A path to high performance Fenestration system

Context: Glass Facade

- Element connecting indoors with outdoors
- Aesthetic expression and identity to building

“Aesthetic matters are fundamental for harmonious development of both society and the individual” – Friedrich Schiller
Context: Fenestration

- Heat gain through Façade add to cooling load in hot climates
- Visible Light Transmission help conduct activities inside building

Parameters to understand Façade performance

- Reduction in heat through conduction – U Value
- Reduction in direct solar gains – Shading & SHGC
- Increase availability of visual light – daylight, VLT
Optical Characterization

- Measurement of Glass properties in solar spectrum
- Optically characterized more than hundred glass from Indian market
- Glazing database is available on website

Early Design Tool – COMFEN India

- Indian Climates with Indian Glass Database
- In-built Life-cycle Cost Analysis (LCCA)
- Integration with Radiance for Visualization
**Facade in Indian Context: Challenges**

- Deep floor plan office does not allow daylight to penetrate deep inside.
- Evaluation of impact of shading on facade.

**Effectiveness of Laser Cut Panels**

- Building with normal glass
- Building with LCP
Measurements of Laser Cut Panels

Gonio-Photometer II
machine illustration

Initial patterning of
measurement

Measurements of Laser Cut Panels
Use in RADINACE & ENERGYPLUS
Impact of Shading on Façade
Adjusted Solar Heat Gain Coefficient

- E Plus-Extracted Algorithm
- Grid Direct Method
- McCluney AWNshade

M-factor by Orientation
Detailed SHGC
Winter Shaded SHGC on the Sky design
Summer Shaded SHGC on the Sky design

Impact of Shading on Façade
Adjusted Solar Heat Gain Coefficient
Centre for Advanced Research in Building Science and Energy
at CEPT University

Design Assistance Facilities
DESIGN

State of the Art Testing facilities
CONSTRUCTION

NZEBS
M&V
OPERATION

Yash Shukla, Sustainable Façade Conference, New Delhi, February 16, 2016

THANK YOU

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