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FEATURE CANOPIES & SKYLIGHTS

cured silicon gaskets in combination with minimal wet applied weather silicon are a better performer. This however may be objectionable to architects as the choice of silicon colour is between black and grey. Clear weather sealant, though more visually pleasing initially; pick up stains during curing & may have air bubbles.

Though silicon is theoretically considered impermeable to water, it is a good engineering practice to not allow water logging. A minimum glass panel surface slope of 1 to 3 degrees is recommended.

Attention to joinery details & interfacing materials with civil structures of a skylight or a canopy is critical to ensure long term weather resilience & structural performance. Rainwater drainage must be studied at a micro level during the desian concept stage.

Performance Glass Specification:

Overhead glazing as per all international building codes (as well as common sense of well being), requires the glass to be laminated. Whether the panel's needs to be heat strengthened or tempered depends upon the required structural performance of the glass. The chance of laminated glass to fall out of its support frame in the event of any breakage is almost nil.

While on the topic of laminated glass, it is worth noting that only PVB laminated glass has properties of sound insulation & UV radiation filtration, (will prevent upholstery & carpet fading.) As PVB due to its intrinsic material properties is almost hygroscopic by nature; requiring the edges of exposed lami-glass edges should be caped to prevent edge de-lamination of panels. In comparison, an ionoplast interlayer (i.e DuPont's SGP for example) offer better structural, post breakage performance as well as being completely inert in a waterlogged condition.

The effective thickness of the glass panels is determined by the support system design and the panel size. Smaller panels need less effective thickness. However, this may require larger structural cross-section of the primary support structure.

Photometric properties are also to be considered if the glazing area is large, as it will affect the AC load. With regard to Indian climate; shading co-efficient is more important than the emissive factor. i.e. a green tinted glass will out perform a clear Low-E glass. If ceramic screen-printed glass is used with a translucent interlayer the relative heat gain will reduce as the opaque areas of the glass reduces the light energy transmitted through the panels. Where budget permits; a combination of high-performance glass Lami-IGU along with external shading screen would be considered the optimum engineered solution. The trade off may be a loss of see-through visibility & a larger initial capital investment. However, in terms of energy savings (natural day light & AC) over the performance life period of the building would be well worth the investment. Designers should insist upon using glass specs which is translucent, as the cleaning frequency in most Indian city would have to be almost every 2 days

A retractable or a shading / light diffusing system if used will perform better on the outside than inside. The reason being; as the short-wave radiation (that is the high energy part of the visible light spectrum) looses its energy upon hitting a solid material beyond the glass. The glass at this point behaves like a one-way barrier. The long wave radiation in the form of heat is trapped, absorbed and re-radiated by the shading device material; The internal shading system begins to perform as a radiator, making the air conditioning to work less efficiently. This is by definition is the classic case of the "green house effect."

Performance Steel Specification:

All exposed structural members must meet the long-term anti-corrosion performance criteria. All glass to primary support interface hardware is in general specified to be Stainless Steel 316 grade. All glass point fixing bolts shall be articulated (ball & socket joint; rotules) to prevent failure from long-term bending stresses caused by the differential building settlement and sudden high velocity wind impact. Incase mild steel is used for the primary structural steel; UV stabilized epoxy painting is recommended. Under no circumstance should welding of mild steel with stainless be allowed. Incase of interface between mild steel and Stainless Steel, an insulated bolting system should be used. A nonferrous or an engineering grade polymer insulator is recommended. This would prevent bi-metallic corrosion over its structural performance life of the system.

Maintenance & Safety:

One of the costliest problems of skylights and canopies is cleaning the structure and preventing leakage. In the early design concept stage, the cleaning accessibility & glass to civil structure interface along with the rainwater run-off must be accounted for and detailed.

Self cleaning coated glass (though it has it a performance life) is a very practical solution. Regardless, there must be a safe access to all installed panels not only for cleaning; but also, in the event of breakage, speedy replacement of panels. It is therefore imperative to consider a service load in the initial glass performance structural analysis stage. Furthermore, though a service load of maintenance personnel is provided for; codes & again plain common sense requires for a safety lifeline harnessing system to be integrated into the design of skylights & canopies.

not easily accessible. Like any other The recommended silicon-based sealant to be used is structural sealant and not mere weather sealant. The relatively new dry-fit extruded microwave

building material, designing with glass also requires skill and performance foresight.

It's a fact; a well detailed system will perform in the test of time.

DESIGN GUIDELINES SKYLIGHTS & CANOPIES

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INTRODUCTION: There is no denying the fact that glass is the material of the millennium. Even though there is a lot of limitation of the material in terms of handling & usage; the demand for it will only increase in the days to come.

This is quite evident form the fact that the development of any city these days

is superficially judged by its high-rise glass skyline.

As there is no stringent enforcement of the glazing codes, there is a scope for every novice to claim himself to be a glass engineer. For the end user or even an experienced Architect, the domain knowledge is

CANOPY

ENTRANCE PORCH - PRIVATE RESIDENCE. Mumbai, INDIA. Architects: EDIFICE



1200 HAND CUT CRYSTALS EMBEDED









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ENTRANCE CANOPY - ORACLE



PRE-FAB SS CANOPIES at MAIN RECEPTION BLOCK











CANOPY

Retro-fit Solution:

The design & execution challenge was to install the 2 canopies with out touching the existing façade.

2Ton of SS 304 off-site prefabricated .canopies.

Point Fixed 16.52mm Laminated ceramic fritted glass panels

SYNTHESTRUCTURAL VALIDATION MODELING

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ON-SITE INSTALLATION with BOOM CRANE

CANOPY



IMPACT FACTORY ADMIN OFFICE, BANGALORE ENTRANCE PORTAL - COMPOSITE MATERIALS HYBRID.

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SILVER HEIGHTS, BANGALORE.



Composite materials have been used structurally to balance the overall composition.

CANOPY



SARATHI RESIDENCE, BANGALORE.

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SYNTHESIS

CANTILEVERED GLASS BEAM CANOPY – BHARATH MALL, MANGALORE.





RADHA ECOTEL HOTEL, BANGALORE.

MLR AUDITORIUM - BRIGADE GROUP, BANGALORE.

SKYLIGHT

PRE-FAB SKYLIGHT DOME for MOSQUE Doha, QATAR. Client: DUBAI METAL, UAE.







SYNTHESIS



SKYLIGHT & CANOPY





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The challenge is to always create a signature entrance for a building.

BOW TRUSS WITH TENDON & GLASS BEAM HYBRID CANOPY - BMW SHOWROOM. BANGALORE



SKYLIGHT & CANOPY

IMPACT ADMIN OFFICE, BANGALORE.





LIDO, ISHTA, BANGALORE.

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NAZEER AHMED GARMENTS FACTORY, BANGALORE.





NAZEER AHMED RESIDENCE, BANGALORE.





DIGITAL - HP, BANGALORE.





MFAR, BANGALORE.

CANOPY: WATER CASCADE





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ORNAMENTAL

FEATURE DOME - PRIVATE PENTHOUSE. Bangalore, INDIA. Architects: PRISM





SOLID WORKS MODELLING



FABRICATION IN PROGRESS

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CONCEPTS



SYNTHESIS

THANK YOU FOR YOUR TIME



