Mechanical Breadth

Introduction

An additional investigation must occur into the effects on the heating and cooling loads from the redesigned electrical and lighting systems. The mechanical breadth work will evaluate these effects on the system.

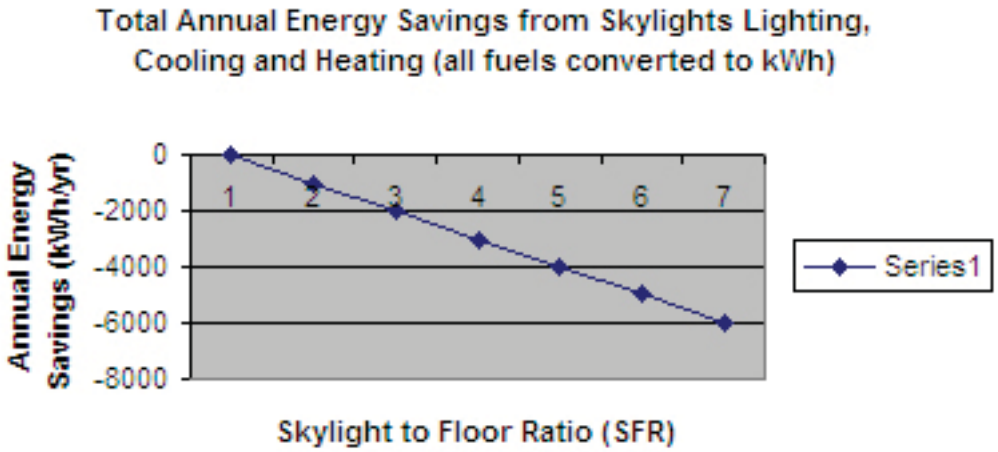
Important design factors of a good daylighting system are not only the controls and actual design of the system, but also load minimization. This Mechanical Breadth will study the different types of glazing for the windows to determine if they are the best solution for the daylighting system.

The glass in the library and learning center is Solarban 60 Solar Control Low-E glass made by PPG. Using Solarban 60 windows supposedly is “designed to provide solar control, while continuing to offer the traditional insulating performance and aesthetic benefits of low emissivity coated glass” (www.ppg.com).

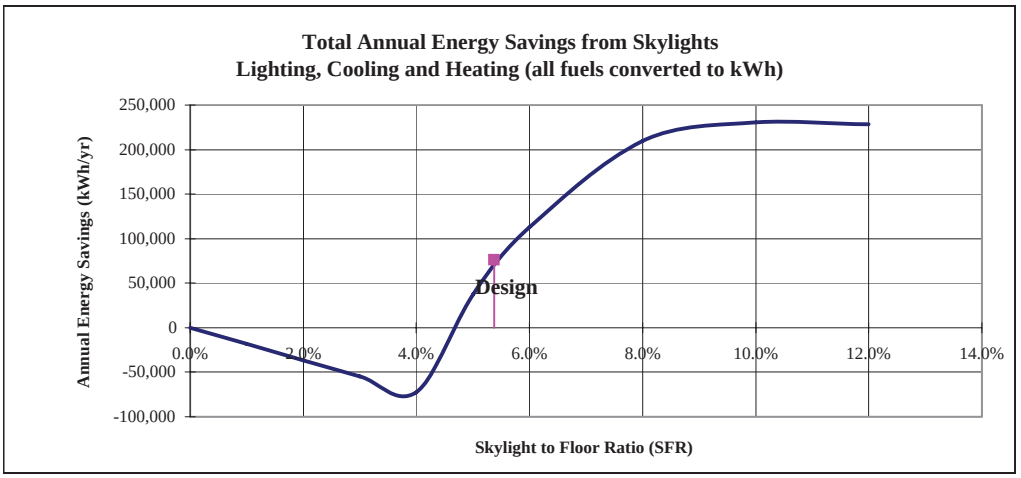
In the lobby, the skylight runs the length of the space. The advantage of the daylight in this area is much less than compared to the other spaces. This skylight could prove to be more of a problem than an asset. Skylights create unwanted heat gain and heat loss. This breadth work will determine if the skylight proves to be a good choice.

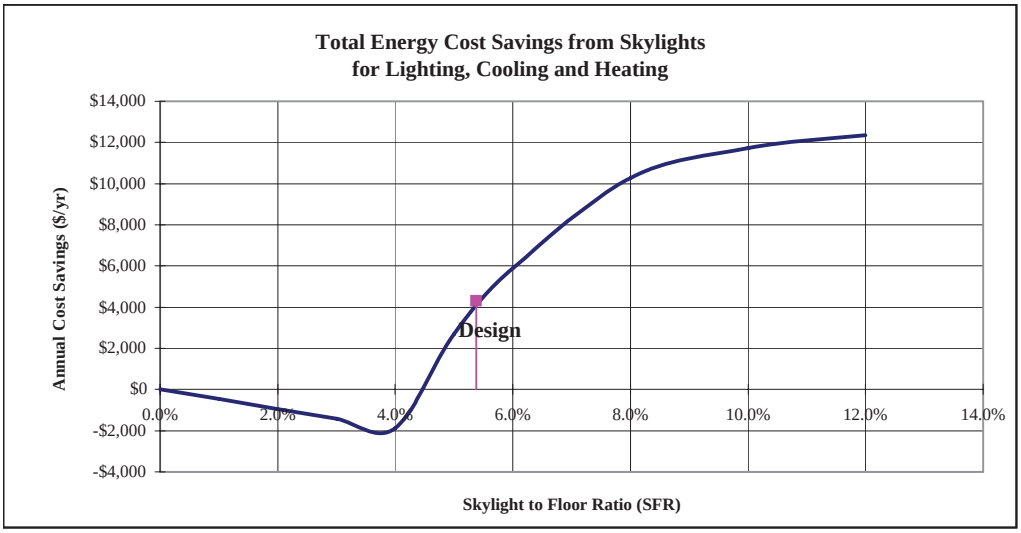
Existing Conditions

Performance Properties	Monolithic Clear Glass	Clear Glass and Solarban 60 (2) Glass 1G Unit
Ultraviolet Light Transmittance	77%	16%
Visible Light Transmittance	90%	72%
Insulating Properties Winter Night U-Value Winter Night R-Value BTU/(hr*sqft*degreeF)	1.12,0.88	0.3,3.33
Shading Coefficient	1.01	0.45
Indoor Glass Temperature	16.5degrees	54.5degrees
SHGC	0.75	0.39



The skylight dimensions are 4’ x 104’5-1/16”. The actual lobby dimensions are 28’-2” x 105’-4-1/2”. Sky calc is a simple program that calculates if the skylight in the lobby will pay off in energy savings over a period of a year. Entering basic knowledge of the system will give you an estimate if it is in the plus range or the system is losing money.





Conclusion

The skylight does have a net earnings annually in regards to energy consumption. Keeping the skylight is beneficial to the lobby space in both cost savings within electric lighting, cooling, and heating.Savings in annual energy is close to 75000 kwh/yr which exceeds assumptions.