26 Ensure Operable Windows in Residential Buildings

I. Summary

Issue:
Operable windows permit cooling without power, which allows buildings to remain habitable during power outages and saves energy. New windows are often installed with stops that prevent them from opening more than 4.5 inches, reducing their cooling potential.

Recommendation:
Extend the mandate of the Task Force through Fall 2013 to recommend options for regulating windows that address both child safety and the overheating during blackouts.

II. Proposed Legislation, Rule or Study

Extend the Mandate of the Building Resiliency Task Force:

Extend the mandate of the Task Force through Fall 2013 to examine the impact of window size openings on cooling without power, and recommend options to simultaneous address concerns for child safety and overheating during blackouts that may include the following:

- Eliminating requirements for window stops on windows over a certain height
- Requiring double-hung windows with stops on the lower sash to have an openable upper sash
- Alternative window hardware that allows window sections to “pop out,” opening along all four sides
- Providing tenants without children the option of removing window stops as part of the annual window guard notice, while addressing landlord liability concerns
- Creating parameters for internal temperatures during blackout that could be met through prescriptive or performance means

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III. Supporting Information

Expanded Issue and Benefits:

From 1997-2010, 152 New Yorkers died from heat stroke,[i] often associated with power outages. During heat waves, mortality from other diseases also increases, as the extreme heat exacerbates existing conditions. The Department of Health and Mental Hygiene estimates that deaths from existing conditions, such as cardiovascular and pulmonary disease, increased by 6.5% during 12 prolonged heat waves over that period, representing approximately 1,090 additional deaths.

Extreme heat, defined as a heat index greater than 100ºF for one day or greater than 95ºF for two or more days, occurs roughly four times a year in NYC. According to a recent study, temperature-related deaths in Manhattan could rise 20% by the 2020s and, under worst-case scenarios, 90% by the 2080s.[ii] While heat-related deaths may not be directly related to the size of window openings, if the power fails during a heat event – and extreme heat is a common cause of power failures – the only way to cool an apartment is to open the windows. This is of particular concern for older residents, who are more vulnerable to overheating and whose limited mobility means they may be unable to leave buildings when elevators fail during a blackout.

Before mechanical ventilation existed, natural ventilation via windows and skylights was the only way to flush stale, hot or dirty air out of an interior space. New York City's ground-breaking Tenement House Act of 1901 ensured that all apartments would have access to fresh air and natural light. Operable windows are still an efficient way to provide fresh air and can substantially reduce energy use, especially during spring and fall when the temperature and humidity match human comfort levels. In homes where air conditioning is not used, operable windows function as the main source of temperature control.

For many years the New York City Building Code has required naturally ventilated residential buildings to provide a minimum openable area to the outdoors that is equivalent to 5 percent of floor area. Buildings that mechanically supply fresh air into habitable spaces must also provide openable windows (though the minimum operable area required is reduced to 2½ percent of the floor area[iii] if a minimum of 40 cubic feet per minute of fresh air is supplied).

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[i] New York City Department of Health and Mental Hygiene, *Health Advisory #11 Heat-Related Morbidity and Mortality in New York City*, May 26, 2011.

[ii] Freeman Klopott, *Manhattan Heat Deaths Seen Rising 20% in 2020s as Climate Warm*, BLOOMBERG, May 19, 2013, http://www.bloomberg.com/news/2013-05-19/manhattan-heat-deaths-seen-rising-20-in-2020s-as-climate-warms.html.

[iii] CITY OF NEW YORK, NY, HOUSING MAINTENANCE CODE §1203.4.1.2 (2009) available at http://www.nyc.gov/html/dob/downloads/pdf/cc_chapter12.pdf. (The minimum operable area to the outdoors shall be 5 percent of the floor area of the habitable space to be ventilated. Every opening providing required natural ventilation shall be at least 12 square feet, providing a minimum of six square feet of openable space. Exceptions: 1. Where fresh air is furnished in any habitable room or space by mechanical means supplying a minimum of 40 cubic feet per minute, the free openable area of the openings may be reduced to 2½ percent of the flow area but each such opening shall provide not less than 5½ square feet of openable area. 2. The minimum free openable area of a mullioned casement window shall be 5½ square feet provided that the minimum ratio of floor area to openable area is met); CITY OF NEW YORK, NY, HOUSING MAINTENANCE CODE § 27-2058(c) (2009) available at http://www.nyc.gov/html/dob/downloads/pdf/cc_chapter12.pdf. (1. The total area of all windows in the room shall be at least one- tenth the floor area of such room... 3. At least one-half of every required window shall open, except that for a mullioned casement window a minimum of five and one-half square feet is sufficient. In a room where a centralized mechanical ventilating system provides forty cubic feet of air per minute, twenty-five percent of the window area or five and one-half square feet of such area, whichever is greater, shall be openable).

In 1976, in response to children accidently falling out of apartment windows, the New York City Department of Health and Mental Hygiene enacted Window Guard Regulations to require landlords, building managers or owners (in condominium units) to install window guards and/or stops. They are required in all windows of apartments where children 10 years or younger reside, except at fire escapes, and must reject the passage of a solid 5 inch sphere.[iv] This is straightforward for some windows as guards on double hung windows are now common in the city. Depending on the configuration, some pivot windows present particular complications for using guards, in which case window stops must be installed to prevent the window opening beyond 5 inches.[v]

Window stops are inexpensive, simple to install and not as unsightly as guards. For these reasons, many building owners install all windows with stops in order to comply with the Department of Health, whether or not children reside in the apartment. Manufacturers of double hung windows even include them as an option in the window assembly.

Once windows have stops, however, ventilation is reduced. While tenants or owners of apartments without children 10 years or younger can request the removal of window stops, those with children 10 years or younger cannot, many tenants do not know they have this option, and some building owners are unwilling to allow the removal of stops due to concern about legal liability. Moreover, the use of stops has grown more widespread as recent residential construction has incorporated large fixed expanses of glass with minimal openings, increasingly turning to pivot-style windows.

There are several potential options, which require further consideration, to both ensure child safety and protect against overheating:

1. The location of an opening should be considered along with its size. For example, balcony railings typically have a height of 42", above which opening sizes are not limited. It would be consistent to not limit opening sizes on windows starting more than 42” from the floor, or some higher level to take into account the ability to crawl onto furniture. In addition, double-hung windows with stops on the lower sash could be required to have an openable upper sash.

2. In new buildings, openings might be provided in the form of: hardware that allows window sections to “pop out,” opening along all four sides; an additional window; operable spandrel or louver sections; or different window designs.

3. Tenants without children could be annually presented with the option of removing window stops, while also providing landlords protection from any associated liability. Tenants could be given the opportunity to “opt out” when they return the annual window guard notice.

[iv] CITY OF NEW YORK, NY, HOUSING MAINTENANCE CODE § 12, (2009). (Requires the installation of window guards “on all windows except fire escape access windows and secondary egress windows in first floor apartments, where the fire escapes are on the upper floors. Choice of unguarded window is optional in latter cases.” Section 12-10 specifies that window guards must be at least 15 inches high and capable of rejecting “the passage of a solid five (5) inch sphere at every space and interval.” That section also requires the installation of stops to prevent “the lower window from being raised more than 4½ inches above the lowest section of the top horizontal bar of the window guard.”)

[v] CITY OF NEW YORK, NY, HOUSING MAINTENANCE CODE § 12-11 (2009), available at http://www.nyc.gov/html/doh/html/win/wincha.shtml#12-11.

4. The city could develop parameters for internal temperatures during blackouts such as limiting them to no more than 3 degrees F above external temperatures, and provide prescriptive and performance-based compliance options. These measures might include limiting glazing area, providing blinds or external shutters, providing additional ventilation openings, providing higher performance glazing, carrying out natural ventilation calculations to determine ventilation area, or requiring standby power to internal ventilation systems (which usually have relatively small power requirements).

Implementation:

Marvin Windows manufactures all of its sashes with optional limiters that are installed in the field. They can be removed with normal tools.[vi] Pella Windows produces vent stops for their double hung windows only.[vii] The vent stops can be popped out and are not tamper proof. Their double hung windows require guards or stops as per the requirements of the Department of Health.

Cost:

No cost estimation was performed for this proposal.

Sources:

All projects pursuing LEED certification must meet minimum indoor air quality performance (AE Prerequisite 1), in conformance with ASHRAE Standard 62.1-2004. Buildings that are not mechanically ventilated are required in Section 5.1 to have all naturally ventilated spaces permanently open to and within 25 feet of operable wall or roof openings and that the opening area be at least 4% of the net occupiable floor area.

[vi] Telephone Interview with Doug Andersen, Technical Staff, Marvin Windows (June 10, 2009).
[vii] Telephone Interview with Mr. Cricket, Technical Staff, Pella Windows (June 10, 2009).