



Risk Assessment and Safety Evaluation
of
Fall Potential from Windows, Balconies and Decks
at
Washington State University
Pullman, Washington

STATEMENT OF PURPOSE

Safety Management Resources has been retained by Washington State University (WSU) to perform a risk assessment and safety evaluation of the university's residence halls and associated properties. The primary focus of this assessment and evaluation is to address the potential for falls from windows, balconies, decks, and other elevated surfaces, as well as the potential for injuries incurred from related falls from these elevations. This work is in furtherance of the university's efforts to enhance and ensure the safety of students, faculty, staff, and campus visitors relative to these areas of potential exposure.

This report is intended to convey the observations, findings, and guidance developed as a result of our assessment and evaluation completed for the benefit of WSU.



BACKGROUND

A WSU student suffered serious injuries in August of 2017 as the result of a fall from a second-story window at the Community/Duncan Dunn Residence Hall. This accident has prompted the university's administration to provide for an independent assessment of the condition and construction of the windows and other elevated surfaces present in the residence halls throughout the campus. This process is to include a review of matters which can be reasonably expected to impact safety related to the potential for falls from windows, balconies, decks, and elevated surfaces in the residence halls. The stated objective of this project is to ensure that reasonable controls and protection are in place to prevent falls from these windows and elevated surfaces.

With the safety and welfare of all students being of critical importance, it is imperative that the efforts put forward to analyze the level of protection and oversight be completed with a proper perspective. Serious injuries resulting from students unintentionally falling from the windows of university or college-owned facilities are rare, but highly reported, events in the United States. With no intention of avoiding an introspective review of an individual incident, or the issue of unintentional falls as a whole, it is noteworthy that the frequency of this type of accident is quite low on the nation's campuses¹ and on the campus of WSU.

While no comprehensive national database of injuries and deaths among college and university students is maintained, the USA Today has reported on issues related to student safety in higher education on multiple occasions. A 2006 story reviewed 620 deaths occurring over a six-year period among this population, finding that fewer than 40 of these incidents resulted from falls of all types on campus. Only a small percentage of these 40 incidents were attributed to unintentional falls from windows, decks, and balconies, with many attributable to suicide and falls of an unrelated nature.² With over 3,000,000 students living in college and university housing across the country³, the number of unintentional falls from windows constitutes a rare occurrence on the nation's campuses.

Although previous injuries related to falls from windows, balconies, and other elevated surfaces have been reported in the WSU/Pullman community, the preponderance of these incidents

¹ United Educators Risk Research Bulletin: *Reducing Serious Injuries in Residence Halls with Informed Facility Management*. <https://www.edurisksolutions.org/WorkArea/DownloadAsset.aspx?id=2048>

² USA Today, *In College, First Year is by Far the Riskiest*. https://usatoday30.usatoday.com/news/nation/2006-01-24-campus-deaths-cover_x.htm

³ Association of College and University Housing Officers – International, *U.S. On-Campus Housing Data, 2016*. <http://www.acuho-i.org/resources/cid/5800>

involving WSU students have occurred in off-campus structures, where the institution's control and impact are less direct.

It is noteworthy that numerous organizations such as the U.S. Consumer Product Safety Commission, the National Safety Council, Safe Kids Worldwide and the American Architectural Manufacturers Association are working to address the issue of unintentional falls from windows. In fact, numerous educational campaigns and efforts to enact legislative solutions to this issue are ongoing. However, the catalyst of these efforts has focused solely or primarily on children under twelve years of age. This is due to the fact that unintentional falls from windows are comparatively common among this population, with an average of over 25 fatalities per year reported to the U.S. Consumer Product Safety Commission. Over two-thirds of those injured are under five years of age.⁴ This is not to minimize the issue of college-age students being injured, but serves as a valuable point of perspective.

CAMPUS SURVEY

The complexity and scope of this review is significant given the sheer number of windows present in the residence halls and the broad range of window styles, age, configuration, and construction present on campus. This review encompasses approximately 5,000 windows present in housing units, including those in residence rooms and public areas. With the age of the residence halls on campus ranging from those constructed as early as 1893 to new construction completed in 2015, the range of window styles and configuration to be addressed is quite broad.

This physical assessment was initiated by a visit to the Pullman Campus of WSU during the week of October 22, 2017. During the course of this visit, Mark Briggs and Henry Briggs were accompanied by WSU professionals as they visited and viewed the exterior of each of the 22 residence halls present on campus. Additionally, the interior public spaces and at least one resident room, or an exemplar of each, were observed and appropriate window and railing measurements recorded. In those instances where multiple buildings share design and construction standards, only a single residence room was inspected in order to minimize the disruption of the resident students.

Physical observations have been supplemented by informal conversations with multiple student residents during the site visit. Additionally, formal interviews have been completed with individuals representing WSU, the City of Pullman, WSU Student Government, and others. The purpose of these interviews was to assess and understand the operations and activities transpiring

⁴ U.S. Consumer Product Safety Commission, Window Falls Prompts CPSC to Issue Warning. <https://www.cpsc.gov/content/window-falls-prompts-cpsc-to-issue-warning>

within these buildings, as well as the applicable codes, rules, and regulations. A listing of the individuals interviewed is included as an appendix to this report.

During the site visits, attention was given to the design, construction, and condition of the windows in each public area and in each resident room surveyed. Additionally, the presence and use of any related safety devices such as window stops, casement restrictors, and security screens were noted.

In order to ensure a thorough assessment of all causal factors, the presence and condition of furniture or other items which might impact access to each window was noted. This assessment was supplemented with a review of the furnishings provided in WSU residence halls, as well as related WSU policies and procedures provided to, or easily accessible to, students residing in WSU residence halls.

These inspections, interviews, observations and reviews have been completed in order to ensure the provision of a comprehensive assessment and evaluation.

FIRE AND LIFE SAFETY ISSUES

The State of Washington and the City of Pullman have adopted and enforce the International Fire Code (IFC) for all campus buildings. This code mandates specific standards for new or renovated residence hall sleeping rooms, including the provision of an exterior emergency escape opening. This requirement is typically met by providing a window which is code compliant. In simple terms, all windows on or below the third floor must be able to be easily opened, without restrictions or impediments, to provide at least 5.7 square feet of opening with a minimum width of 20" and a minimum height of 24".

It is critical that any actions that would impact the overall size of each emergency escape window, as well as the width and height of each window, be completed in full compliance with the IFC as enforced by the City of Pullman Fire Department. This issue was discussed in detail with the Chris Wehrung, the Pullman Fire Marshal. Mr. Wehrung indicates that the department enforces the IFC with minimal variance.

With the application of the IFC requirements, the installation of devices intended to prevent falls from open windows or to limit the opening height and/or width of a window is notably restricted. These limitations directly impact many of the windows on the first, second, and third stories of the residence halls, effectively limiting the available options on many of the residence halls.

ADDITIONAL SAFETY CONSIDERATIONS

WSU administrators and public safety officials are mindful of the potential for emergencies, other than structure fires, which may necessitate the quick and efficient evacuation of a residence hall. Dependent upon the circumstances, the presence of an active shooter, a bomb threat, or a chemical release may dictate the need for residents to promptly evacuate the building. It is imperative that any solution designed to address the potential of students accidentally falling from windows give appropriate consideration to the potential need for residents to evacuate a residence hall in the event of an emergency.

OBSERVATIONS AND FINDINGS

WINDOWS AND WINDOW OPENINGS

Typical of mature university campuses, the age and construction of the residence halls at WSU varies greatly, ranging from historical structures to those of very modern design and construction. Resulting variances include the types and characteristics of windows provided in the residence halls, as well as the design, prevalence, and accessibility of balconies and decks.

Window construction and design issues of note include the following:

- Construction type and materials;
- Total size of windows;
- Size and design of operable opening window dimensions;
- Height of lower window sill from surrounding surfaces;
- Presence and style of any window fall prevention device; and
- Presence and style of construction of window opening control devices designed to control an opening to a pre-determined limit.

Given the great diversity of window size, style and design, it is typical that a significant variance in each of the factors noted above would be encountered in the WSU residence halls. This was, in fact, the case, with the following differences observed:

- Window styles include casement, single-hung, double-hung, and slider;
- The operable range in which window are able to be open horizontally ranges from a minimum of approximately 11" to a maximum of 57", with all windows being compliant with codes in effect at the time of construction;
- The operable range in which windows are able to be raised vertically ranges from a minimum of approximately 21" to a maximum of 57", with all windows being compliant with codes in effect at the time of construction ;
- The height of the lower sill ranges from approximately 11" to 41" above the surrounding surface;
- A variety of implements designed to limit the height and/or width of window openings are in place. These include sill stops, hinge restrictors, slide restrictors, and physical design. Devices include both original construction and add-on accessories;
- Insect and security screens of varying designs which would be expected to provide minimal or no resistance to interior pressure are in place on limited windows;
- Numerous windows in public areas are sealed either by original construction or via permanent and semi-permanent means.

BALCONIES, DECKS, AND ATRIUMS

Numerous balconies, elevated decks, and interior and exterior atrium overlooks easily accessible for resident use were observed. Additionally, numerous balconies requiring administrative access and those with no public access were observed. In each instance, standard guardrails meeting or exceeding uniform building code and/or the IFC are provided. In no instance was any structure or furniture which would be expected to create an unsafe condition under normal circumstances located in the immediate proximity of the railings.

ROOF TOP ACCESS

No roof tops were observed to be readily accessible via intended means except to staff provided with appropriate pass keys. However, roof top access is available via resident rooms and shower rooms in Wilmer-Davis. Based on the condition of window screens and frames, it is reasonable to believe that students have or could have used these windows to access the roof top.

FURNITURE AND FURNITURE PLACEMENT

As is typical and expected in campus housing, beds in numerous resident rooms were observed to be lofted/elevated and configured as bunk beds. Multiple instances of elevated furniture being located immediately adjacent to the operable windows were observed. This is likely due to the inclination to seek natural lighting and the desire to be in close proximity to the outside air and may be expected to be more prevalent in those residence halls not equipped with air conditioning.

The presence of furniture elevated to, or near, the level of windows increases the probability of students leaning against these windows while awake and asleep. This situation is exacerbated by the lack of rails installed on the bunked and lofted furniture. These protective devices, while readily available, were not observed to be in use in the resident rooms visited.

Existing Housing and Dining policy does address the modification of residence hall rooms, dictating that "Students may not modify existing structures in the residence hall room without approval of residence hall and fire safety officials. Beds may not be bunked or lofted without prior approval and use of approved WSU equipment."

Students desiring to loft or bunk their beds are required to read and sign a related Warning/Assumption of Risk form. This form does address some of the dangers associated with lofted and bunked beds and clearly notes that the use of guardrails increases the safety of bunk beds. While side rails are available upon request for resident use, the Assumption of Risk Form nor current policy, requires the use of safety rails on either or both sides of the elevated bed.

Existing policy does not address the placement of furniture within the resident's room, and therefore does not address the placement of lofted or bunked beds adjacent to windows.

Videos prepared by Housing and Residence Life staff are available on-line to demonstrate the proper procedures for the lofting and bunking of resident's beds.⁵

POLICIES AND PROCEDURES

Existing Housing and Dining policies address window safety and fall issues with the prohibition of "...hanging or sitting outside of residence hall windows, climbing the exterior of University buildings, throwing items out of a window, etc." Related policies also prohibit roof access by residents and guests.⁶

Additional related policy states that "For reasons of health and safety, nothing is to be thrown or hung out of any residence hall window. Individuals are not allowed to lean out of windows or sit on windowsills or remove screens."

HOUSING AND RESIDENCE LIFE STAFF

Approximately 150 professional and para-professional staff members are responsible for the support and oversight of students living in the residence halls, providing a safe and supportive environment for all students. This staff consists of student-staff members/resident advisors, Stimson Sponsors, residential education directors, and senior management personnel.

Each resident education director and member of the management team has significant experience, education, and training in the realm of resident life and participates in professional development activities on a regular basis. The resident advisors are typically full-time students who have participated in a minimum of four weeks of training prior to assuming their role. These students also participate in continuing education programs on a regular basis.

Housing and Residence Life staff are responsible for working with students to facilitate compliance with existing policies and to ensure the safety and well-being of all residents. Formal operational procedures are in place to ensure uniform application of relevant policies and procedures and staff members meet on a regular basis to discuss issues of concern.

⁵ WSU Pullman Housing Policies. <https://www.youtube.com/watch?v=kLbfyDzOUFU>

⁶ WSU Pullman Housing Policies. <https://housing.wsu.edu/media/2031/h-policies-summer-14.pdf>

Compliance with Housing policies related to safety issues within individual resident rooms is typically addressed based on informal observation, as opposed to active inspection and enforcement. Formal room inspections are conducted on a scheduled basis, typically coinciding with scheduled breaks.

Significant and on-going efforts are in place to address issues related to the use of alcohol and drugs. This includes proactive education programs designed to benefit all students, as well as an aggressive intervention program intended to recognize and address inappropriate individual behavior.

Numerous methods of communicating with students are in place. These communications can be delivered to individuals, to residents based on their housing location, or collectively to all residents. These methods include individual contact via phone, email, or in person, as well as the use of MyWSU communications. These communications are employed on an as-needed basis to address a variety of topics, including those related directly to health and safety.

GUIDANCE AND DIRECTION

Based on the observations and findings of this risk assessment and safety evaluation previously noted within this report, opportunities for improvement have been identified. The guidance and direction offered is founded upon custom and practice in the realm of higher education, accepted consensus standards, and successful systems identified in the world of higher education. The suggested action items which follow are presented for each category discussed in the previous “Observations” portion of this report. Each item offered for consideration in the following section is numbered for ease of reference.

WINDOWS AND WINDOW OPENINGS

The State of Washington and the City of Pullman have adopted and enforce the International Fire Code (IFC) for all campus buildings. This code mandates specific standards for new or renovated residence hall sleeping rooms, including the provision of an exterior emergency escape opening. This requirement is typically met by providing a window which is code compliant. In simple terms, all windows on or below the third floor must be able to be easily opened, without restrictions or impediments, to provide at least 5.7 square feet of opening with a minimum width of 20” and a minimum height of 24”.

With existing configurations, the available window openings in some of the WSU residence halls significantly exceed the IFC minimum requirements. For example, the opening achievable for the windows in Gannon and Goldsworthy Halls is approximately 56.75” in width and 38” in height. This equates to approximately 15 square feet. Limiting the opening height to the code minimum of 24” would provide an area of access nearly 9.5 square feet. Additional examples of residence halls where existing window openings could be restricted and meet IFC requirements include:

Residence Hall	Current Opening Dim. (W” x H”)	Minimum Opening Per IFC
Honors	40.5 x 30.0	40.5 x 21.0
McEachern N & S	28.0 x 55.75 (portion of windows)	28.0 x 29.50
Rogers – Orton	29.0 x 45.0	29.0 x 28.50
Stevens	28.0 x 39.0 (portion of windows)	28.0 x 30.0
Stimson	29.75 x 32.75 (portion of windows)	29.75 x 28.0
Wilmer-Davis	28.0 x 39.0	28.0 x 30.0

1. Decreasing the size of the allowable opening of select windows while maintaining compliance with the IFC will minimize the potential for an accidental fall from these windows, thus providing for a safer living environment. The use of permanent and semi-

permanent devices best suited to the construction and style of each affected window will serve to better ensure that the devices remain in place. These devices may consist of window opening control devices designed to restrict window opening to a pre-determined limit or fall prevention devices such as bars or rails.

It is important to note that only very minimal reductions in window opening size can be achieved on some of those windows currently in excess of the IFC minimum. For example, the windows in Community/Duncan Dunn have an opening of 35" x 25". In order to maintain code compliance, the opening height of these windows may be restricted by only 1". In this example, where the windows are currently code compliant, the resources necessary to reduce the window opening size would be significant in comparison to any potential improvement from a safety perspective. For each window with an opening in excess of the IFC minimum standards, it will be prudent to consider the necessary resources and the potential benefits of any possible changes.

BALCONIES, DECKS, AND ATRIUMS

No areas of recommended improvement are noted at this time.

ROOF TOP ACCESS

1. Access is available to the roof of Wilmer-Davis via resident rooms and/or shower rooms. The placement of security screens, similar to those currently in use on select first floor windows, on all windows where this access is possible will enhance security in the affected rooms and minimize the likelihood of unauthorized personnel entering the roof areas.

FURNITURE AND FURNITURE PLACEMENT

Housing and Residence Life staff notes that the bunking and lofting beds is frequently completed by students immediately upon arrival to campus and without receiving the required approval. This practice precludes the opportunity to provide safety guidelines and requirements to these students.

Current housing policy does not address the use of safety rails on bunked or lofted beds. The Warning/Assumption of Risk form clearly states that these rails increase the safety of bunks beds and indicates that the rails are available upon request. However, housing staff indicates that the rails are rarely requested or used. The experience of numerous universities is that the safety rails will rarely be used unless this use is mandated and enforced.

Current housing policy also does not address the placement of lofted or bunked beds within the rooms. This often results in the elevated surfaces being placed immediately adjacent to, or in very

close proximity to, the windows. In this arrangement, the likelihood of an individual leaning or laying against an open or closed window is increased, as is the corresponding potential of the individual falling through the window.

1. Given the frequency and severity of accidents resulting from the use of bunked and lofted furniture⁷, consideration should be given to mandating the use of a side rail for all bunked and lofted beds and the required use of a rail separating the bed from any nearby window. The mandated use of one rail will very likely result in this rail being placed against the window or wall. Consideration should be given to permanently attaching one rail on those beds that are symmetrical in construction, thus allowing the student to choose the location of the rail.
2. The development of written guidelines and policies related to the use and placement of lofted and bunked beds will serve to ensure the provision of consistent information to all students. These guidelines are an excellent means of ensuring that every student is provided with information regarding the proper set-up and use of the furniture. Providing this information and instructions to students prior to allowing access to their rooms will ensure that each individual has access to all relevant information prior to the movement of any furniture.

POLICIES AND PROCEDURES

The formal inspection of resident rooms to address safety-related issues is currently completed on a scheduled basis, typically coinciding with breaks when students are not present in the residence halls.

1. Consideration should be given to completing a random inspection of each room soon after move-in for the purpose of identifying safety issues early in the semester. This inspection may focus on fire safety matters such as candles, improper extension cords, and unsafe appliances while also providing an opportunity to monitor the set-up of furniture and the use of safety rails on bunked and lofted beds.
2. Existing policies and guidance related to window safety and the use of bunked and lofted beds should be reviewed in order to ensure that all information provided to students is clear and consistent. This review should include instructional videos such as those on the Housing and Residence Life website demonstrating the set-up of bunk beds and similar related materials.

⁷ United Educators Risk Research Bulletin: *Reducing Serious Injuries in Residence Halls with Informed Facility Management*. <https://www.edurisksolutions.org/WorkArea/DownloadAsset.aspx?id=2048>

3. A review should be completed of the current policies, practices, and procedures related to the bunking or lofting of beds and the requirement for prior approval. It is reported that these changes are frequently made by students without benefit of the requisite information and without prior staff knowledge. This review should include the Warning/Assumption of Risk form and should seek to determine the most efficient means of ensuring related compliance including the requirement for approval by residence hall and fire safety officials. This review should also consider the inspection of bunked and lofted beds to ensure that they are properly located and that guard rails are properly provided.

EDUCATION AND TRAINING

1. Consideration should be given to the formal inclusion of awareness training related to the prevention of unintentional falls from windows and elevated areas into existing educational efforts in order to ensure the consistent delivery of this information to all students. This training should include general awareness training, a review of relevant policies, furniture use and arrangement, and related matters. As falls from elevations are more prevalent in off-campus housing than in university-owned residence halls, this training should be suitable for non-campus housing facilities as well residence halls. With alcohol consumption being a factor in approximately 50% of the unintentional falls from windows on college campuses⁸, combining window safety issues into existing alcohol awareness efforts may be an effective means of delivering this information to the student body.

⁸ United Educators Risk Research Bulletin: *Reducing Serious Injuries in Residence Halls with Informed Facility Management*. <https://www.edurisksolutions.org/WorkArea/DownloadAsset.aspx?id=2048>

SUMMARY

When a university determines it prudent to consider the alteration or enhancement of a physical setting and the policies, procedures, and practices related to that setting, a singular perfect approach seldom exists. Indeed, when developing a course of action intended to address the matter, consideration must be given to a multitude of factors including the following:

- Immediate and long-term logistical capabilities;
- Real versus perceived needs;
- Physical limitations and restrictions;
- Value and impact of physical changes versus change of policy, procedure, and practice;
- Federal, State, and Local Legislation and Codes;
- Operational and budget limitations;
- Societal demands and desires;
- The desires of the broad campus community; and
- The needs, desires, and inclinations of the affected students.

It is in providing due consideration of these factors, and more, that the appropriate course of action is identified. The result is not the development of a “perfect” solution, but one which appropriately balances and addresses all relevant factors.

This risk assessment and safety evaluation of the fall potential from residence hall windows, balconies, and decks has been completed to support the efforts of WSU and is designed to identify the actions which may be taken to address this issue in a comprehensive manner.

This is a complex issue, requiring the review and consideration of a broad scope of issues and facts. From a physical perspective, over 5,000 windows exist in WSU’s twenty-two residence halls, with construction styles and techniques representing a period of more than 120 years. From an operational perspective, these residence halls contain over 3,400 individual rooms and are home to over 5,000 WSU students. And from a management perspective, the proper balance of policy and control must consider not only the needs and desires of the university as a whole, but those of the residents who live and study in these halls.

This report provides for the review and consideration of relevant physical factors, operational needs and limitations, human factor issues, and policy matters. Opportunities for improvement addressing each of these are presented within this report and are intended to serve as a guide in developing a comprehensive approach to the issues at hand. The suggestions offered for consideration are founded upon custom and practice in the realm of higher education, accepted consensus standards, and best practices identified in the world of higher education.

APPENDIX

INTERVIEWS COMPLETED

Terry Boston, Associate Vice President, Division of Student Affairs

Deb Donning, Risk Manager, Risk Management Services

Jordon Frost, President, Associated Students of Washington State University

Kate Gannon-Cullinan, Assistant Director, Residence Life

Mary Jo Gonzales, Ph.D., Vice President, Division of Student Affairs

Dwight Hagihara, Executive Director, EHS and Risk Management

Edwin Hamada, Director, Residence Life

Steve Hansen, Assistant Chief of Police, WSU Police Department

Darren Jones, Fire and Safety Compliance Officer, WSU Police Department

Joe Kline, Assistant Vice President for Facilities Services Capital

Mark LaBolle, Director, Housing & Dining Maintenance Services

Adam Malcolm, Assistant Attorney General, Office of the Attorney General

Dr. Kathleen MacKay, Interim Dean of Students

Bob Tattershall, Director, Housing & Conference Services

Gene Young, Assistant Director, Risk Management Services

Chris Wehrung, Pullman Fire Department, Fire Marshall