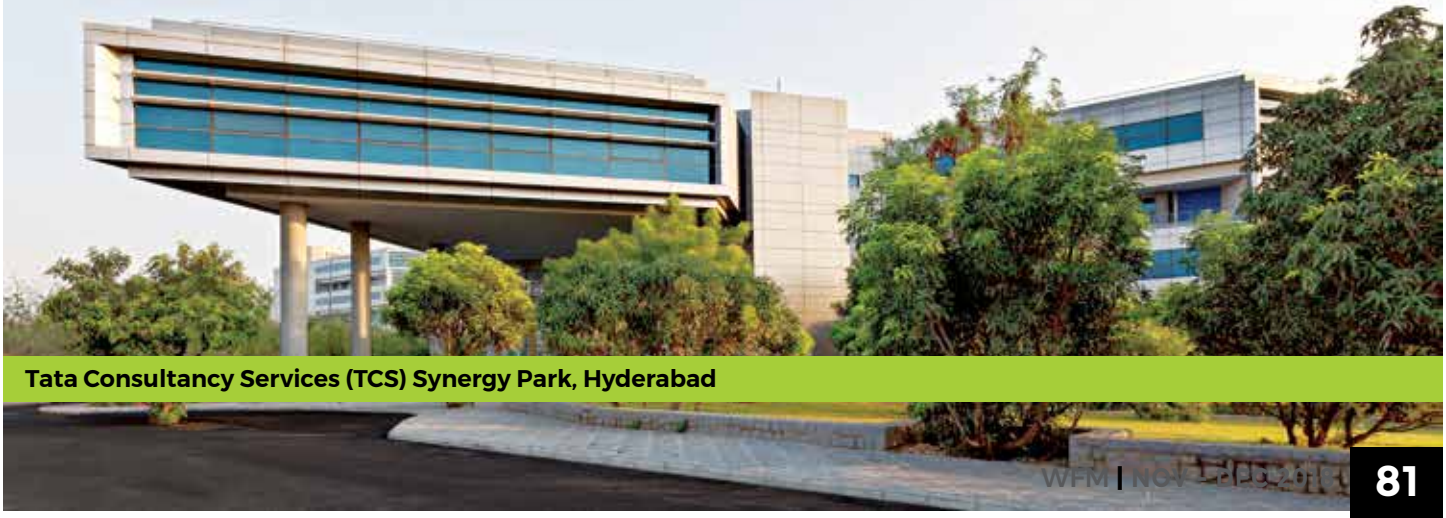
A well-managed façade also contributes to sustainability – as well as public health – by facilitating a cleaner, healthier environment. The growing trend of installing green screens on building façades is geared towards this end, typically through growing plants and creepers on trellises which filter out dust and promote evaporative cooling.

Maintaining an optimal interior environment is also governed by façade design immensely. For example, in our project Ascendas Victor, we devised a modular façade strategy which utilised heat-strengthened DGU panels and fritt glass of 1050 mm width each, to achieve 35-37 per cent glazing - which is the optimal wall-window ratio. Paired with performance glass, this proportion of glazing ensures optimal diffused daylighting inside the building with minimal heat gain. With daylight penetration of upto 12-15 meters, the floorplates are uniformly lit from all sides, allowing for flexibility of function within. Being a multi-tenant building, leasability was a crucial factor for this project – given that the offices would be Built-To-Suit (BTS), it was important that the ingress of daylight be largely consistent across each floor and each office within. The design of the façade takes this into account and ensures a consistent wall-to-window ratio on each floor and across the grid. The use of blue-green laminated glass and orange fritt glass further reduces the glare inside the office space, creating an ambient glow. We not only managed to reduce

the heat load of the building but also ensured a pleasant interior environ for the users regardless for the eventual interior design schematic of individual offices.

What are your views on future façades & fenestration technologies, and materials?

Façade Systems and strategies are ever-evolving – there is a lot of potential for growth in the sector, and each new day brings a new technology or innovation to the public eye. As we discussed before, façade design can introduce texture and depth to a typically two-dimensional component, and I believe that



Tata Consultancy Services (TCS) Synergy Park, Hyderabad

Brigade Senate, Bengaluru

Incor One City, Hyderabad

the industry is also cognizant of this potential. Widespread use of 3-D printing, in particular, can revolutionize façade design – not only in terms of aesthetics but also through greater ease of assembly and installation. 3D printing also provides a scope for extreme scalability and appears to be the next big paradigm in façade, fenestration as well as building design.

On the other end of the spectrum is the new technique of self-growing façades – algal or vegetative deposits that assume the form of the underlying 'skeleton', and envelope the building over time. Cost-effective and unique – and with a tremendous impact on aesthetics and quality of air – the technique promises to produce some very distinctive buildings in the near future.

There are many cladding materials available in the market. How do you choose the apt one for your project? What are the criteria while choosing the façade/cladding material?

The right choice of cladding material can be made keeping in mind a few key factors:

- **Its performance index:** especially for materials like glass, where optimizing ingress of daylight and cutting down solar glare must go hand in hand. Performance parameters must also address issues of safety in the case of hazards like fire.
- **Its longevity:** especially given the particular micro-climatic conditions of a place, as those impact the life-span of a material the most.
- **Its carbon footprint:** especially factoring in transportation and installation; as an example, we used stone sourced from local quarries for the façade design of Syntel Global Development Centre, to ensure that the long-term ecological impact of the project
- **Its reusability:** the choice of façade material should be made keeping the three R's in mind - reduce, re-use and recycle. The environmental impact of construction processes can be reduced measurably if we restrict ourselves to materials which can be reused and repurposed efficiently.

What is your advice to young, aspiring architects?

My only advice to young and aspiring architects would be to never lose sight of the big picture while designing. There is no dearth of choice in material and technology, and the wide selection available to us can be distracting. However, as the architect, the onus of determining relevance and applicability is always on you, regardless of what's trending in the market. Trends change within days, but a well-designed building is timeless.

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Jang-E-Azadi memorial is a beautiful government project, designed by Ar. Raj Rewal

SWAPNIL PATHAK
Partner, Art-N-Glass Inc.

SATWIK PATHAK
Partner, Art-N-Glass Inc.

Established in 1988, Art-N-Glass Inc. has made a name for itself in the list of top suppliers of glass & glass products in India. Founded by Lokesh Pathak, the company has come a long way from its humble beginning to one of the most comprehensive and technologically advanced glass processors in the country, providing complete glass solutions for both interior and exterior applications. The company, headquartered in New Delhi, has become a renowned name in almost all verticals related to glass – everything from decorative mirrors to laminated glass, insulated glass, stained glass, etc.

In an exclusive interview with Window and Façade Magazine (WFM), partners at Art-N-Glass Inc., Swapnil Pathak and Satwik Pathak, spoke about their family business, state-of-the-art integrated processing facility at Kala Amb in Himachal Pradesh, their products and projects, the company's persistent efforts to improve quality and their future plans. Here are the excerpts from the interview.

Tell us briefly about your company and yourselves?

Swapnil Pathak: I and my brother Satwik Pathak are currently handling the business. My father, Lokesh Pathak, is the Group Chairman and he started this company more than 30 years back in 1986. Now his hard work is being acknowledged and rewarded. I joined the work in 2011.

I am a production engineer from MIT Manipal and did an MBA from SP Jain, Mumbai.

Satwik Pathak: After completing mechanical engineering from MIT, Manipal and Masters in Façades and Fenestration from Germany, I joined the company in the year 2016.

Swapnil: It It is a very flat family business where our father is the boss. I and Satwik handle different operations and our mother is also actively involved in the business, taking care of accounts and finance. Every breakfast and dinner at home is a board meeting!

You are one of the largest players in the market. That is a great achievement.

Satwik: We are one of the top three players in the glass industry. When it comes to façade, in another 4 or 5 years we aim to reach the top level.

Tell us about some of your major milestones?

Swapnil: We started the business in 1986 as 'Nangloi Glass' later renamed as Art-N-Glass. We kept expanding, established a factory in Delhi. We became the biggest in decorative glass and in the specialised interior glass. We started the business of architectural glasses in 2005, producing tempered, laminated, ceramic fritted and insulated glass from our factory in Kala Amb in Himachal. At that time, it was one of the biggest investment in the glass industry. By 2007, we were the biggest in terms of volumes and verticals. Today, with the advancement in technology, Art-N-Glass has become a renowned name in almost all verticals related to glass – everything from decorative mirrors to insulated glass, bullet proof glasses, automotive glasses, OEMs, and from glass sinks to glass furniture. That was all done during our expansion phase and we have become a company

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capable of providing complete glass solutions for both interior and exterior applications. We still have our retail presence.

In 2011, we started our uPVC business too. We started another glass factory in 2012 and it is the biggest in India in terms of size. In the factory, we make glasses of huge size, 10ft X 20ft single glasses. In 2012, we set up our uPVC factory too, partneringn with a German company and bought a complete German set up. For the glass factory, we bought all Italian and Finnish equipments including LiSEC, Tam Glass, Berloni, etc. There are very few Chinese equipments which we have customised according to our liking.

Satwik: We expanded our production capacity to three times in one go in 2012, which was a major milestone. In 2014, we started an aluminium factory with all the machines purchased from Germany-based Alumatic. In 2015, we started our own powder coating plant. It is the only plant in India, which is Qualicoat

uPVC factory, Green Fenestration Technologies

Manufacturing facility - Axsys Solutions

Jade 90, Mohali - was one of the initial projects in Punjab, which has a semi unitised glazing

approved. Whether it is glass, uPVC or aluminium, we tend to take certification from the best in the world. For powder coating, we have certifications from Schueco, AkzsoNobel, Jotun and Qualicoat. Even when we do our own ISO, ERP systems are completely customised in all the verticals. We are hands on with almost all the new technologies. In 2015, we got a new machinery from Holland for glass for heat soaking, which is NRW certified (European certification) – probably the only one in India with this certification.

Swapnil: In 2018, we have developed a lot of in-house systems in aluminium. Earlier, people were importing these from abroad. Retail is a big chunk of our business even now, and a lot of people still prefer aluminium doors and windows. We develop our own systems and we have become a highly R&D focused company.

We have multiple verticals. Art-N-Glass is the parent company; Green Fenestration - which is our uPVC division, predominantly does retail business, and now entering into projects. Axsys Solutions is an aluminium system solution provider. We are not just fabricators, we do interior aluminium too, like railings. We have our own interior aluminium sliders and doors. For exteriors, we have multiple systems. We have also parted with a German systems, in case client demands for such high-end systems.

In glass, we got three tempering furnaces, two lami lines, two insulation lines, four fritting and four cutting. It is a huge set up for glass. We have a brand of ours.

Ireo Skyon, Gurugram - A 10,000 Sq m of system windows were fabricated and supplied

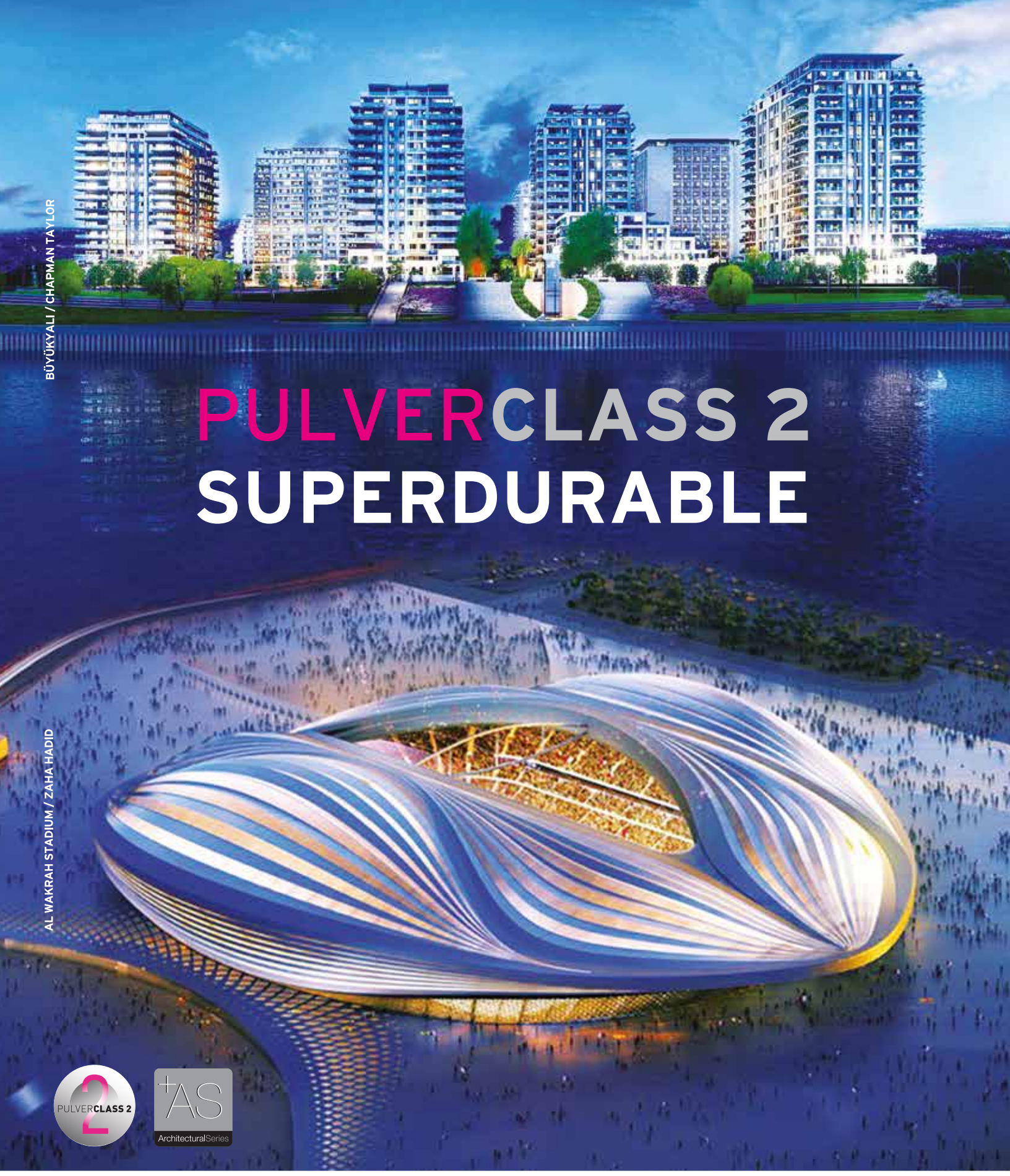
What is your vision for the future?

Swapnil: We are born into a business family. We have seen its humble beginning and have become one of the top glass companies. That itself is a motivation. Our father is one of the known personalities in the glass industry in India. He is very hardworking and it is inspiring to have someone like him to compete with in running the business. We compete with each other in work within the family and the whole dynamics of the family keeps us going ahead of others. We wish to grow more and expand, and our parents are the real motivation along with many others in our group.

When did you see the real change in the façade industry in terms of technologies and materials?

Swapnil: The change is happening right now! Even while we are talking.

We were selling glass to a lot of fabricators, and all of a sudden the aluminium industry went against credits and was for "cash and carry". But the glass was still going on a 60-90-120 day credits. Now, with this approach, fabricators business was affected and started



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shrinking. A lot of big companies had lost their business and took a big hit. This has happened four to five years ago and the impact can be seen even now. We at Art-N-Glass took a bold decision - not to give credit. Though we lost a little business but we became secure. Then we took a very hard decision to choose our own fabricator with whom we want to work, that too only in advance payment.

Satwik: The transformation in this industry is happening at a very fast pace. We see that none of the glass manufacturer is going to a fabricator, instead, they approach the client directly. Now, these kind of transformations have taken us to the top level.

Looking at the façade industry, most of the big players have lost their game in the past four years. There were none to compete with and we got lucky with our arrival, or we planned it quite rightly. It was a tough two years for us. But the retail being our backbone helped us.

Swapnil: In the case of glass, there were a few other big companies like Tatas, OEMs, which were still buying glass. They had formatted a system and we had to follow the same. Façade business had no streamlined systems earlier. When we started the façade business, everything was a kind of hotchpotch in the industry.

When we look at the façade fabricator's business in the north, many of them couldn't do well and vanished in the first few years. Many fabricators from the south and west started working in the north. This was the condition when we entered the aluminium business, and now we have done over 25 projects and have gained trust automatically.

Please tell us about the company facilities?

Swapnil: Right now we have got four factories – two of glass, one of uPVC and one of Aluminium. Aluminium plant basically has two different set up - in one factory, there are two units, a powder coating plant and a PVDF plant. We are planning for an expansion very soon. The factory is in 17 acre land with a built up area of five lakh square feet.

Satwik: We do have the complete setup from glass to glazing, to uPVC, to aluminium and powder coating; there is no need to outsource any work. We provide a complete solution. So when a customer talks about timely delivery, we can give him accurate time for delivery. Impeccable on-time delivery is our forte.

Earlier, customers used to give impossible time lines due to the delay in delivery. But for them, it had always been a nice experience with us and they are more realistic with the timelines now.

What is your company's contribution in bringing about the current revolution in façade and fenestration industry?

Swapnil: There are very few people in India who have taken very bold step in the glass industry and this

Axsys Solutions - Plant interiors

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has led to a biggest change in the complete fenestration industry. We always think about 5 to 10 years ahead, like – we bought our ceramic digital printing machines 3-4 years back and that time there was no work for those machines. We have foreseen that ceramic digital printing machines will be in demand in the future and now they are getting popular. People rely on us if they need anything related to glass. We are supplying windows to railways and many other real estate projects.

We are not just bound by how the industry works, we try and do lots of different things simultaneously. We mix and match couple of the products to bring a totally innovative product in market. Right now, we are working on bringing 2-3 highly innovative products. R&D and innovation is our strength.

Satwik: We brought a really high spec tempering glass machine in the market at that time when others were predicting it as a wrong decision. We had a very clear vision that we will bring the most complicated glasses like – double silvered and triple silvered glasses in India.

Could you please tell us about some of your projects done with innovative ideas or techniques?

Swapnil: Let me tell you about one of our projects in Mysore. It's a laminated ceramic digitally printed glass project -- a commercial project spread in the area of 1400 Sq m and designed by Ace Group. It has been also awarded as the most innovative façade project. Other than this, there is one project in Goa. This project was also done with the same technique.

We have also done a huge glass project for SBI in Kolkata. Currently, we are doing a new project in Mumbai. This project is very unique because it uses different types of glasses like laminated, bend and tempered glasses.

We are based in Delhi, but are doing lot of projects in Bangladesh, Mysore, Chennai and other parts of India because of our innovative technologies, which no other company is doing. We also cater the needs of the defence sector in India.

How do you help your customers to choose the best products?

Swapnil: We have done decades of business and are one of the top companies. We have a huge knowledge of products. When the architects and the clients have intent and are enthusiastic in achieving their dream designs, we help them a lot in achieving that. We explain them everything about what they need and what they don't.

Satwik: Earlier, the architects used to get the façade and glass companies on board, but now the clients have started taking us on board from the very initial design stage. Our involvement right from the concept stage gives us the whole outlook and an idea about how the project will look after its completion. We keep on suggesting and helping the clients during the whole process.

How important is the role of glass in the façade system in order to achieve aesthetics, optimum performance, acoustic and thermal insulation?

Swapnil: I think glass is the most important thing, since it covers around 95 to 96 percent of façade system and rest 4-5 percent is covered by aluminium. Façade system and glass are like skeleton and skin, and they both are useless without each other.

Proximity to airports and other noisy areas enquires special kind of glass which has special acoustic characteristics. Do you cater for such projects requiring customised glass?

Swapnil: Of course, yes. We are living in Delhi and the areas closer to the airport, like Dwarka, Gurugram and Vasant Vihar are affected badly. A lot of customers and architects come to us with their demand for the products which can fulfill their need for acoustic. We plan and decide on the most beneficial products with respect to acoustics and combine it with the best glass to achieve the highest acoustic level.

Casa Picasso, right on the Extension Golf Course Road, is a semi unitised project

AIPL Joy Street, Gurugram

Projects in certain areas of Rajasthan, which experience extreme weather patterns, requires a special kind of glass. Do you cater for such special projects?

Swapnil: Yes, we do provide the special kind of glasses for the projects which require thermal insulation. We have done many projects in areas like where the temperature dips to -5 to -14˚C in the winters and in summers it remains 5 to 10˚C. For these kind of projects, the products should be of certain U-value because heating causes much more power consumption than cooling.

In Rajasthan, we have done a couple of projects like the R&D Centers in interior Jaisalmer, Jodhpur and Jaipur. Even in Delhi, the temperature goes to 45 to 48˚C in summers. For these different locations, we design the products in such a way that they suit those weather conditions.

If we choose the right glass it means that 90 per cent of the desired result is already being achieved. Rest also depend upon the kind of system we are choosing. For a few places uPVC works amazingly well, for few we have to go with thermally broken aluminium systems.

Could you please brief our readers on the importance of testing of façade as well as the material goes into it?

Satwik: The products are tested not just once, but many times for different features. The system initially has to be tested in laboratories; we have a few labs in India where this can be done. The basic testings like – water testing, air penetration, wind load testing, etc., can be done on a day to day basis. If it is a bespoke system, then it needs to be tested by an expert before it goes for any project. Now, as the heights are going higher, the sizes are becoming bigger and even the wind loads are also increasing, and to tackle these situations the system needs to have very good performance levels. Only if the system can meet such levels, the buildings can last for 25 to 30 years. The testing has a very big role now.

Who are doing the testing for your façades?

Satwik: There are only two companies which are doing façade testing in India - one is in Mumbai and other one is in Bangalore. The companies are: Winwall and Façade India Testing.

How do you ensure the quality of your glass and aluminium?

Swapnil: We have our own labs for testing the quality of our products. We have a very strict policy, and have a huge set up, where our quality managers check the quality of each and every one of our products.

In India, we haven't developed any such quality standards, but we follow European standards for the quality check of all our products, as the Europeans stick to stringent standards and are very conscious about their quality.

What are the criteria for choosing a glass for a typical high rise building? What advice do you give to your clients?

Swapnil: It depends on client requirement the four basic needs on which we typically ask clients to pick is: 1. acoustics; 2. safety; 3. energy Efficiency and 4. aesthetics. On these four basic parameters we tend to choose our glass.

Generally people have their budgets and pursuing that budget we try and give them the best possible combination so that both the pocket and the projects are happy.

Once a glass is finalised in terms of these four parameters, then we go into technical requirements -for example, for the panel size, what kind of dead loads and wind loads will be affected on the same, and

Lotus Isle - Designed by Architect Kulmeet Shanghari from ACPL for the client Lotus

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hence thickness of the glass and the spacer is determined..

Could you please tell us about the challenging façades in case of parametric façades?

Swapnil: A dome project in Punjab, which we completed two years back, was a challenging one. It was on the 7th or 8th floor and was a hollow structure from ground floor to top. In this project, around 500-600 glasses were used and all the glasses were either triangular or hexagonal. Every glass was practically different, and was double-laminated. This skylight project was the one which we designed with some special techniques and it was a very special design for an Indian structure. There were quiet many challenges, but we gave our best to deliver that project.

What are the major hurdles in the Indian construction scenario considering façades?

Swapnil: In India, people want to get a good product in lesser money. There are a lot of companies who can offer good looking product in lesser money, but there will be no assurance of the quality of those products. It is the biggest problem seen in India.

The big companies like L&T are using quality products, but there are few local projects which are using the inferior products in order to minimize the cost and those are the biggest challenges.

How is the competition in the market? Where do you see the industry in next five years?

Swapnil: It is a very different kind of market now. There are a few clients who know from whom they want the product to be purchased or installed, but there are also a few people who cannot differentiate between two companies and their products.

There are cases in which people don't even know about façade. The market is open for the discussion, some people will quote unitise, while others will quote semi unitise and this leads to a big hassle in the industry.

I think the glass and façade is going into a stage of filtration, clients are understanding this and many of the people might exit from this business.

For the next two years the market position is not expected to be good

M3m Latitude - A skyscraper in the heart of Gurugram with high-end residences. The scope of work for Axsys was bespoke doors

since people will not exit and it will result in in price crashing and the projects will be half-developed. Such half-done projects will create huge problems as no new person will take the responsibility of completing these projects half done by someone else.

The next 2-3 years will be difficult, but after that the future is good for the industry.

What are your expectations for company in next five years?

Swapnil: We see ourselves on top in next five years. We want our company to be known as a system solution provider - not just as a fenestration company or glass company. We want to do everything on time with best quality. We are already giving our every six months in getting a new product and we will keep this consistency in future also.

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Zak Expo, Mumbai

The Zak Doors & Windows exhibition was inaugurated by the Mayor of Mumbai, Vishwanath Mahadeshwar

Zak Glasstech was inaugurated by Subhash Desai, Minister of Industries, Maharashtra State Government

South-Asia's leading show on fenestration, aluminium extrusion, glass and glazing industry, was held successfully at the MMRDA Exhibition Centre, Bandra-Kurla Complex, Mumbai from 6th to 9th December 2018. The 10th edition of Zak Aluminium Extrusions Expo, the 15th edition of Zak Doors & Windows Expo, and the 16th edition of Zak Glass Technology Expo witnessed a huge gathering of industry leaders, architects, builders and consultants. The exhibition impressed the exhibitors as well as the visitors with the riveting display of latest advancements in windows, doors, railings, curtainwall systems, cladding, hardware, fixing systems and much more. The expo saw participation from a huge segment which included glass, doors & windows, and aluminium industry. More than 600 domestic as well as international brands showcased their products and technologies in this four days exhibition. The event also witnessed a remarkable visitor footfall, with over 5000 industry members marking their presence.

Renowned for its quality and innovation over the past 15 years, the Zak Expo 2018 was held successfully at the MMRDA Exhibition Centre, Bandra-Kurla Complex, Mumbai. The Zak expo constituted of three concurrent fairs — 10th Zak Aluminium Extrusions Expo, 15th Zak Doors & Windows Expo, and 16th Zak Glass Technology Expo, which have offered unmatched business opportunities to both national as well as international players from the industry to learn and explore the future trend of the Indian market and the latest technologies.

The Zak Expo is one of the most distinctive and comprehensive annual event for façade and fenestration industry, showcasing latest products and techniques. The show serves as a perfect platform for the players across the glass and fenestration sector to network and develop their business relationship.

The Zak Expo 2018 proved to be the country's premier platform for experts to share their expertise and to have open discussion on what can be the future trends in Indian fenestration sector. The key players came under one roof and met

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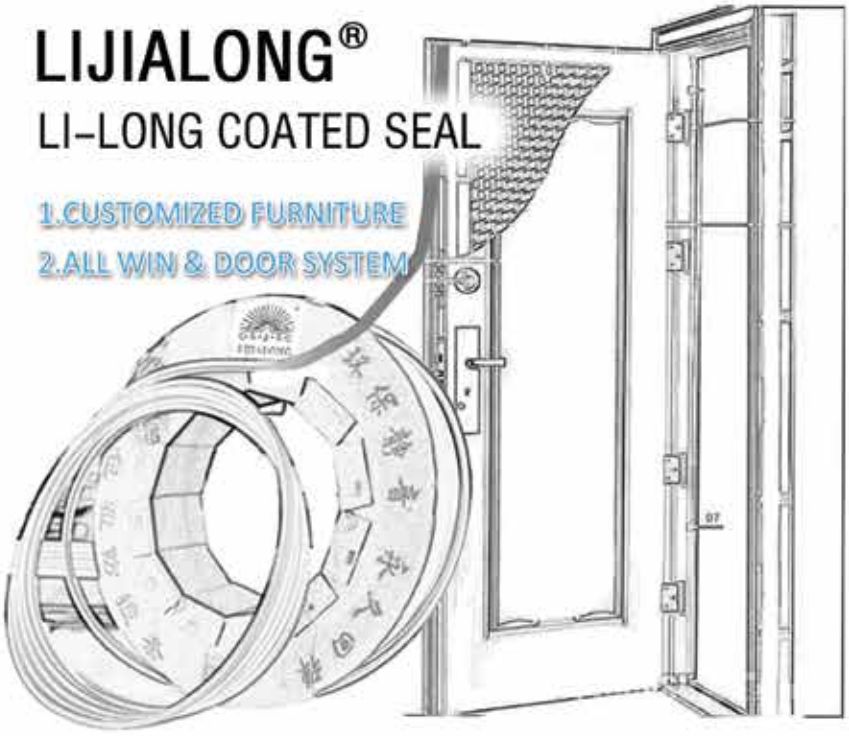

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The expo serves as a perfect platform for the players across the glass and fenestration sector to network and develop their business relationship

The inauguration ceremony was followed by lighting of the lamp by the Mayor

their respective buyers or sellers to explore the opportunities to grow their business. This event not only helped the companies to grow their business but also helped them to unveil and market their new launches. The show provided an ideal platform for professionals to network and exchange their ideas.

The exhibition impressed the exhibitors as well as the visitors with the riveting display of latest advancements

The Zak Expo 2018 had registered the visitor footfall of over 25,000

GLOBAL PARTICIPATION

Extending the International presence from the previous year, the expo saw participation from over 30 countries from across the world. The participating countries were: USA, UK, Germany, Italy, Spain, Greece, Austria, Belgium, Turkey, UAE, China, Japan, Korea, etc.

There were some big Indian and international brands, including Schüco, Kinlong, Lisec, Bottero, Hegla, Benteler, NCL Veka, Alupure, SchlegelGiesse, Nexion, Fundermax, Salamander and many more.

The exhibitors and visitors augur well for the Indian glass, glazing, windows, doors and aluminium extrusion industry. They took full advantage of the opportunity to exchange ideas and information, numerous business prospects were generated and cooperation agreements reached.

FACT FILE

As one of the biggest show of the Industry, it had the exhibition area of more than 30,000 Sq m. The exhibitionshowcasedtechnologies, products, equipments etc., under one roof. The products which were showcased in the exhibition included doors, windows, façade elements, allied products, raw

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The training session on glass was also organised by Federation of Safety Glass (FOSG) and GSC Glass Ltd to enhance the knowledge of the industry members

materials, railings, cladding, machineries, fenestration and façade accessories, hardware, extrusion technologies, glass products, etc.

The expo received appreciation from the industry for its quality and the way it was managed. The exhibitors were overwhelmed by the response they received in the exhibition.

VISITOR ATTRACTION

Behind the success of every show, the visitors play a vital role. The success of the show not only depends on the exhibitors but it also depends on the quantity as well as quality of the visitors.

The Zak Expo 2018 had registered the visitor footfall of over 25,000. The visitors profile included architects, builders, manufacturers, dealers, distributors, contractors, consultants, students, officials from housing development, government authorities, etc.

GLIMPSES

The Zak Doors & Windows exhibition was inaugurated by the Mayor of Mumbai, Vishwanath Mahadeshwar and Zak Glasstech was inaugurated by Subhash Desai, Minister of Industries, Maharashtra State Government. The inauguration ceremony was followed by lighting of the lamp. In the inaugural speech Syed Zakir Ahmed, Chairman, Zak Group, welcomed all the exhibitors. The inaugural ceremony was studded by the experts from fenestration industry and many well-known professionals shared their thoughts on the current scenario of fenestration industry. They congratulated the organisers

Exhibitors at 5th Zak Doors & Windows Expo

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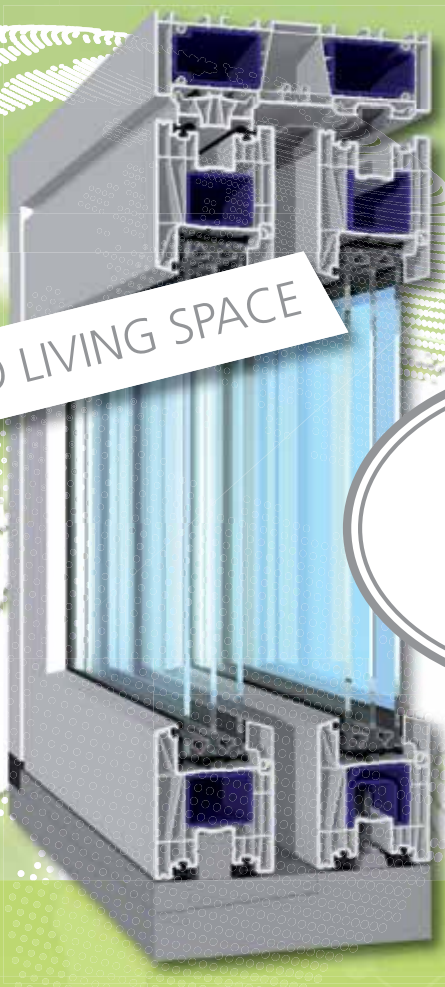

Another successfull event at ZAK Expo Mumbai.
Thank you all.

ZAK DOORS & WINDOWS EXPO 2018

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The key players of the window, door and hardware industry came under one roof and met their respective buyers/sellers to explore the opportunities and to grow their business

for the success of the past shows and gave their best wishes for the further editions.

A concurrent training on glass was also organised by the Federation of Safety Glass (FOSG) and GSC Glass Ltd to enhance the knowledge of the industry members. This master session was conducted by Sharanjit Singh, Chairman, GSC Group - an expert of glass Industry. The participants got to know about various glass technologies and products which are currently in trend. With Sharanjit Singh's vast experience, the participants learned about different types of glasses and their manufacturing technologies. They got the chance to see them live on exhibitors' stall. They were convinced on the use of quality glass relevant products for various projects and the need for ISI certification for the products, which is going to be mandatory for all projects in the coming year.

LOOKING AHEAD

This year's edition has proven to be the best expo for the industry till date and this is affirmed by the rebooking of stalls for the next edition, which has already begun from the last day of the expo. The expo has touched new heights and reached the milestone which was set in the previous year.

The show has already proved itself as the most preferred choice for the exhibitors to participate in. The momentum and consistency it has shown in past 16 years is a clear indication of the further growth of this expo.

Making the show a big Success in 2018, the organisers have already announced the dates for the next edition. The next edition of this India's largest international exhibition on glass, doors & windows, and aluminium extrusions will be held from December 12 to 15, 2019 at Pragati Maidan, New Delhi. For more information, visit: https://zakgroup.com/

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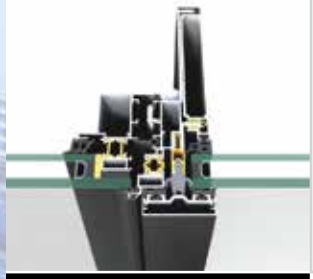
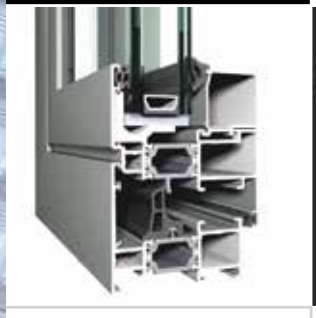
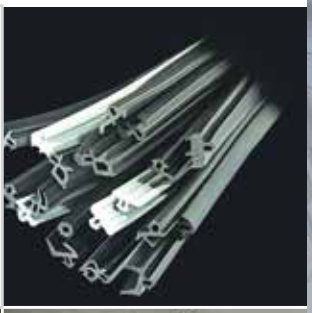


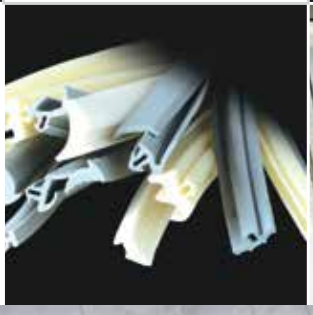
GASKET FOR GLASS FACADE SYSTEM



GASKET FOR ALUMINIUM SYSTEM WINDOW



GASKET FOR UPVC WINDOW SYSTEM



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What the Participants Say

We have been participating in the expo for the past 10 years. This exhibition is a good platform for the companies to showcase and launch new products. It is also a very good show for the architects and developers to visit and get awareness about the new products and technologies. The progress of this industry is seen here and the exhibition is moving on the right path.

Baiju Mehta, Business Head,
Alupure, Profine India Window Technology Pvt Ltd

Zak Expo is a good platform for exposure and this is the reason behind our participation in this show. The participants are very relevant to our industry. We have launched new products in Zak Exhibition this year. We have already made the plan to participate in next year's edition.

Atul Vijayvergia, AGM - Facade,
Nexion International Pvt Ltd

The Zak Glass Technology Expo received huge appreciation from the industry

Zak Expo is a great platform to showcase our products and technologies. The quality of the visitors was too good. We met our clients including fabricators and architects. I would like to thank Zak team for organising the expo wonderfully. I look forward to the next edition of Zak Expo in 2019.

Abhishek Kale, Area Manager - India, Sobinco

It is a great exhibition and is the only trade show in India for our industry. We have been participating in the Zak expo since its inception. LGF sysmac has been engaged in the supply of high quality machineries for aluminium and uPVC fabrication for a long time. We also supply hardwares for aluminium and uPVC doors & windows and facades. We have Europeans partners like Alu Alpha, UCS, Mueller etc., and they all are exhibiting in this exhibition. We have been exhibiting in Zak expo from past 15 years. Zak expo is growing bigger every year.

Ashim Chugh, Director, LGF sysmac

We have been participating in the Zak Expo for the past few years. It is the best platform to meet different people from the Industry and we get a chance to increase our distribution network. It is a good show to showcase your products and your business.

Harpreet Singh, Director, Awesome Designs

Our experience with Zak Expo has been very good for the fourth time. Our association with Zak has been very strong and we look forward to continue it. The future for Zak as well as for Schüco is very good and our partnership will always grow to new heights.

Ashish Kapoor, Sales Director, Schüco

This edition of Zak Expo was bigger than before, there was more participation of the companies and lot of new products were displayed there. The Zak Expo helps to gain knowledge and awareness on new technologies and innovative products.

Sharanjit Singh, Founder Chairman, GSC Glass Ltd

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Zak is a good platform to meet new people and explore new products. The new products we get to see in Zak expo are beneficial for all the customers from all around the world. Lot of innovations are happening in India and Zak gives a stage to the companies to unveil their products in front of the people. The main benefit of this expo is that it gives us the chance to meet all our existing customers under one roof.

Hardik Panchal, General Manager, Orgadata

We have been participating in Zak Expo for past 14 years. We have seen changes in Zak Expo in the past decade and the number of exhibitors are increasing every year. As compared to the last year, this year the footfall of visitors has increased and the participation of international companies is also remarkable.

Allen Chen, Managing Director,
Kin Long Hardware (India) Pvt Ltd

We have been participating in the Zak Expo for almost last 10 years. This year, we have showcased our aluminium system range for the first time. The expo has amazing quality of visitors. We are very happy with the response we got for our Alupure Aluminium systems. NürnbergMesse and Zak Expo have joined hands, so now it has become a much bigger platform. We will continue our participation in this exhibition.

Farid Khan, Director and CEO, profine GmbH

For us, lot of B2B sales have happened in this expo. We found many suppliers as well as customers in this expo. We met many architects and developers here and made few new contacts. It is a good expo for doing B2B sales. A great show for our industry.

Smita Limaye, Country Manager, Aluminco

This year Zak Expo has showcased new facade elements and added new facade companies. The number and quality of visitors has also increased. This year in Zak Expo, new kind of product categories have also been displayed over there. Overall, good experience for us.

Kapil Chikodi, Head - Business Development,
Glass Wall Systems

For us, Zak is about credibility. We are really privileged to participate in Zak Expo. Companies from all around the world are participating in this exhibition. We really wish a big success to all the participants and Zak's team.

Dharmesh Shah, Business Head - India,
Dow Chemical International Pvt Ltd

This is our first time in Zak Expo. The response is very good and the way people have designed their stalls is very inspiring. The new systems for windows & doors, facades and cladding are really very good. The visitors are industry specific, so the quality of the visitors is up-to-the-mark.

Divyam Shah, Director,
Euro Panel Products Pvt Ltd

Zak is a very good platform for facade and fenestration industry. All the solutions related to Facade and Fenestration industry are present under one roof. The footfall was very good this year.

JK Sharma, VP Marketing, Global Aluminium

Glimpses of the Zak Glass Technology Expo

Zak is a very good platform for the industry to come together. The industry is making lots of improvement every year and it requires such big scale events to take place more often, and I think Zak has been doing a wonderful job in this area. These kind of events inspire the people to take next steps.

Jimmy Tyagi, Executive Director,
Gold Plus Glass Industry Ltd

The Zak Expo is a perfect event for facade and fenestration industry. The visitors' quality are very good. We are very happy to be the part of Zak Expo and we will continue our participation with Zak in future also.

Manav Gupta, Director, Stylam Industries Ltd.

We have been participating in Zak expo for a long time. Since its inception, the Zak expo has shown a consistent growth and improvement. This is the only expo in India which is relevant to us and for other industry players.

Pratap Singh, VP (Asia), Windowmaker Software

We have been participating in Zak Expo for a long time. I believe that Zak Expo 2018 is very different and better from its previous editions. The Indian as well as international events, like the Zak Expo and Conferences, have brought new and innovative products, and technologies particularly the hardware for doors & windows.

Navin Keswani, Director, Aluplex India Pvt. Ltd.

We have been participating in Zak Expo for the past few years. We have got a good mileage from this exhibition and it has also helped us in increasing our brand awareness.

B. Jayarama Krishna, GM Marketing,
PlastOne UPVC Profiles Pvt Ltd

Zak is India's one of the top exhibitions in which the whole industry of windows, doors and facades comes under one roof. It is the one point solution where all the developers and architects come together to find new solutions and meet the industry people. We have been participating in this expo for quite a long time and we will have this association in future also.

Makrand Kendre, Area Sales Manager - India,
Renson Ventilation

This is our first time in the Zak expo and we find it a very good and useful show for us. We got the chance to connect with people from all over the India. We also got new enquiries for our products through this exhibition.

Shankesh Rathore, Proprietor,
Champion Coats Industries

We have been participating in the Zak expo for the last 10 years. This expo has provided us many dealers from all over India. I am really thankful to Zak Expo, it has helped us a lot in increasing our distribution area.

Dong Shuhong (Melisa), Head of Sales - India,
Kinbon

Many key players showcased their products and latest technologies in the exhibition

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Zak Awards
for Excellence
in Façade & Fenestration 2018

The second edition of Zak Awards 2018 for Excellence in Façade & Fenestration was a gala awards ceremony which was held on the 7th of December at Sofitel BKC in Mumbai, and saw a participation of over 700 delegates.

"We feel extremely overwhelmed with the amazing response garnered from the industry during the second edition of the Zak Awards 2018. This has reinforced our belief in the importance of recognising all the people from the construction industry. This year, most of our winners were not our participants during the exhibition but the genuineness and credibility of the company made them receive these awards", said Syed Zakir Ahmed, Chairman & Managing Director, Zak Group.

The award is organised by Zak Trade Fairs and Exhibitions Pvt Ltd., which is one of the leading conference and exhibition organisers. Zak is a specialist in events related to glass, façade, fenestration & aluminium extrusion industries. Zak World of Façades is

The event saw a participation of over 700 delegates

the world's largest conference series on façade design & engineering with a presence in 16 countries. Since its inception in 1994, Zak has organised over 600 exhibitions and conferences involving 22 different industries globally. The core strength of Zak is acting as a bridge between the visitor and the exhibitor.

Zak Awards has always aimed to give global recognition to façade & fenestration designs which drives individuals and companies to fabricate the unthinkable. The aim of this award is to recognise developers, architects and contractors across India who have made exemplary contribution to the industry through best in class design, engineering and construction. Zak Awards has proven to be the benchmark for the designers, façade specialists and the industry enthusiasts to look up to, for international recognition and fame for their work

Zak Awards 2018, in its second year received 400+ entries. Round 1 of qualifiers, basis the registration submitted online, were shortlisted by Ernst & Young who are the Process Advisors for this initiative. Round 2 was screened by Jury members and the winners were decided from amongst them, by means of case presentation to the grand jury with Q&A.

The winners are in accordance to the evaluation averaged out for each finalist, on the basis of their implied diligence in the project submitted.

The Jury comprised of distinguished names from the industry, the likes of whom are:

1. **Vishal Shah** - Director, Gleeds Hooloomann
2. **Mukesh Jaitley** – Director, Wadhwa Group
3. **Namrata Mehra** – Associate Vice President, Godrej Realty
4. **Reza Kabul** – Architect/Founder, Reza Kabul Architects
5. **Mahesh Arumugam** - Regional Director, Meinhardt Façade Technology
6. **Gautam Bhasin** – Regional Manager, Inhabit Group
7. **Mathieu Meur** – Director, DP Façades, Singapore
8. **Ashish Pimpalkhare** – Associate Director, Gleeds Hooloomann
9. **Kiran Kapadia** – Founder Director, Kapadia & Associates

The eminent Jury members

An official from Ernst & Young, who were the Process Advisors, explains the award selection procedure

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EXCELLENCE IN WINDOW EXECUTION UPVC RETAIL

EXCELLENCE IN WINDOW EXECUTION UPVC PROJECT

2018

EXCELLENCE IN WINDOW EXECUTION UPVC RETAIL

EXCELLENCE IN WINDOW EXECUTION UPVC PROJECT

TRIUMPHANT FOR THE 2ND TIME LINGEL RETAINS THE TITLE AT ZAK AWARDS

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Zak Awards for Excellence in Façade Design – Residential - Kamat & Rozario Architecture for Corbel House, Bengaluru

Zak Awards for Excellence in Façade Design – Commercial - CnT Architects for MindTree East Campus, Bengaluru

Zak Awards for Excellence in Façade Design – Institutional - Cadence Architects for Navya's Wellness Centre, Bengaluru

Zak Awards for Excellence in Façade Design – Hospitality - Ace Group Architects for Spectra Convention Sector, Mysuru

Zak Awards for Façade Project of the Year - Residential - S Raheja Realty for SP VII, Mumbai

Zak Awards for Facade Project of the Year - Commercial - Century Real Estate Holdings for Century Greens Marketing Office, Bengaluru

Zak Awards for Excellence Window Execution - Aluminium Project - Geeta Aluminium Company for SNN Raj Etternia, Bengaluru

Zak Awards for Excellence Window Execution - Aluminium Retail - GSC Glass for Shubha Residence, Bengaluru

Zak Awards for Excellence Window Execution - uPVC Project & uPVC Retail - Lingel Window & Doors Technology for GIZ Headquarters, New Delhi & for Kishore Residence, Chennai, respectively

Zak Awards for Excellence in Façade Execution - Skylight - Argo Facades and Fuso Glass for Glass House, Devanagree, Karnataka

Zak Awards for Excellence in Façade Execution - Cladding - Construction Catalysers for Quest Mall, Kolkata

Zak Awards for Excellence in Façade Execution - Point Fixed Glazing - Aluplex India for Omkar 1973, Mumbai

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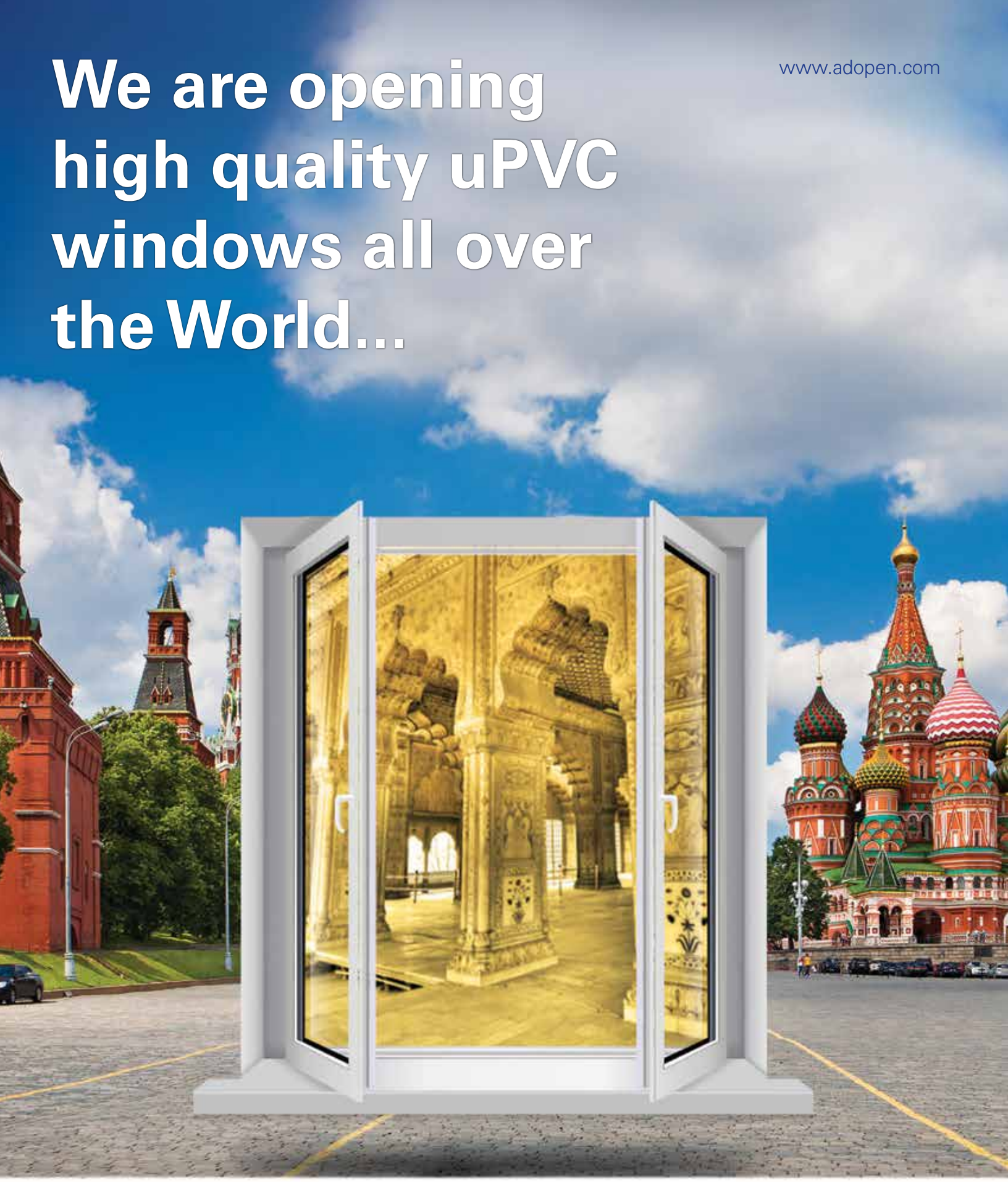

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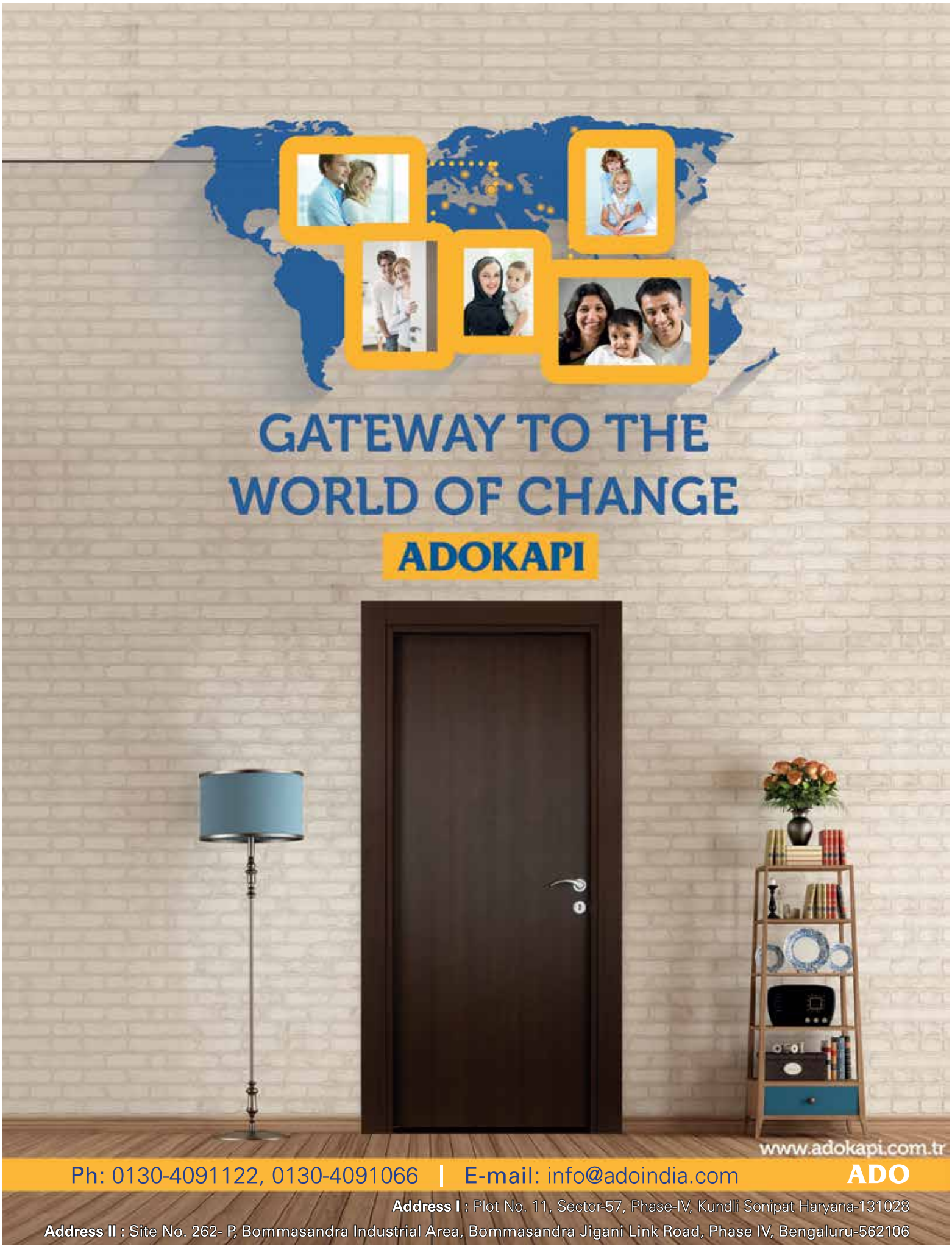
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Outstanding Application of Glass in a Project - FG Glass Industries for BASF, Navi Mumbai

Remarkable Façade Bringing Paradigm Shift - Glass Wall Systems, Indiabulls, Anupam De Architects for Indiabulls Blu

Outstanding Contribution to the Façade Industry - Vijay Wadhwa, Wadhwa Developers

Outstanding Contribution to the Façade Industry - B Narayan, Reliance Industries

Outstanding Contribution to the Façade Industry - Vikas Oberoi, Oberoi Realty

Zak Awards for Excellence in Façade Execution (Curtain Wall)- Alufit India for Intel SSR4, Bengaluru and Aluplex India for Omkar 1973, Mumbai

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Post Event Report

The final winners of Zak Awards 2018 for Excellence in Façade & Fenestration are as below:

Category	Name of the Project	Name of the Company
Excellence In Façade Design - Residential	Corbel House, Bengaluru	Kamat & Rozario Architecture
Excellence In Façade Design - Commercial	MindTree East Campus, Bengaluru	CnT Architects
Excellence in Façade Design - Institutional	Navya's Wellness Centre, Bengaluru	Cadence Architects
Excellence in Façade Design - Hospitality	Spectra Convention Center, Mysuru	Ace Group Architects
Façade Project of the Year - Residential	SP VII, Mumbai	S Raheja Realty
Façade Project of the Year - Commercial	Century Greens Marketing Office, Bengaluru	Century Real Estate Holdings
Excellence in Window Execution (Aluminium Retail)	SNN Raj Etternia, Bengaluru	Geeta Aluminium Company
Excellence in Window Execution (Aluminium Retail)	Shubha Residence, Bengaluru	GSC Glass
Excellence in Window Execution (uPVC Project)	GIZ Headquarters, New Delhi	Lingel Window & Doors Technologies
Excellence in Window Execution (uPVC Retail)	Kishore Residence, Chennai	Lingel Window & Doors Technologies
Excellence in Façade Execution (Skylight)	Glass House, Devanagree, Karnataka	Argo Façades
Excellence in Façade Execution (Skylight)	Glass House, Devanagree, Karnataka	Fuso GLass
Excellence in Façade Execution (Point Fixed Glazing)	omkar 1973, mumbai	Aluplex india
Excellence in Façade Execution (Cladding)	Quest Mall, Kolkata	Construction Catalysers
Outstanding Application of Glass in a Project	BASF, Navi Mumbai	FG Glass Industries
Façade Project Bringing Paradigm Shift	Indiabulls Blu	Glass Wall Systems
	Indiabulls Blu	Indiabulls
	Anupam De Architects	Anupam De
Outstanding Contribution to the Façade Industry	Vijay Wadhwa	Wadhwa Group
	B. Narayanan	Reliance Industries
	Vikas Oberoi	Oberoi Realty
Excellence in Façade Execution (Curtain Wall)	Intel SRR4, Bengaluru	Alufit India
	Omkar 1973, Mumbai	Aluplex India

The partners for the event were: Platinum Partner: Koemmerling; Gold Partners: Dow Chemical, Schüco; Strategic Partners: Messe Nuremberg, Fensterbau Frontale. The Process Advisor was Ernst & Young; Media Partner was Window and Façade Magazine.

The **Zak Awards 2019 for Excellence in Façade & Fenestration** looks forward to seeing many more participants. The award ceremony in 2019 will take place during Zak Expo scheduled to be held on on 12th, 13th, 14th and 15th December 2019 at Pragati Maidan, New Delhi. For more information on the awards, visit http://www.zakawards.com

GRIHA Launches CITIES Rating

Launch of GRIHA for CITIES Rating at the inaugural session of 10th GRIHA Summit by Harindher Sidhu, Australian High Commissioner to India; Abhay Bakre, Director General, Bureau of Energy Efficiency (BEE); Prof. Ian Jacobs, President & Vice Chancellor, University of New South Wales (UNSW), Sydney, Australia; Dr. Ajay Mathur, President, GRIHA Council & Director General, TERI and Sanjay Seth, Chief Executive Officer, GRIHA Council

Green Rating for Integrated Habitat Assessment (GRIHA) Council successfully organised the 10th GRIHA Summit and launched GRIHA for CITIES rating. The event took place in the gracious presence of Harinder Sidhu (Australian High Commissioner to India), Prof. Ian Jacobs (President and Vice-Chancellor, University of New South Wales (UNSW), Sydney, Australia), and many other dignitaries.

The GRIHA for CITIES rating has been structured as a framework for sustainable development of a city, to be achieved by measuring 'greenness' of existing as well as proposed cities. The rating sets performance benchmarks for key resources such as energy, water and waste, and evaluates performance in areas such as smart governance, social wellbeing and transportation. GRIHA also launched their revamped website which aims to serve as a knowledge-repository for its customers.

GRIHA has also signed two Memorandum of Understanding (MoUs) - one with the Global Association for Corporate Services (GACS) on training and awareness of green buildings and the second with the Public Works Department (PWD), Govt. of Maharashtra, on green rating for 1608 existing buildings in Maharashtra.

During his welcome speech, Dr. Ajay Mathur, DG, The Energy Research Institute (TERI) said, "India and Australia are the two countries which share the same climate. But Australia is the only country with the similar climate that has an active energy-efficiency program. This, therefore, provides a huge potential for collaborative learning as India moves to a future where we see a lot more planned habitats and air-conditioned buildings".

Harinder Sidhu, Australian High Commissioner to India, said, "Making cities sustainable is imperative, and government and community collaboration is essential to make that happen. Government has an important role, but it needs the combined effort of the private sector and the academia. Research institutions, such as University of New South Wales (UNSW), and GRIHA Council, help in connecting and incentivising government to make the enormous contribution to this goal of sustainable urban future".

Prof. Ian Jacobs, President and Vice-Chancellor, UNSW, said, "India's commitment to green buildings and renewable energy is to be applauded. UNSW shares the view that the government and research institutions are natural partners. So, the 2018 GRIHA Summit theme, 'Fostering partnerships for sustainable habitat', aligned in seeking out partnerships to maximise our impact on the communities we serve".

Speaking on the occasion, Sanjay Seth, CEO, GRIHA Council, said, "The 10th GRIHA Summit shall serve as a dynamic platform for industry partners, design practitioners, academia, policy makers, multi-lateral & bi-lateral partners and other stakeholders to collaborate, deliberate on and share collective knowledge on innovative and indigenous solutions to promote sustainability through meaningful partnerships".

The event was an enriching experience with a number of insightful presentations, lectures and panel discussions that saw participation from many eminent experts.

Launch of Material Handbook on Sustainability

UWDMA Organises Workshop on uPVC Windows

UWDMA President Mario Schmidt felicitating Chief Guest G Srinivasan during Team Window Workshop

UPVC Window and Door Manufacturers Association (UWDMA) organised a window workshop "U-RC 2.0" at Hotel Gokulam Park in Coimbatore on 21st November. The workshop addressed the issues of quality window production and sales method to create better value for uPVC window producing community.

The workshop witnessed a large gathering of industry people. G. Srinivasan, Managing Director, Srinivasan Associates Pvt Ltd, Nivasan Homes Pvt Ltd, graced the event with his presence as the chief guest. Key dignitaries from UWDMA warmly welcomed the chief guest and the delegates. The program started with the opening speech by G. Srinivasan, he shared his views on uPVC window industry. The programme agenda included welcome address and UWDMA updates, UWDMA quality sales team window presentation and an open forum discussion.

One of the key speakers of the workshop was P. Jothi Ramalingam (Director, Winwall Technology India PVT. Ltd.). He conducted the session on "Window testing - Its importance and benefits to architects, builders and fabricators". Another key speaker, Arun Prasad Prakashan (Architect, City Technical Advisory Group (CTAG)), conducted the second session on "Expectations in uPVC window & industry - An architect's perception".

The workshop by UWDMA aimed at providing the participants a clear understanding on the recent technologies in window testing and the benefits they can offer to the window industry. The workshop also helped the delegates to get the idea on architect's expectations from window industry. At the end, the event also saw open forum discussion in which the delegates and the speakers discussed few interesting things about the window & doors industry. The workshop was appreciated by all the participants.

The workshop was sponsored by Prominance uPVC Window Systems, Osaka Rubber Pvt Ltd and KM Hardware. The event concluded with a networking dinner, and the participants carried on their discussions in the friendly and relaxing atmosphere.

P Jothiramalingal - Winwall Tech presenting about Window Testing during Team Window Workshop

UWDMA General Secretary Satish Kumar addressing audience during Team Winow workshop

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Perfecting Fenestration

Lapkaman Project, Ahmedabad, Gujarat

Executing the project of installing over 300 windows for three family villas at Lapkaman, Ahmedabad was not an easy task. Here is the detail of the challenging project.

THE CHALLENGE

Executing three individual villas for three family members with more than 300 windows in total within the same plot, following the individual design, taste and aesthetics, and maintaining the overall look of all three villas as one structure, was a challenge. It was also a challenge to unite the different aesthetic expectation of the owners so that the overall concept of the building remained the same. Multiple sample approval lead to the slow execution of the project, but it was completed as per the time frame calculated and given by the owner.

Individual villas for three family members with more than 300 windows in total

THE TASK

The task included collaboration and development with Lingel

Family villas at Lapkaman, Ahmedabad

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Lingel had taken the entire responsibility of fabrication of each window

R&D team at the headquarter in Germany, on site planning with the steel contractor, etc. Lingel had taken the entire responsibility of fabrication of each window as per actual size due to on site fabrication tolerances of the steel sub frames.

UNIQUE ASPECTS OF THE PROJECT

The project required installation of more than 300 individual doors and windows with over 500 glasses in total, with inbuilt security grill as per colour chosen by the customer. Special handle colour and design were developed for this project. Special McCoy chain meshes were used for windows. Customised internal doors as uPVC doors confirming each height individually as per actual site measurement were provided, ensuring uniformity. With an overall execution time

THE BENEFITS OF IMPLEMENTING THE INITIATIVE:

Parameter	Details of impact
Thermal transmission	All windows are double glazes with Ug 2.8w/Sq mK, Frame 1.8w/Sq mK
Acoustic values	Double glazed windows providing Rw of glass of 32 dB
Air permeability	Not tested and no specific requirement. But all casement and fixed glazing with double gasket sealing are considered and tested air tight
Water permeability	Not tested and no specific requirement for this residence villa from the customer's end. It is actually monsoon proof as there was no water entry during monsoon within the building

QUICK FACTS:

Fact File:

Project: Lapkaman

Location: Ahmedabad, Gujarat

Client: Nehul Patel

Architect: OHM Design

Consultants: Patwa and associates, Ahmedabad

Profile surface: Renolit

Glass: Saint Gobain

Glass processor: Kainath Bhiwadi

Hardware: Siegenia & Lingel SS 304

Design software: PrefCo Germany

Silicon: McCoy Soudal

Fixing fastener: Wuerth Germany

Fabrication machine: URBAN Germany

Total value of façade (in INR): 1.16Cr

Total façade/door window area: 8200 Sq ft

Commencement Date: August 2016

Completion Date: May 2018

of more than two and a half years to handover, each window as an individual masterpiece to the customer was the main challenge.

MAINTAINING QUALITY, EXECUTION AND TIME LINE

All the products were fabricated as per actual size. Lingel had the responsibility of correct measurement. The site team coordinated with the civil contractor, relevant agencies, as well as the architects and provided the final action plan to the customer / project management.

This particular project took its time in execution as it was a masterpiece project by the architect for the owner families.

Lingel is a certified ISO 9001/2015 since 2010. Fabrication of windows and doors is done as per uPVC Window Manufacturers Association (UWDMA) guideline and UWDMA proposed BIS standard for uPVC doors and windows as well as EN 12608.

All the products were fabricated as per actual size

MARIO SCHMIDT
Managing Director,
Lingel Windows and Doors Technologies Private Limited

ABOUT THE AUTHOR:

Mario Schmidt is the Managing Director of Lingel Windows and Doors Technologies Private Limited. Besides establishing the company and making it one of the top 10 companies in India, he has helped in creating new windows like Smart Windows. He is the President of uPVC Window Manufacturers Association (uWDMA). Mario is a voracious reader and an orator, who can speak on varied topics related to the industry. He has been a part of various panels and has expressed his views on various forums related to the industry. His intense knowledge of the product and vast experience in the field has helped foray and make a mark in the market. He has actively participated as a panellist at various events and has been actively associated with events like ZAK.

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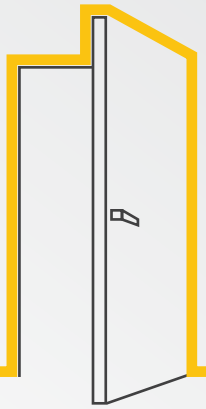

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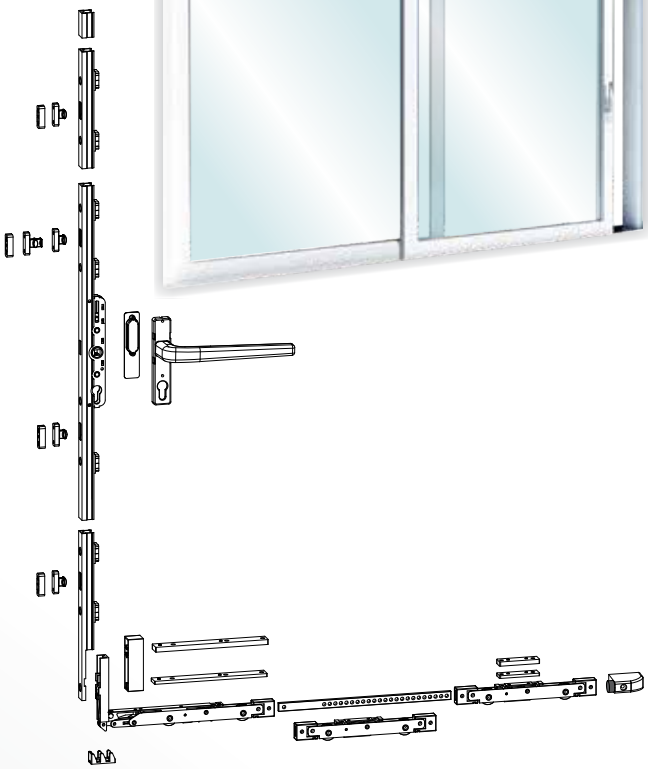

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A One-Of-Its-Kind Living Space

AIS Glass Villa, Goa

A fusion of contemporary and local architecture, AIS Villa is being built in the village of Nachinola in Goa, nestled amidst lush green fields. It is being developed by Ahilia Homes, a boutique interior and an architectural team led by the Tarun Tahiliani design house with support from AIS Glasxperts, the architectural division of Asahi India Glass Ltd. (AIS) that specialises in applied glass.

In keeping with the spirit of modern architecture of the country, this glass and laterite villa is a befitting tribute to the marriage of tradition and technology. A classic Goan courtyard structure has been reinterpreted with steel columns, giant glazing fold out glass doors, and glass chambers in the bedrooms through which old trees retain their beauty, keeping the light and form unique by any structural standards. The villa has been designed architecturally by Sameep Padora in concert with the vision of Tarun Tahiliani and

AIS Glass Villa - Exterior view

Bindu Vadera of Ahilia homes. The project is the orchestration of Jahan Tahiliani of Ahilia Homes and with the support from AIS Glasxperts.

The two-level AIS Glass Villa has a built-up area of 6,628 Sq ft with four bedrooms, including a very natural master bedroom en suite bath, which includes a special cove study area and massage rooms. The home will be adorned by a 2900 Sq ft landscaped garden with a private, glass, infinity pool, all on a plot size of 16,953 Sq ft.

What sets the villa apart is the use of glass in its construction. Various kind of glasses is being used in the AIS Glass Villa, where experts are trying to offer various solutions to the residents of the villa, while keeping the aesthetic appeal of the material – Glass. Products like AIS Security glass is being used to keep the villa burglar proof as it is has very high level of intrusion resistance, high performance, energy efficient glass AIS Ecosense is used on the façade, sound proof and dust proof AIS Windows are installed to keep sound and pollution at bay for the residents of the villa. The wooden window profiles are selected to enhance aesthetics of the structure. All these materials are selected keeping in mind the functionality, performance and aesthetic appeal, which would enhance the look of this villa.

QUICK FACTS:

Project: AIS Glass Villa

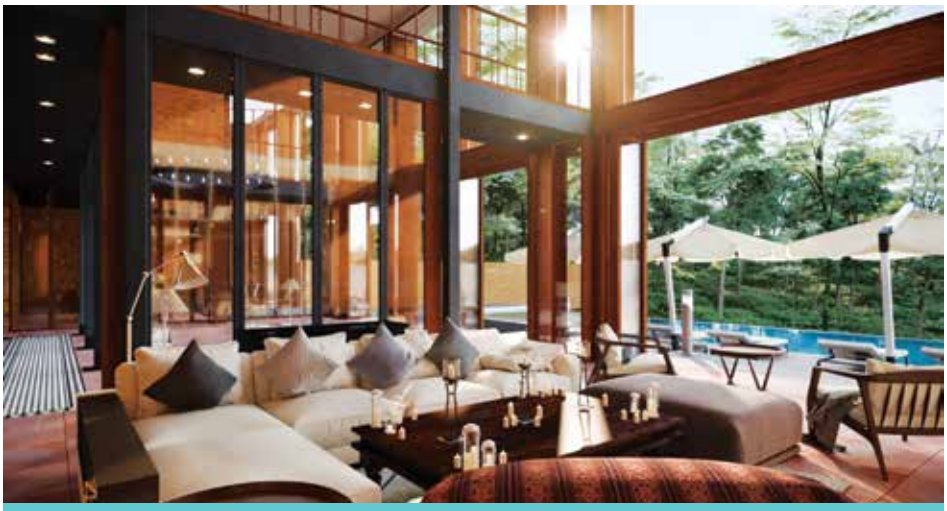
Location: Nachinola, Goa, India

Architect: Ar. Sameep Padora

Commencement Date: January 2017

Completion Date: January 2019

AIS Glass Villa – various kinds of glass used in its construction sets it apart



Living room at AIS Glass Villa

Dining room at AIS Glass Villa

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AIS GLASS VILLA - PRODUCTS

1. AIS Securityglas is a range of laminated glass with specialised PVB interlayers to provide high level of intrusion resistance from burglar attacks.

- It eliminates the need for grills or shutters.
- It gives the ability to see more without compromising on safety.

Application: Windows, Roof Lights, Canopies, Glazed Area - swimming pool, Overhead Glazing, Domes, Skylights, Glass lift walls, etc.

2. AIS Acousticglas

A range of laminated glass with a specialised PVB interlayer that dampens external sounds and provides 90% sound reduction. When compared to normal 5mm ordinary glass, AIS Acousticglas provides an 30--60% sound reduction. AIS Acousticglas is ideal for homes, offices and shops in high traffic zones or near railway-lines and airports.

Application: Board rooms, Partitions, Houses and Facades

3. AIS Customized Solutions for Skylights are available in a variety of glazing options. Made with Laminated Sentry glass which is five times stronger than the conventional laminated glass, these skylights offer you a 5-times stronger durability. A special coated film makes them immune to scratches. A 99% UV protection film keeps away the harmful rays and let's in uncontaminated and pure sunshine. These are roof windows which provide a visual connection to the outdoor environment to interiors.

4. AIS Décor (Lacquered Glass) has a unique, coloured, opaque appearance. It is manufactured using special, high-quality paint on one side of the glass and oven-cured through a unique process. This gives it a uniform feel and makes it highly resistant to heat, thus ensuring a lasting impression.

- Durable: Lacquering ensures long-lasting, beautiful colours
- Easy to use and maintain
- Environment-friendly paints used
- Processing: Can be cut, drilled, ground, bevelled, and edge-finished or polished
- Heat-resistant up to 80˚C. (Slight fading of colour with prolonged exposure to high temperatures)
- Moisture-resistant for use in bathrooms and kitchens. (Avoid regular contact with water)
- UV resistance prevents discolouration
- Many Colours available like Venetian Red, Black Pearl, Sterling Silver, Snow White, Chrome Yellow, Stone Grey, Turquoise Green, etc.

5. AIS Fabric Laminated Glass is manufactured by sandwiching layers of clear PVB / EVA to add texture, colour, and pattern to laminated glass. This product offers a wide range of fabrics within protective glass layers.

- Combines the beauty, colour & texture of the fabric with the structural strength & practicality of glass
- The interlayer acts as a security film resisting any kind of intrusion or impact, thus ensuring safety
- Its acoustic property dampens outside noise

6. AIS Wooden Fenestration:

Wood has been the material of choice for lavish and durable architecture all over the world and has enabled glass doors and windows to be equipped with much modern functionality and advantages that traditional wood and glass doors or old wooden window frames never had.

Key features provided by wooden doors & windows are durability, weather resistance, low maintenance, noise & heat insulation and offers premium aesthetics.

We offer a host of solutions for doors and windows solutions which include - noise reducing windows, burglar-resistant windows, solar control windows, anti-pollution and safety glass windows.

AIS offers variety of windows types with functional benefits -

- Casement
- Sliding & Folding
- Lift & Slide
- Tilt & Turn
- Top Hung
- Arched Windows
- Combination / Customized
- Special-shaped Windows

Courtyard at AIS Glass villa

The use of cutting-edge glass products & solutions blending with the other building materials have given birth to a unique Villa by the river. The three main features of the living room are the double-height ceiling, sunken seating pit and a dining around a cluster of trees almost at the level of water. The dining room also includes a game corner which is built around the smaller courtyard around the cluster of existing matured trees.

The Villa is being given monumental façade so that there is no invasion of privacy from outside. Some of the best glass products from the AIS portfolio such as the burglar-proof AIS Securityglas which delivers a very high level of intrusion resistance, AIS Décor coloured lacquered glass, and the energy-efficient AIS Ecosense, which is considered to be the green standard in glass, are used in this project. The glass selection and installation ensures that while the aesthetic value of the AIS Villa is high, it does not compromise on the functional aspects of a living space, so the Villa is not just beautiful to look at, but will also be very safe and comfortable to live in.

Sunken lounge at AIS Glass Villa

ADITYA BHUTANI
Director & COO,
AIS Glasxperts

ABOUT THE AUTHOR:

An alumni of Indian School of Business, Aditya Bhutani has a solid foundation in understanding complex ideas and managing various customer behaviours. He has a meticulous eye for project planning and execution. With over 25+ years of experience in glass and window industry he has gained an ability to read customers' minds. Being the COO & Director of AIS Glasxperts, he adds value to his customers with innovative ideas in glass. He enjoys briefing them on how glass can transform their space, and involves them in every aspect so they can make an informed decision.

A full service offering from Asahi India Glass Limited (AIS), AIS Glasxperts brings together an integrated approach and specialized knowledge in glass and allied products & services. They provide complete architectural glass, windows and doors solutions for aesthetic, safety & security, energy efficiency, acoustic and privacy needs.

Merino Launches Experience Center for Industry Professionals

Merino Group has recently launched their Merino Experience Centre (MEC) in Mumbai. It will serve as a one-stop solution for all surface needs, with a grand display of all products of Merino under one roof. The Merino Experience Centre not only offers display of the complete bouquet of Merino's product portfolio but also adds value when it comes to experiencing them in real life scenario, with all possible surface products combinations. Merino's Mumbai centre showcases what the brand can offer - from decorative laminates to compacts, PU acrylic panels to internal and external wall cladding to restroom solutions, offering all surface solutions. The event was graced by the presence of architect Hafeez Contractor, by inaugurating and taking a round of the center. Architect Chandrashekar Kanitkar also adorned the event by his presence. Apart from him, industry gems like Ar. Bakir Baldiwala, Narsi Kularia, Bhupesh Mistry and Deepak Lakhani were also present to share their experiences. MEC in Mumbai will be a single business hub for architects and interior designers, enabling them to explore their choice of products through customisation of their imagination. The product display will inspire them to have creative brainstorming sessions to choose the best from exhaustive range of Merino surface products.

EvoWood Opens its First Experience Centre in Mumbai

EvoWood, a wood engineering brand has opened its maiden experience centre in Mumbai at Laxmi Industrial Estate, Andheri West. It is one of the main hubs for interiors in Mumbai. Launched in 2017 by Atul Marwah, a 4th generation woodpreneur, the brand is all set to expand to various cities to provide versatile solution for manifold interior and structural applications in homes, offices, hotels etc. The newly opened store in Mumbai offers the brand's exclusive collection of engineered wood products such as EvoLlae - thin 3.5mm sheets, EvoLumber- ready to use processed lumber and EvoBoards – the finger jointed boards. EvoWood aims to simplify woodworking and provide unprecedented solutions and applications to the industry. The name "EvoWood" comes from the word "Evolving" (Evo) and the core product "Wood", which is the essence of the company's meaning "Woodworking Evolved". EvoWood offers a range of products making them viable for all kinds of applications. The brand is the first ever entity that has introduced unique 3.5mm thick solid wood sheets in the world. The 3.5 mm sheets known as 'EvoLlae' come in various species of solid wood making it versatile and easy to use. Available in different species, textures, sizes and patterns, the price of the products ranges from Rs 150-800 per square feet. EvoWood also announced its future plans to launch two more stores in the upcoming year.

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Saint-Gobain Unveils the World's Most Elegant Dynamic Glass

Saint-Gobain has released SageGlass Harmony®, one of the world's most elegant dynamic glass. Unveiled for the first time at Glasstec in Dusseldorf, Germany, Harmony is a unique glazing solution for building owners and designers seeking to enhance the occupant experience by maximizing visual and thermal comfort. Unlike other solar management solutions that compromise aesthetics and impede views, Harmony dynamic glass provides daylight, heat and glare management while maintaining a natural and seamless connection to the outdoors. The pioneer of the world's smartest electrochromic glass, SageGlass® is the ultimate connector between the built and natural environments. SageGlass tints on demand to optimize daylight, reduce glare and manage heat – all while maintaining unobstructed views of the outdoors. With SageGlass, architects and building owners can improve occupant comfort and reduce energy demand in buildings. As a wholly owned subsidiary of Saint-Gobain, SageGlass is backed by more than 350 years of building science expertise.

SageGlass LightZone® was the first dynamic glazing to allow for in-pane tinting to precisely control the source of uncomfortable heat and glare while providing optimal lighting conditions. However, LightZone® has defined lines between tinted and clear areas of the glass. Harmony improves on this by delivering a gradual in-pane tint transition from fully clear to fully tinted. The result is a glazing that affords a more seamless connection with the outdoors while still providing optimized daylight, color rendering, heat and glare control. According to SageGlass CEO Alan McLenaghan, "Harmony represents the best glass technology evolution ever produced in our dynamic glazing portfolio. It represents a near perfect balance between the performance and aesthetic goals a solar control and glazing solution needs to deliver".

Lioli Ceramica Launches its Latest TechnoSLAB Offering - Grey Alaska

Lioli Ceramica, one of India's technologically most advanced porcelain slab manufacturers, has launched its latest product, Grey Alaska under the company's flagship brand–TechnoSLAB. The Grey Alaska has a misty, cloudy appearance that illustrates the cold, wintery feel of the season. The beautifully variegated, polished porcelain slab is reminiscent to natural marble and lends a charismatic grace to the surface. With a standard 9mm thickness, the slabs are available in 2400 x 1200 mm and in 1200 x 1200 mm sizes and in two distinct finishes viz. Crystalline and Lustrous. The Grey Alaska is best for flooring and wall cladding applications on building facades, in baths, kitchens, living rooms, bedrooms or any such interior areas. TechnoSLAB products are robust, contemporary and monolithic porcelain surfaces that combine technology with aesthetics making them an ultimate replacement for any other surface materials available in the market. These superior surface solutions are not only visually gratifying but are also stain, water and fine resistant and hence are suitable for all kinds of interior and exterior applications. The specification of the products are: Size - 2400 x 1200mm / 1200 x 1200mm, Series - Marble, Finish – Crystalline / Lustrous, Thickness - 9 mm.

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Power Ministry launches Energy Conservation Building Code for Residential Buildings

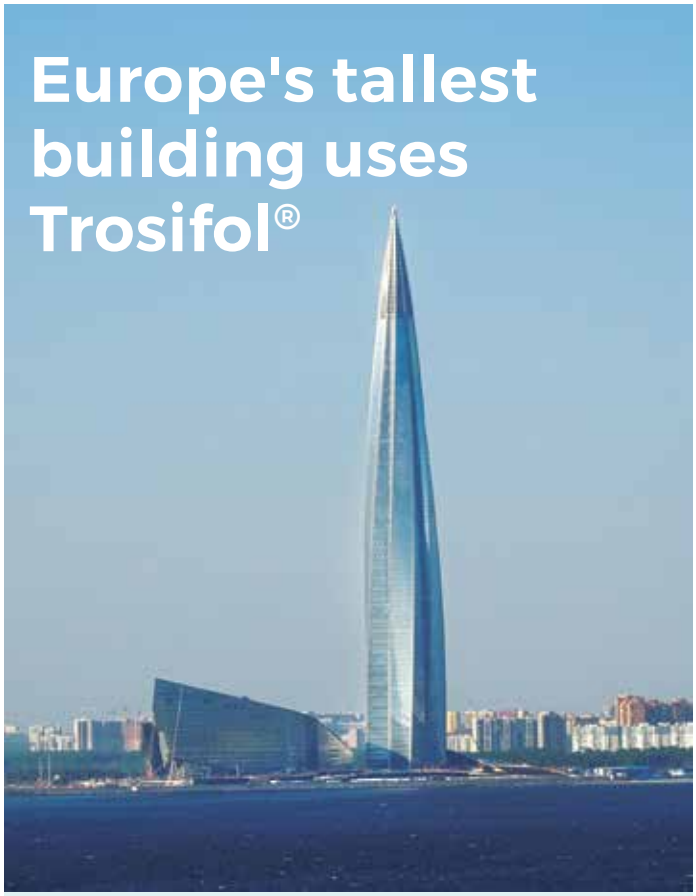
Making an effort towards energy efficiency, the government of India has launched the Energy Conservation Building Code for the residential sector on the occasion of National Energy Conservation Day 2018 in the presence of Lok Sabha Speaker Sumitra Mahajan and power minister Raj Kumar Singh.

The new rule "Eco Niwas Samhita 2018" has been launched to benefit the occupants and environment by promoting efficiency in design and construction of homes, apartments and townships. With the launch of this Energy Conservation Building Code, Government is aiming to save 125 Billion Units of electricity per year by 2030, which is equivalent to 100 million ton of CO2 emission.

Speaking on the occasion, Raj Kumar Singh, Minister of Power, stated that building sector will have highest growth in energy demand in coming 10-15 years. Government is encouraging all building professionals including architects, builders to generate awareness towards energy conservation while constructing new residential homes.

The Code has been prepared after having extensive consultations with the stakeholders, which included: architects & experts building material suppliers and developers. Climate and energy related data was considered for listing the parameters in the code. Initially, Part-I of the Code has been launched which prescribed minimum standards for building envelope designs with the purpose of designing energy efficient residential buildings. The Code will assist the architects and builders who are involved in design and construction of new residential complexes in different parts of the country.

Europe's tallest building uses Trosifol®



The 462 meter tall Lakhta Tower, the tallest building of Europe has used Trosifol® glass. The building occupies a 170,000 Sq m footprint on the shores of the Gulf of Finland in the Primorsky District, some 10 km northwest of St. Petersburg's city center. Designed by the RMJM partnership under Tony Kettle's direction, the project was managed by ZAO Gorprojekt; and the work planned by Samsung Production.

As a modern business center with many public functions, the building is intended to form the hub of a new downtown and take the strain off the historic city center.

Before the start of the World Cup 2018 in Russia, the fitters from façade constructor Gartner – aided by roped industrial climbers – install the last of the 3 x 4 m glass panes at heights of over 300 m, without helicopter assistance. This oversized needle, with its curved glass façade, now stands majestically over the Gulf of Finland, welcoming approaching cruise ships from afar. Over 3,000 people were involved in the construction, with some 600 Russian and international companies. Over 20,000 people from 18 countries involved in the project's full realization.

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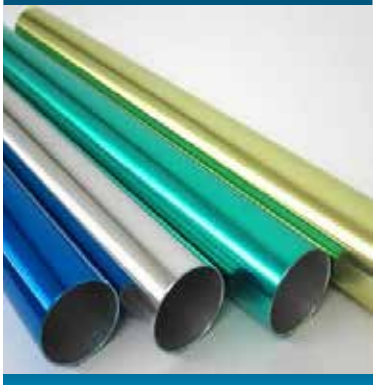

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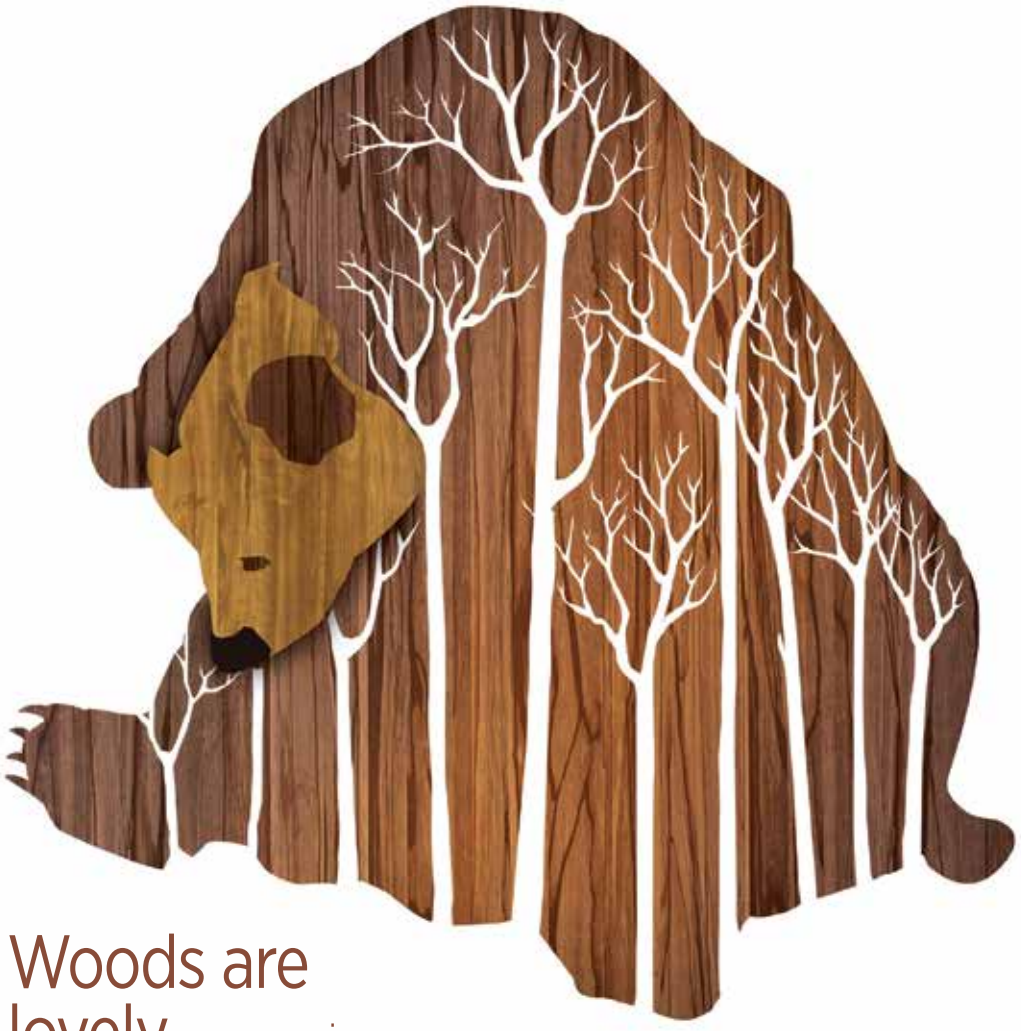

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