EF 6: INCREASE ALLOWABLE SIZE OF SOLAR SHADES

Summary

Issue
Shading devices help combat heat gain and prevent glare, decreasing cooling energy requirements. The Building Code only permits these shading devices to extend 10 inches from the building, thus restricting their effectiveness. They are also not “permitted obstructions” under the Zoning Resolution.

Recommendation:
Treat shading devices the same as awnings and canopies, which are permitted to extend five feet from the building. Also add these devices to the list of “permitted obstructions” in the Zoning Resolution.

Proposed Legislation, Rule or Study
Text Amendments to the Zoning Resolution:

1. Include the following definition of “sun control device” in Section 12-10 (Definitions):

   Sun control device

   A “sun control device” is an architectural projection as defined in Section 202 of the New York City Building Code.

2. Include “sun control devices” as a permitted obstruction in the following sections:

   Section 23-12 (Permitted Obstructions in Open Space)
   Section 23-44 (Permitted Obstructions in Required Yards or Rear Yard Equivalents)
   Section 23-62 (Permitted Obstructions)
   Section 23-87 (Permitted Obstructions in Courts)
   Section 24-33 (Permitted Obstructions in Required Yards or Rear Yard Equivalents)
   Section 24-51 (Permitted Obstructions)
   Section 24-68 (Permitted Obstructions in Courts)
   Section 33-23 (Permitted Obstructions in Required Yards or Rear Yard Equivalents)
   Section 33-42 (Permitted Obstructions)
   Section 37-721 (Sidewalk Frontage)
   Section 37-723 (Circulation Paths)
   Section 37-726 (Permitted Obstructions)
   Section 43-23 (Permitted Obstructions in Required Yards or Rear Yard Equivalents)
   Section 43-42 (Permitted Obstructions)
   Section 62-626 (Permitted Obstructions)
   Section 81-252 (Permitted Obstructions)
   Section 84-135(e) (Limited Height of Buildings)
   Section 84-333(b) (Limited Height of Buildings)
   Section 104-322 (Permitted Obstructions)

Amendments to the New York City Building Code:

1. Include the following definition of “sun control device” in Section 202:

   **SUN CONTROL DEVICE.** An architectural projection that provides protection against solar radiation entering a building through glazed areas and is supported by the building to which it is attached. A sun control device may be a fixed sun control device, a retractable sun control device, a rotating sun control device or other similar device. A fixed sun control device has no moving parts and is typically composed of horizontal overhangs or vertical fins. A retractable sun control device extends or retracts, and in the extended position casts a shadow on designated glazed portions of the building. A rotating sun control device may be of fixed or adjustable length and pivots at its base.
2. Amend Section 3101.1 as follows:

3101.1 Scope. The provisions of this chapter shall govern special building construction including membrane structures, temporary structures, pedestrian walkways and tunnels, awnings [and], canopies[,] and sun control devices, marquees, signs, telecommunications towers and antennas, swimming pools and enclosures, sidewalk cafés, and fences.

3. Amend Section 3105 as follows:

SECTION BC 3105
AWNINGS, [AND] CANOPIES AND SUN CONTROL DEVICES

3105.1 General. Awnings, [and] canopies and sun control devices shall comply with the requirements of this section, the requirements of Chapter 32 for projections over public ways, and other applicable sections of this code.

4. Amend Section 3105.3 as follows:

3105.3 Design and construction. Awnings, [and] canopies and sun control devices shall be designed and constructed to withstand wind or other lateral loads and live loads as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. Awnings shall have frames of noncombustible material, covered with flame-resistant fabric in accordance with NFPA 701, plastic in accordance with Section 2605, sheet metal, or other equivalent material, and shall be either fixed, retractable, folding or collapsible.

5. Amend Section 3202.2.3 as follows:

3202.2.3 Awnings and sun control devices. Awnings and sun control devices constructed in accordance with Section 3105 and supported entirely from the building may project beyond the street line as follows:

3202.2.3.1 Store front awnings. Store front awnings may project beyond the street line not more than 8 feet (2438 mm), provided no part of the awning is less than 8 feet (2438 mm) above the ground or sidewalk level, except for a flexible valance which may be not less than 7 feet (2134 mm) above the ground or sidewalk level, and provided that the awning box or cover does not project more than 12 inches (305 mm).

3202.2.3.2 Awnings and sun control devices over windows or doors. Awnings and sun control devices over windows or doors may project beyond the street line not more than 5 feet (1524 mm), provided that no part of the awning or sun control device is less than 8 feet (2438 mm) above the ground or sidewalk level.

6. Amend Section 3202.2.1.2 as follows:

3202.2.1.2 Architectural details. Details such as cornices, eaves, bases, sills, headers, band course, opening frames, [sun control devices,] rustications, applied ornament or sculpture, grilles, windows when fully open, air conditioning units, and other similar elements may be constructed:

Supporting Information

Issue – Expanded

Prior to the advent of mechanical cooling, standard building design included awnings and other solar shading techniques like inset windows. Early pictures of iconic buildings like the Flatiron Building, City Hall and just about any New York street show awnings over many windows. Although these techniques fell out of fashion, new exterior sun control devices have been developed which save energy, improve user comfort in summer and reduce glare. As the amount of glass in buildings has increased, exterior solar shading has become an increasingly important tool to combat solar heat gain, reduce glare and improve occupant comfort. Since solar shading is a passive design element, it reduces cooling loads on mechanical equipment.

Due to an anomaly in the Building Code and Zoning Resolution, modern solar shades are regulated differently than awnings and face more restrictions on their use. However, in shading and visual impact they are equivalent. This proposal seeks to apply the same standards to exterior solar shades as apply to awnings.

Environmental & Health Benefits
According to analysis by the Office of Long-Term Planning and Sustainability, 15 to 20% of the energy use in New York
City is related to cooling buildings. In the summer, energy consumption for cooling purposes increases dramatically and accounts for 40% of the energy use in the city. Solar shading is a passive design technique that presents a long-term solution to reducing cooling of buildings. Most importantly, sun shade devices can reduce peak energy loads and thus, conserve energy at times when it is most valuable, expensive, and polluting. When mounted on the outside, solar shades can decrease 30% to 60% of air-conditioning loads and substantially lower room temperatures in uncooled spaces. Unlike interior curtains or shades, exterior solar shading devices do not impede window view or disrupt airflow through open windows. As a result, they facilitate passive, natural ventilation.

This proposal was found to have a high, positive environmental impact per building and to impact a small number of buildings. It was thus given an environmental score of 2.

This proposal was found to have a positive, indirect health impact.

Cost & Savings
This proposal is for a code allowance, which will have no direct impact on construction costs.

Precedents
There are no know precedents for this proposal.

LEED
The implementation of this proposal will encourage the use of sun control devices that would assist in LEED compliance across numerous rating systems (including pilot programs under development).

Used in conjunction with daylighting strategies, sun control devices will provide daylight redirection and/or glare control to ensure daylight effectiveness. Therefore, this proposal could facilitate achieving the following credits:

- LEED NC-EQ cr. 8.1 & 8.2, Daylight & Views
- LEED CI-EQ cr. 8.1 & 8.2, Daylighting & Views
- LEED for Schools EQ cr. 8.1 & 8.2, Daylight & Views
- LEED EB-EQ cr.8, Daylight & Views

This proposal could be advantageous for projects utilizing the Performance Rating Method for compliance with LEED Energy & Atmosphere credits. Shading projections in the proposed design, which reduce the solar gains on the glazing, can be modeled to demonstrate energy savings compared to the baseline model which will have fenestration flush to the exterior wall. This would facilitate achieving the following credits:

- LEED NC-EA cr.1, Optimize Energy Performance
- LEED for Schools EA cr.1, Optimize Energy Performance
- LEED EB-EA cr.1, Optimize Energy Performance
- LEED ND-GCT cr.2, Energy Efficiency in Buildings (pilot program)
- LEED for Homes EA cr.1, Optimize Energy Performance

Implementation & Market Availability
Sun control devices are fabricated from standard construction components. In addition to custom devices, many curtain wall and window manufacturers offer them as options in their systems. One concern sometimes expressed about solar shades is ice and snow build-up. This is an issue for all projections such as cornices, eaves, lintels and sills, railings, ornamental work, sculpture, signage and signage supports, air conditioning units, and fire escapes. Snow and ice can be mitigated by providing:

- A canopy or awning at sidewalk level;
- Less solid horizontal surface areas for ice and snow to build up on, such as fin-shaped or vertical louvers, or perforated metal; or
- If horizontal surfaces are used, include projections, such as fins at the edge of a device that will catch snow and ice so that it melts gradually rather than blows off in large portions.

It should be emphasized again that snow and ice is a concern for all projections, and so solar shades should not be singled out on this issue. In addition, sun shade devices are typically arrayed one atop another – falling ice from one would tend to shatter on a device below before falling to the ground.