

Thick walls offer many detailing possibilities: these curves are made from quartered Sonotubes.

# Using Less Glass with More Thought

*How to Get the Joys of Daylighting Without the Headaches*

by John Rahill

Everyone loves light and glass in a home. Sweeping views and good daylighting sell homes. Conversely, a dark, windowless space is a big turnoff.

But if a little glass is good, more glass is not always better. In their enthusiasm to brighten a space, capture solar gains or open up a view, designers often use too much glass.

People always are surprised by how much discomfort a large bank of glass can bring. Too much glass in the wrong places can lead to overheating in spring, summer, and fall, and to cold drafts and cold home owners in winter.

Furthermore, if the plan is not well-thought-out, the light can be harsh, glaring or blinding at times—making the home owner draw a shade or leave the room. (In one passive-solar home we



drawings and photos by John Rahill

Stairwells make convenient light shafts for bringing sunlight into interior rooms. Placing the skylight next to the wall makes an effective reflector and reduces glare.

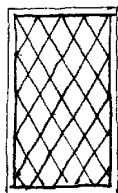
loss. We'll look at the major issues to consider in resolving these conflicts and deciding where and how much glass to use.

## Glare

A brightly lit window is a powerful source of naturally balanced light—and glare. Glare is experienced when a bright light source, such as a window, sits next to a dark surface, such as a dark wall. This type of glare, called contrast glare, causes eyestrain because the eye can't decide which level of brightness to adjust to.

Color is the first and easiest tool for reducing glare. Keep the walls and ceilings adjacent to the window a light color. (On a bright day, even a white

AT ONE TIME YOU GOT DIVIDED LIGHTS WHETHER YOU WANTED THEM OR NOT.

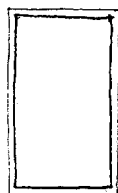


12<sup>th</sup> CENTURY LEADED GLASS

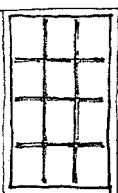


JAIL CELL (GLASS OPTIONAL)

WITH MODERN THERMOPLANE, YOU NOW HAVE THE OPTION.



MODERN CASEMENT



MODERN CASEMENT WITH SNAP IN VIEW DIVIDERS

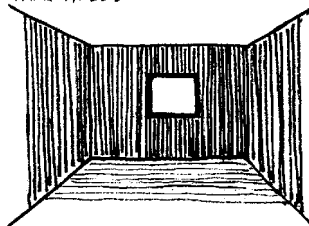
know of, the occupant showed a visitor how handy the thermal insulating shades were for blocking out the hot, glaring afternoon sun—in January.)

In the early days of superinsulated houses, some builders and designers were so fanatical about reducing window size that the interiors were gloomy. But there is a happy medium. By using a modest amount of glass and placing it

thoughtfully, you can have dramatic, light-filled spaces without the cost and comfort problems too much glass will bring.

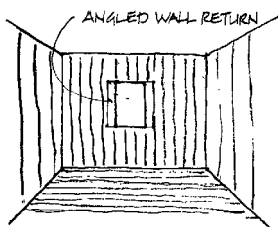
In using glass, designers generally have to make trade-offs between competing needs. They must consider daylight, views, passive-solar gains, and aesthetics, while at the same time trying to keep a lid on both first costs and heat

DARK WALLS

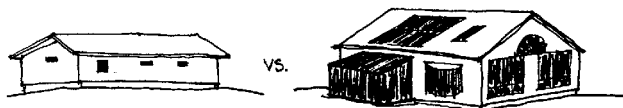


GLARE:  
CONTRAST BETWEEN LIGHT WINDOW AND DARK SURROUND.

LIGHT WALLS



TO REDUCE GLARE: LIGHTEN UP WALLS, PROVIDE SURFACES FOR LIGHT TO BOUNCE OFF OF.



THERE IS A HAPPY MEDIUM

wall can seem dark and cause glare.)

An effective way to reduce glare is to make a gradual transition between the brightness of the light source and darkness of the wall. With thick walls or roofs, we can accomplish this with splayed (angled) openings around windows and skylights. The lengthened and gradual transition is easier on the eyes.

We use the splayed opening frequently because it has other benefits as well. It makes a window or skylight seem larger. It permits views from a



One small skylight with a splayed opening can dramatically brighten a kitchen or bath.

broadier area within the room, and it spreads the light out over a larger space. Using a splayed light shaft, a very small skylight can dramatically brighten a kitchen or bath.

Another technique is to reflect the light off a wall. For example, we sometimes place a skylight directly adjacent to a partition. The light from the skylight washes over the partition, which then lights the room evenly and softly.

Another way to reduce glare is to raise the light level in the rest of the room by adding another light source. In a solar space, for example, we will place a skylight near the back wall to back-light the room, thereby evening out the light levels and reducing the sometimes harsh quality of light in these spaces.

## Orientation

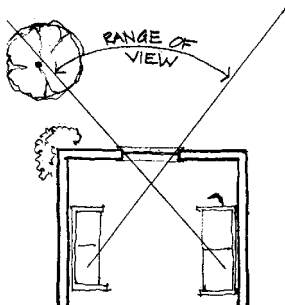
If you can generalize (which is dangerous), south and east windows are best. East windows bring in morning light, which is particularly welcome in winter when both light and heat are needed. South windows provide passive-solar gains and are the easiest to shade in summer.

West glass is the most troublesome. The heat from the afternoon sun is unwanted in summer and comes too late in the day in winter. West glass is difficult to control with either fixed shades or overhangs.

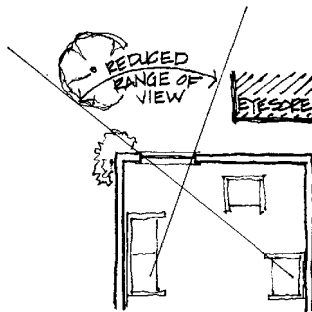
North glass lets in no direct sun, so it loses more heat than it gains. On the other hand, north light is softer and more diffuse than the direct sunshine brought in from other orientations. For that reason, north light usually is the first choice for artists' studios.

## View

From the clients' perspective, a stunning view of a lake, meadow or mountain often is the first priority for windows. In most cases, they've paid a premium for the property because of the view and now, by golly, they want to



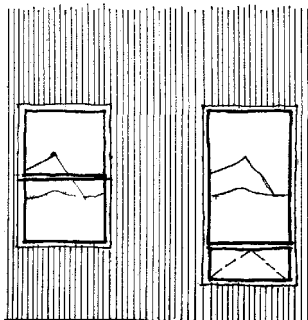
CENTERED WINDOW



WINDOW INTENTIONALLY PLACED OFF CENTER TO CONTROL VIEW

show it off. "We want this to be a whole wall of glass."

We often take the approach favored by the Japanese—that a well-framed view is more dramatic than a wall of



WINDOW TYPE AND MULLION LOCATION CAN BE IMPORTANT

glass. This is a hard concept for clients with a "bigger is better" attitude to accept. But once the house is completed, they concede that the view from inside the house is better than that from the outside. The view is focused, and distracting elements are screened out.

As a side benefit, smaller areas of glass avoid some of the pitfalls of large expanses: overheating when the sun shines, underheating when it doesn't, drafts, and the need for window treatments to cover up the large black wall that is created at night.

## Window Placement

Ideally, we center a window or set of windows in a room; a centered window gives the widest view from the most places in a room. But too often this is done without considering what is outside the window.

Sometimes the view straight ahead is great and sometimes it's an eyesore. If an eyesore lies straight ahead, place the window off center or even crowd it against a partition. This effectively cuts the width of the view in half, and directs the view off to one side. The partition prevents you from looking the opposite way.

The vertical placement of a window also will guide the viewer: a high window forces one to look up and a low window encourages one to look down. If the good views lie up a hill, go for a window high in the wall, and vice versa.

Tall windows solve the problem by allowing views both up and down, which is fine if the whole up-and-down view is desirable. But more often than not, the bottom half of the window adds about 10 feet of lawn to the view, and very little additional light.

Low windows can cause problems

when it comes time to arrange the furniture in the living space, or locate electrical outlets.

Another popular item in New England is the divided-light sash—in double-hung windows, French doors, or even casements. But if it's a view you're after, stay away from divided lights. What they add in character, they take away in the quality of the view by chopping it up into pieces.

## Ventilation in Large Windows

The need for ventilation and the desire for an unbroken view often conflict. The double-hung window probably is the worst compromise, since the dividing rail usually is smack in the middle of the view. Similarly, a series of casements placed together to take advantage of a panorama only serves to break it up.

With the wide selection of standard types and sizes, you can usually tailor the window to the view desired. Recently, we've seen more stock sizes available in hopper windows (awnings over or under fixed glass). This combination offers great flexibility, since the horizontal mullions can be positioned high or low in response to the desired view.

## Getting the Light In

In general, the best source of light is up in the sky, and the worst is down near the ground. (An exception to this is during the winter, when a snow cover will transform a window at grade into a bright light.) Square foot for square foot, you get more light from a skylight than a vertical window, and you get more light into the interior from a high window than a low one.

When there's no easy way to get natural light into an inner room or a basement, stairwells can come in handy. A skylight or window over a second-floor

stair can flood the center of a home with good levels of daylight. Similarly, if a basement stair is on an outside wall, a window placed in the stairwell can bring daylight into a basement.

Other open spaces, such as hallways, also can serve as light shafts to brighten interior rooms. The opening to the room may simply be framed and left open, or, if privacy is desired (as for a



The splayed opening effectively reduces glare and lights a wider area.

bath), glass block or frosted glass can be used. Similarly, the ceiling of an enclosed space such as a bathroom may be glazed to let in light from a central skylight above.

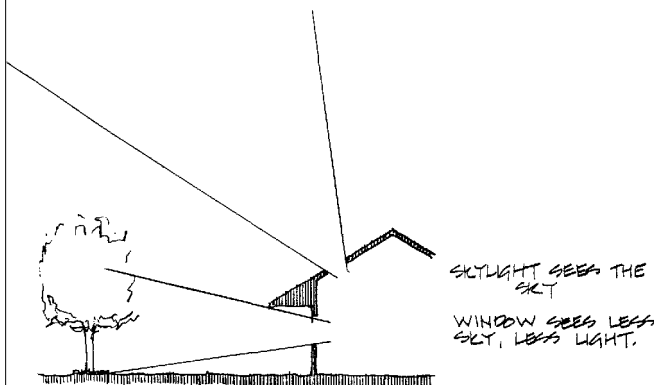
## Notes on Skylights

Skylights have become very popular. They have many benefits, but some cautions are in order, too.

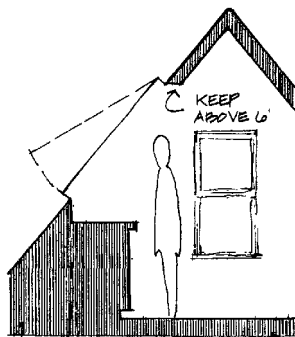
First of all, beware of skylight catalogues, which generally show immense expanses of skylights spreading across the roofline. These walls of sloped glass can generate enough heat in summer to turn a Jacuzzi into cannibal stew. Because of their high light levels, one small skylight with a splayed frame usually is sufficient for an entire room.

A skylight should be accompanied by a window with a normal view. A room with only overhead skylights or high windows can feel like a Chinese tiger cage. Humans need to see a horizon line or a tree or a building—something to help them feel oriented.

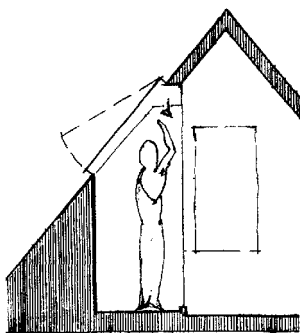
If you're working with a sloped ceiling, you can have a skylight and a view at the same time if you place the skylight at the same level as a standard window. In practice, this means that a kneewall



A SMALL SKYLIGHT CAN LET MORE LIGHT INTO A ROOM THAN A LARGE WINDOW.



SKYLIGHT MAKES A LAV.  
POSSIBLE IN AN OTHERWISE  
TOO LOW CEILING.



SKY LIGHT MAKES A SHOWER  
POSSIBLE.



*This skylight creates headroom over a sink in a tight space.*

has to be short enough—say, less than three feet—so that a roof window above will be at view height. Or it should be high enough—perhaps six feet—to accommodate a vertical window at eye level.

Finally, a skylight can be a great boon in a tight space with inadequate headroom. In a small attic bathroom, we placed a skylight above the sink so that the user could stand up straight. In the same tiny bath, we put a skylight over the shower stall, changing it from a dark cell to an open-air shower. In these cases, we gained the height that the skylight is raised above the roof (four to five inches) plus the depth of the joists and finished ceiling.

With the bathroom skylights, we deviated from many of the principles set forth in this article. As with most aspects of design (and glazing in particular), the exceptions to the general rules often make the most interesting design solutions.

Too often, the daylighting design of a house consists of simple "window selection" from a catalogue. Yet few aspects of house design affect the quality of the building as much as the glazing. And giving windows their proper consideration can even save money—by going for quality of light, not quantity of windows. ■

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