AECOM

FenestraPro

CASE STUDY – MAY 2017

Company:
AECOM, London

Project:
Kuwait International Airport Support Terminal

AECOM Dynamically Investigates Options on Façade Design to Kuwait Airport

Optimises Specifications and Generates Recommendations using FenestraPro Premium for Revit.

"FenestraPro Premium is versatile, fast, and can provide a continuous feedback loop, thus optimising the environmental response design process.
In design stage of this project, FenestraPro gave us a high-level overview of the implications of the use of excessive glazing in such a sunny climate, and a great understanding of the overall building performance."

Yifan Zhang,
Façade Engineer, AECOM

FenestraPro

KEY FEATURES EMPLOYED:

Dynamic Revit Add-in and model support;

Real-time analysis of **thermal**, **solar** and **daylighting** performance in extreme climate;

Intuitive use of glazing and frit specifications, to immediately understand implications.

AECOM were engaged to design a support airport terminal at Ghazali Street, Airport District, Farwaniyah, Kuwait.

With a footprint of over 40,000m^2, the design itself included an undulating roof extending from a low level on landside to a higher level on airside. The terminal was proposed to consist of 11,000m^2 of façade, of which over 63% of which was glazed, predominantly to the two main elevations on landside and airside. Of this almost 7,000m^2 of glazing 2,600m^2 of glazing was orientated East-North-East (landside), while the substantial 4,400m^2 of glazing was orientated to the West-South-West.

FenestraPro Premium was used to examine the implication of the substantial glazing to these orientations and examine the impact it would have in this hot sunny climate in terms of **thermal** performance and a measure of the passive **solar heat-gain** and natural **daylight**.

In the first instance, considering the use of a standard double glazed unit with a g-value of 0.23 and a diffuse transmittance of 0.5. **FenestraPro calculated a solar heat gain** of 68.4W/m^2 to the East-North-East orientation based on a solar load of 141W/m^2 over 270% higher than the maximum recommended 25W/m^2. The average design **daylight factor** (ADDF) of 22.2%, more than the 5% recommended. With even more glazing to Airside, and higher a solar load of almost 310W/m^2 FenestraPro calculated heat gains in excess of 95W/m^2 and ADDF of almost 23%, 380% and 450% higher that the recommended respectively.

Although additional shading could be used to reduce the excessive solar heat gains, this compromised the design. **FenestraPro gave dynamic feedback that the use of a solar control glazing, with some low-level fritting ensured that the building would not overheat and would maintain a high level of daylight**.

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