



Shown is a clear-view glass partition system with a swing door.

Photo: Geoff Captain, courtesy of C.R. Laurence

Beyond Energy: How Glass in Architecture Contributes to Occupant Well-Being and Comfort

Glass as a multifaceted solution for post-pandemic commercial and residential construction

Sponsored by The National Glass Association | By *Erika Fredrickson*

Glass is a significant architectural technology featuring versatile applications and the ability to achieve several purposes at once. The multifaceted material is used for transparent glazing in the building envelope to harness natural light and provide views. At the same

time, it can incorporate safety characteristics that prevent severe weather or guard against assault—such as intentional breaking in or bullets—from affecting the building and its occupants. Glazing technologies have improved in the form of high-performance thermal systems, which

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Learning Objectives

After reading this article, you should be able to:

1. Explain how new glass technologies can help support wildlife and bird safety through new anti-collision design.
2. Describe new trends using glass for artistic and decorative expression in workspaces and commercial buildings that promote well-being and comfort.
3. List some ways that daylighting has contributed to the health and well-being of students and workers.
4. Discuss vacuum-insulating glazing and how it is used in various applications for the benefit of occupant safety, comfort, and well-being.

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can help building owners hit or surpass sustainability goals. The wide range of aesthetic possibilities make it a unique design element inside and outside, while still being functional on other levels. More recently, in light of a worldwide pandemic, glass offers a solution for homes and commercial buildings to help decrease virus transmission and make healthier, happier spaces for people.

BIRD-FRIENDLY GLASS

There are so many functions that glass can perform in combination with its basic natural-light qualities. In fact, the glass industry is always finding new ways to meet design needs. One example is bird-friendly glass, which has recently become a hot topic in the glass world.

According to the American Bird Conservancy (ABC), about 1 billion birds die annually from colliding with public and private buildings. The passive, invisible killer? Clear and reflective architectural glass. Windows of all sizes in both commercial and residential buildings in urban, suburban, and rural landscapes are thought to be invisible to most or all birds due to fly-through conditions, reflected habitat conditions, or a black-hole effect.

A fly-through condition is created when architectural elements provide birds with a clear line of sight to sky or vegetation on the other side. A reflected habitat condition is a condition in which the reflected image in glass is undisturbed and blends with the surrounding habitat (i.e., sky, vegetation). A black-hole effect, also known as a “passage effect,” is a condition in which glass can appear black due to lighting conditions and create the appearance of a cavity or passage through which birds can fly. All of these conditions can create hazardous environments for birds.

Specific buildings may accrue more bird deaths than others due to the large amount of glass and vegetation present. Bird collisions occur throughout the world at all times of day, in every season of the year, and under all weather conditions.

Even just 10 years ago, there was little science for bird-safe technology and very few products available to architects. Over the past decade, however, increased media attention to



The City of Seattle’s Cedar River Municipal Watershed Headquarters located in North Bend, Washington, features bird-friendly glass with acid-etched designs so that birds can identify the glazing and avoid collision.

the issue has attracted the interest of the public as well as building industry professionals such as glass manufacturers, architects, developers, and landscape designers. The demand for bird safety has resulted in many products tested and marketed as bird safe, and research on bird-glazing collision prevention has guided the development of bird-friendly building design.

The key to bird-safe glass is in transforming clear and reflective glazing into barriers that birds will see and avoid.

Solutions and Mitigation Strategies

Creating visual markers: Research has shown that birds begin to perceive buildings and houses as objects to be avoided when the distance between features or patterns on the glass is approximately 11 inches, with the most effective pattern distance at 4 inches edge-to-edge or less. The denser the pattern, the more effective it becomes in projecting itself as a solid object that is perceived by birds. The following glass and glazing products can help minimize bird-related injuries by creating visual markers:

- Etch
- Frit
- Film
- Decals
- Fenestration patterns of vertical and horizontal mullions
- Decorative grilles and louvers
- Artwork
- Ultraviolet (UV) patterns

Making architectural glass safe for birds is a responsible bird-friendly building design practice. The application of markers that are visible to birds and humans or visible to birds only and spaced 2 inches vertically or 4 inches horizontally on the outer pane of a window, with markers ideally located on or adjacent to the outer glass surface, will reduce bird-window collisions.

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