



DAYLIGHTING INITIATIVES

**Submitted by
Heschong Mahone Group
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Skylighting and Retail Sales

Executive Summary

An Investigation into the Relationship between Daylighting and Human Performance

This study looks at the effect of daylighting on human performance. It specifically focuses on skylighting as a way to isolate daylight as an illumination source, and avoid all of the other qualities associated with daylighting from windows. In this project, we established a statistically compelling connection between skylighting and retail sales, and between daylighting and student performance. This report focuses on the retail analysis.

We analyzed data on the sales performance of a chain retailer who operates a set of nearly identical stores. The analysis included 108 stores, where two thirds of the stores have skylighting and one third do not. The design and operation of all the store sites is remarkably uniform, with the exception of the presence of skylights in some. The electric lighting was primarily fluorescent. The skylights often provided far more illumination, often two to three times the target illumination levels. Photo-sensor controls turned off some of the fluorescent lights when daylight levels exceeded target illumination.

The monthly gross sales per store were averaged over an 18-month period that went from February 1 of one year to August 31 of the following year. This average sales figure was transformed into a "sales index" that we could manipulate statistically, but that did not reveal actual dollar performance. Stores in the sample were selected to operate within a limited geographic region that had similar climatic conditions, and to have a constrained range of size and age. The geographic region has a relatively sunny climate. All of the stores in the data set are one story.

The multivariate regression analysis allowed us to control for the influence of other variables, which might influence sales. Other variables considered included the size and age of the store, hours of operation, and economic characteristics associated with the zip code location.

Skylights were found to be positively and significantly correlated to higher sales. All other things being equal, an average non-skylit store in the chain would be likely to have 40% higher sales with the addition of skylights, with a probable range somewhere between 31% to 49%. This was found with 99% statistical certainty. After the number of hours open per week, the presence of skylights was the best predictor of the sales per store of all the variables that we considered. Thus, if a typical non-skylit store were averaging sales of \$2/sf, then its sales might be expected to increase to somewhere between \$2.61 to \$2.98 with the addition of a skylighting system.

The skylights are seen to have a major impact on the overall operation of the chain. Were the chain to add the skylighting system to the remaining 33% of their stores, their yearly gross sales are predicted to increase by 11%. The difference between having none of their stores skylit and all their stores skylit is a 40% increase in gross sales for the retail chain.