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Window Fall Prevention Device Code

Legislative report to the chairpersons of the House and Senate Committees with jurisdiction over health and human services as required by 2007 Minnesota Statutes 16B.61, subd. 3c.

MINNESOTA DEPARTMENT OF
LABOR & INDUSTRY

February 15, 2008

Background

During the 2007 session, legislation was passed to direct the commissioner of the Department of Labor and Industry (DLI) to adopt rules for window fall prevention devices as part of the Minnesota State Building Code. The directive impacts section R613.2 – Window sills of the *2006 International Residential Code* (IRC) and section 1405.12.2 – Window sills of the *2006 International Building Code* (IBC).

Section R613.2 of the 2006 IRC was deleted in its entirety and noted in the text of Minnesota Rule Chapter 1309 of the *2007 Minnesota State Building Code* (MSBC). During the Minnesota Rule 1309 adoption process, it was understood that several other states had deleted these portions of the model code documents due enforcement and uniformity concerns. DLI's Construction Codes and Licensing Division's staff believed it was best to delete the model code text from the 2006 IRC rather than have potential conflicting requirements for window fall prevention between the model code language and the pending legislative outcome requirements.

The window fall prevention model code language also received several requests for a public hearing pertaining to the adoption of the 2006 IRC and Minnesota Rule Chapter 1309. Public hearing requests were received from the Window & Door Manufacturers Association and other Minnesota-based window manufacturers. The manufacturers' requests questioned the technical merit submitted to support the 24" sill height threshold established to require a window fall prevention device. They noted the technical flaws would create code interpretation and enforcement difficult resulting in non-uniform enforcement. Also, the National Safety Council (NSC) urged the International Code Council (ICC) not to approve the minimum-sill-height requirement without a complete study of all safety issues.

Minnesota Rules, Chapter 1305, that adopts the 2006 IBC as part of the 2007 MSBC, was completed and published prior to the completion of Minnesota Rules, Chapter 1309. By contrast, section 1405.12.2 of the 2006 IBC (that pertains to window fall prevention) was adopted without opposition and prior to the legislation requirements.

The legislative directive requested that any rule language developed should require compliance with standards for window fall prevention devices developed by ASTM International. It should be noted the standards ASTM F 2006 and ASTM F 2090 (referenced in the 2006 IBC and IRC model code documents) are currently undergoing extensive revision by the ASTM F15 Window Fall Prevention Standards Committee. These standards were initially based on window guards and not necessarily for the variety of after-market, window fall prevention devices currently available.

Several Window Fall Prevention Advisory Committee members (see "Committee formulation" below) are also involved with the ASTM F15 Window Fall Prevention Standards Committee reviewing those referenced standards. The ASTM F15 committee's activities anticipate that draft documents for standards ASTM F 2090 and ASTM F 2006 will be ready for ballot mailings to its members in February 2008.

Key directives assigned by legislation

- Window fall prevention devices shall include, but not limited to, safety screens, hardware, guards, and other devices that comply with the standards established by the commissioner of labor and industry.

- The rule shall require compliance with standards for window fall prevention devices developed by ASTM International, contained in the International Building Code as the model language with amendments deemed necessary to coordinate with the other adopted building codes in Minnesota.

- Rule text shall establish a scope that includes the applicable building occupancies, and the types, locations, and sizes of windows that require the installation of fall devices.

- The rule language developed shall be effective July 1, 2009.

- By Feb. 15, 2007, the commissioner of the Department of Labor and Industry (DLI) must report to the chairpersons of the house and senate committees with jurisdiction over health and human services about the status of the window fall prevention device code rulemaking.

Window Fall Prevention Advisory Committee formulation

Thirteen invitation letters were sent to agencies, groups and organizations having a vested interest and valuable input requesting their expertise as a committee member for the Window Fall Prevention Advisory Committee (WFPAC). Eleven individuals responded to the invitations and submitted completed Construction Codes and Licensing Division, WFPAC Appointment Forms to conclude the committee formulation. The Building Owners and Managers Association (BOMA) of St. Paul and Building Owners and Managers Association of Minneapolis did not reply or acknowledge to the invitations sent.

WFPAC members

- Richard Lockrem (committee chair)
  Construction Codes and Licensing Division

- Erin Peterson
  Minnesota Safety Council

- Rick Davidson
  Association of Minnesota Building Officials – City of Maple Grove

- Karen Linner
  Builders Association of Minnesota

- Mark Ryan
  American Institute of Architects Minnesota – J. Buxell Architecture, Inc.

- Michael Fischer
  Window and Door Manufacturers Association – Kellen Co.

- Mark Mikelson
  Andersen Windows, Inc.

- Glen Bergstrand
  Minnesota Fire Marshal Office

- James Graham
  (Representing himself)

- Jack Horner
  Minnesota Multi Housing Association

- Sheran McNiff
  Minnesota Department of Health – Environmental Health Division

- Susan Gerberich
  University of Minnesota – Regional Injury Prevention Research Center, Division of Environmental Health Services.

WFPAC study

The WFPAC conducted five meetings during August to October 2007. The first three meetings primarily focused on the role and responsibility of the committee, the types of fall prevention devices available, and discussion about mandatory and volunteer fall prevention programs that already exist throughout the nation. The committee's fourth and fifth meetings concentrated on the development of proposed rule language to be submitted for consideration. Additional meetings may be required for further review regarding the draft rule language and preparation of the statement of need and reasonableness (SONAR).

After the first meeting, it was determined that WFPAC members needed to learn more about the industry's current and future window fall prevention devices. The group's second meeting reviewed some current after-market devices and a safety screen product. Kathy Coen, of Andersen Windows, Inc., discussed four after-market devices that were independently tested. Coen participated as an interested party of the WFPAC and as chairperson of the ASTM F15 Window Fall Prevention Standards Committee.

Some of the window fall prevention devices reviewed by the WFPAC include:

- window stops;
  - stainless steel, flip-type style with manual reset
  - pin-and-chain
  - suction-cup style
- window guards (bar device);
- vinyl window with "night latch" (device to limit the window opening); and
- safety screens.

Of the devices independently tested, the flip-type bracket and pin-and-chain were determined to be the most intuitive. Two concerns were raised with the after-market products. First, bending of the bracket is a concern that could prevent the window from moving either up or down thereby making it unusable for escape and rescue purposes. Secondly, the warranty of the window units is also an issue for after-market products. Several of these after-market devices are required to be attached to the existing window unit and that could void the window manufacturer's warranty.

Several WFPAC discussions focused on child fall prevention safety and emergency escape and rescue. Section R310 of the 2006 IRC and section 1026 of the 2006 IBC pertain to emergency-escape and rescue-opening requirements. Each of these code sections identify the minimum window requirements for emergency escape and rescue openings, include the maximum height that the bottom of the window opening needs to be above the finished floor and include operational constraints for the openings (windows). The model code language was established to incorporate minimum-opening requirements to permit firefighters in full gear to enter a structure for rescue operations and offer occupants an adequate opening to escape.

These issues have a considerable impact in the preparation of rule language to address window fall prevention. The maximum height from the floor to the bottom of a window opening is required be 44 inches. Operational constraints require the window to be operable from the inside the room without the use of keys or tools. It also states that bars, grilles, grates or similar devices are permitted to be placed over the window opening provided that the minimum-clear-opening requirements for escape remain compliant. Further, the code requires that such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that required to for normal operation of the window.

When the ICC code hearings were conducted about window fall protection, the sections (R613.2 of the 2006 IRC and 1405.12.2 of the 2006 IBC) became code language despite the lack of current statistical data. The proponents of this new language used window fall data prior to 1991 during the code development cycles of the 2006 IRC references. Some data provided at the code hearings did not reflect the significant reduction in falls based on Consumer Product Safety Commission (CPSC) statistics since 1991. The proponents also stated "there will be no additional cost impact because of this change." The proponents believed that by just using a smaller height window or raising the sill height would be the solution.

Typical construction practice is to provide a rough opening header height of 6 feet 10 ½ inches (82 ½ inches) from the bottom of the header to the floor sheathing. This conventional framing practice allows the doors and windows to have horizontal site lines that most people are accustomed to.

With the addition of a fall prevention device, there will be a cost impact. Most double-hung windows will require a fall prevention device because they will have a sill height of less than 24-inches above the finished floor. According to the window manufacturers, the double-hung-type window represents a major market share of windows manufactured in the country. A cost effect will be present, by either altering the construction method, manufacturing window unit compliant to the code requirements and ASTM standards or installing an after market product which may void the window warrantee.

Code sections R613.2 of the 2006 IRC and 1405.12.2 of the 2006 IBC will be further challenged during the International Code Council (ICC) code development hearings during February and March 2008. These code hearings will determine the code text for the 2009 IBC and IRC. It is anticipated that several rules changes will be submitted and generate some lengthy discussions.

The ICC Code Technology Committee will propose language to clarify screens and opening-limiting devices. Opening-limiting devices allow the window to open to a specified opening height or width depending on the style of window. Typically, the devices will allow the window to open to a point such that a four-inch sphere cannot pass through. This type of device appears to be a solution to the unattended open window issue, but it must also provide the required emergency escape and rescue-opening requirements when required by the model codes. The device needs to be operational from the inside of the room without the use of keys, tools or special knowledge. In summary, it would provide a window that can limit the opening that a child cannot pass through, yet operable by a child for emergency escape and rescue.

The WFPAC meetings also discussed several window fall protection programs currently in use.

One of the first window fall prevention programs was in New York City, which reported 217 window falls in 1976 and enacted its Window Falls Law. Three years later, the city's reported falls were reduced to 80.

In fiscal year 2003, the New York City Department of Health identified nine window falls; seven of them were considered "preventable" (i.e., properly installed window guards on a multiple-dwelling window might have prevented the fall of a child 10 years of age or younger).

Despite the apparent success, the law did not incorporate the ASTM standards which created some safety issues for the same occupants they were trying to protect. The safety issues pertain to the guards that were installed; they limited emergency escape and rescue from the interior and exterior of the window opening. The law required the installation of

window guards at the window opening and installation of L-shaped stops to restrict further opening of the window unit beyond that of the guard. The guard and L-shaped stops are required to be fastened to the window unit with one-way screws (non-reversible). The WFPAC raised concern regarding the limitation of emergency escape and rescue in the event of emergency.

Elsewhere, volunteer programs have proven to be successful. A few of these include the:

- Window Fall Prevention Program, "Kids Can't Fly," in Boston,
- National Safety Council's "Keeping the Promise of Window Safety," and
- Andersen Window Corporation's "Lookout For Kids."

Between June and December 1993, Boston reported 18 children falling from open windows resulting in three fatalities. The city's data showed that each of the window falls involved children less than six years of age and residents of low-income neighborhood, including subsidized housing. Seventy-eight percent (including two fatalities) of the falls occurred during the months of June through August and 17 percent occurred in the Fall season. Eighty-three percent of the falls occurred from second and third stories, 6 percent were from the first floor, and 11 percent of the incidents were unknown. It was noted that a guardian was reported to be home at the time of each incident except for one.

The "Kids Can't Fly" program in Boston identified an outcome that showed an 83 percent decrease in the number of window falls from 1993-1995. Its goals were to:

- Increase awareness of the danger posed by open windows by conducting city-wide education and outreach efforts;
- Expand outreach and make available information and technical assistance to the public on the devices that might mitigate this serious problem;
- Provide a forum for discussion with industry representatives on the design and manufacture of an operable window guard and improved designs thereafter;
- Expand inter-agency cooperation and involvement and encourage property owners to voluntarily install window guards on windows in dwellings occupied by children aged six or under;
- Identify and track voluntary installations of window guards;
- Improve cooperation among hospitals for accurate tracking of accidents; and
- Participate in industry discussion about product specifications and standards.

The WFPAC did not specifically review and discuss the merits of each volunteer safety program currently available, but it did unofficially agree with goals and concepts of the Boston "Kids Can't Fly" program. Each of the programs has similar goals and objectives to educate and encourage volunteer window safety.

Erin Petersen, from Minnesota Safety Council, addressed the WFPAC and described the agency activities related to safety in the home. Petersen provided handouts about the Window Safety Task Force, a "Kids Can't Fly" brochure, and a "Preventing Falls from Windows" flier and referenced a current New Jersey Fall Prevention Program. She emphasized the need to change the current public mindset to focus on safety as a priority

and noted the statistics that show approximately 5,000 preventable falls each year (total falls not just window related) around the world.

Similar to the Boston's "Kids Can't Fly" findings, Petersen said fall incidents typically involve children less than six years of age, are predominately male, generally have a lack of supervision, and incidents commonly occur during the spring and summer months. She also noted that low income and urban neighborhoods are a prevailing factor. Petersen stated the Consumer Products Safety Commission (CPSC) encourages the use of approved window guard devices by means of voluntary installations.

Jon Roesler, Epidemiologist Supervisor from the Minnesota Department of Health gave a brief presentation to the WFPAC in October 2007. Roesler explained the methodology of "external cause codes" and severe injury in regards to the methods of reporting injuries. He also provided narratives from injury reports based on the keywords of window, screen and story. Many of the narratives were related to beds or other furniture adjacent to windows, child horse play, individuals leaning against the screen, and others incidents noted as falls from windows.

Roesler provided charts pertaining to falls from windows resulting in severe injury. In Minnesota, four deaths resulted for children less than 10 years of age between 1996 and 2006. The program concluded by Roesler offering options to obtain more conclusive data by improved methods of reporting injuries related to window falls. The methods of improvement include: refining case definitions, breakdowns by type of injury, newspaper clippings, chart reviews and child fatality reviews.

Michael Fischer, Director of Codes and Regulatory Compliance for the Window & Door Manufacturers Association, gave a presentation to the WFPAC about window safety and emergency escape and rescue issues. Fischer explained the performance issues for windows and the minimum-code criteria for emergency escape and rescue openings. During the program, he illustrated the impact of establishing a minimum-window-sill height with comparisons to current compliant egress windows manufactured by Pella Windows in relation to typical framing rough opening header heights. Of the 19 egress-compliant, double-hung widows he reviewed, all but three would require fall prevention devices or mechanisms based on a window sill height of 24-inches above the finished floor.

Fischer's program also mentioned child window fall factors. These factors include: inadequate supervision; furniture placement; urban, low-income housing; most serious injuries occur in three- to five-year-age group; and non-accidental causes have been cited as a significant contributing factor. These factors were also previously noted by Erin Petersen of the Minnesota Safety Council's presentation to the committee.

Fischer's program listed safety recommendations from numerous agencies and organizations involved in child window fall safety. These include: window safety education programs, parental supervision, furniture placement, use of the upper sash of

double-hung windows for ventilation, and installation of approved window guards or other devices.

The program concluded with the illustration, "Child Safety Check – Can a child reach both latches to open the window?" The illustration allows the user to input various window width and height dimensions for comparing a child's reach range to open a double-hung window. References to double-hung-type windows are common in discussions since this window type represents a major portion of the industry product production.

Sheran McNiff, of the Department of Health, provided the WFPAC with the following update regarding agency activities pertaining to window fall prevention. The Injury and Violence Prevention Unit and the Community & Family Health Division currently work together to address the statutory language regarding window safety education. Staff from both Injury and Violence Prevention and Community & Family Health did attend WFPAC meetings with manufacturers of windows, building officials and others to collaborate and provide data regarding implementing legislation regarding window fall protection devices.

Maternal Child Health Section staff in the Community & Family Health Division said they will update their "Home Safety Checklist and Guidebook" to reflect current best practices and research related to window safety and window fall prevention. They will also develop media strategies to increase community awareness regarding window safety during the April 2008 National Window Safety Week.

The Department of Health's Injury and Violence Prevention Unit continues to gather and analyze data regarding severe injuries related to falls from windows. Together with staff from the Community & Family Health Division, they will facilitate a meeting related to window safety education. The meeting will gather input from interested partners in ways to educate consumers regarding window fall prevention.

Draft rule language

Jim Graham, a WFPAC member who was actively involved in the 2007 legislative hearings, said the legislative intent was primarily focused on apartment-type structures. With this input, the WFPAC focused its rule draft language to address IBC Group R-2 occupancies, which include apartment structures.

> Group R-2 Occupancies (2006 International Building Code Section 310.1)
>
> R-2 Residential occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:
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> Apartment houses
> Boarding houses (not transient)
> Convents

Dormitories
Fraternities and sororities
Hotels (nontransient)
Monasteries
Motels (nontransient)
Vacation timeshare properties

Congregate living facilities with 16 or fewer occupants are permitted to comply with the construction requirements for Group R-3.

Section 1026.1 of the 2006 IBC regarding emergency escape and rescue openings requires that basements and sleeping rooms below the fourth story above grade plane have at least one emergency escape and rescue opening as the general provision.

Exception #1 of Section 1026.1 allows the omission of the emergency escape and rescue openings in other than Group R-3 occupancies provided the building is equipped throughout with an approved automatic sprinkler system in accordance with IBC section 903.3.1.1 (NFPA 13 system) or section 903.3.1.2 (NFPA 13R system).

Section 1026.4 of the 2006 IBC also requires the installation of smoke alarms complying with IBC 907.2.10 when bars, grilles, grates or similar devices are installed at emergency escape and rescue window openings in existing structures.

The rule language as currently drafted does not include text regarding existing buildings undergoing renovation, however, the subject has been raised since the committee's final meeting.

The draft rule language is being proposed for Minnesota Rule Chapter 1303, Minnesota Provisions to the Minnesota State Building Code, to address the fall prevention requirements for the International Residential Code and International Building Code documents. DLI's Construction Codes and Licensing staff decided that Minnesota Rule 1303 is the best avenue to address this issue rather than open both Minnesota Rules 1305 and Minnesota Rule 1309.

The following is **draft** language and subject to further review by the committee. Some WFPAC members sent several e-mail messages to each other after final meeting to request further review of the sill height dimension height. Additional meetings are anticipated to complete the sill height dimension and SONAR needs for the rule. The simplest solution to address window fall prevention in rental dwelling units is to empower tenants with children, the right to request the landlord to install an approved window fall prevention device at windows posing a fall hazard.

In accordance with Minnesota Statutes, §14.101, subd. 1, DLI published a Request for Comments in the *State Register* on Sept. 10, 2007, at 32 SR 468. DLI received two comments during the comment period, which expired on Nov. 9, 2007.

Draft Rule

DRAFT LANGUAGE (Nov. 8, 2007)

1303.2300 WINDOW FALL PREVENTION

Subp. 1 Scope. The provisions of this section shall govern the requirements, methods and devices used to provide window fall prevention for the occupancy uses under 1303.2300 subpart 2.

Subp. 2 Occupancy. Window fall prevention methods and devices shall be provided in Groups R-2 occupancies.

Subp. 3 Window fall prevention required. All windows requiring compliance under 1303.2300 subpart 1 shall be provided with safety screens, guards, or other devices complying with ASTM F 2006 or ASTM F 2090.

Exceptions:

1. Fixed, non-operable windows.
2. Windows located in basements.
3. Windows located in below the first story above grade plane.
4. Operable windows where the opening is such that a 4-inch diameter sphere cannot pass through.
5. Windows where the bottom of the clear opening is located beyond 44-inches (1,118 mm) measured from the floor.

Subp. 4 Emergency escape and rescue openings. Emergency escape and rescue openings shall be provided with fall protection devices complying with ASTM F 2090.

Subp. 5 Building additions; addition or replacement of windows. When building additions occur or when windows are added or replaced requiring a permit, windows must comply with 1303.2300.

Conclusion

The Department of Labor and Industry concludes the WFPAC has worked diligently to review and respond to the task assigned. Its members have reviewed and discussed the events leading to the code change requirements of the model codes and Minnesota Rule chapter 1309 adopted by the state of Minnesota pertaining to window fall prevention.

The death of a child from falling from a window can be tragic, as well as a death or injury caused by entrapment during a fire. The potential impact of these competing safety concerns that can result in injury or death must be further studied and prioritized. Each of these circumstances pertaining to window safety is complex and has not been taken lightly. A solution for one issue should not create an equal or greater hazard as a result. The solutions regarding fire and falls as pertaining to windows is neither, simple or singular. If code language is determined to be required, the language should be drafted to address occupancy groups having the greater window falls occurrences. Based upon discussions that occurred during the 2007 legislative hearings, apartment occupancies and similar uses need to be addressed. The committee's draft rule language will require window fall prevention on new structures of Group R-2 occupancies. The scope of the Minnesota State Building Code and the model codes adopted by the State of Minnesota do not include retroactive provisions for existing structures and neither does the draft rule language.

The WFPAC notes that window fall prevention issues can be addressed through increased awareness, education and voluntary mitigation programs for window fall prevention throughout Minnesota. Education and awareness can alter the current public mindset to focus on safety as a priority, rather than state-mandated requirements that only address a small percentage of child injuries in Minnesota. An extensive educational effort will effect both new construction required by the code and offer knowledge that will have an impact on existing construction.

Minnesota experienced four child window fall fatalities between 1996 and 2006. The WFPAC acknowledges the directive to provide rule language to address window fall prevention requirements for Group R-2 occupancies as identified in the 2006 International Building Code (which includes apartment buildings as similar uses) to help address occupancy groups that have had more window fall occurrences.

The WFPAC members recommend that the Department of Health should be allowed the time and provided the resources to develop a system of collecting accurate data specific to window falls involving children before expanding any mandatory requirements for mitigation in Minnesota.