

EXCERPTS AND BACKGROUND ON THE ANSI IWCA I 14.1-2001 STANDARD

Introduction by Thomas W. Trinen, President of Service One, Inc.

On October 25, 2001, the American National Standards Institute (ANSI) approved the IWCA-I-14.1 Window Cleaning Safety draft standard for publication as an American National Standard.

The action is a result of nearly five years of work by members of the IWCA I-14 Committee who have worked diligently toward achieving this goal. Throughout this time frame, outside parties affected by the Standard were able to provide input and submit comments on the draft. This enabled the committee to review hundreds of comments, statistics and technical reports and make numerous changes to the draft standard in order to achieve a consensus for the window cleaning industry.

As an active member of ANSI Committee since its inception, Service One is familiar with the standard and the requirements it imposes. Participating in the many hours of discussion and analysis of engineering models and related data creates an understanding of the framework from which the standards were developed.

The American National Standards Institute (ANSI), New York City, is a non-profit, privately funded organization that coordinates national standards in the United States. While the ANSI IWCA I 14.1-2001 standard does not have the force of law, ANSI Standards are cited in court as the standard of care and are often referenced by or adopted by OSHA.

The ANSI Standard system provides a way for differing views to be represented in the standards process. Proposed standards go through an exhaustive review process and any group can make objections, whether it is an individual, manufacturer or an end-user. The standard developer can only make replies to those objections. ANSI IWCA I 14.1-2001 requires a majority (66 percent in the case of standards developed using the canvass process) to approve the standard. If unresolved objections remain when the standard is submitted to ANSI, the Board of Standards Review (BSR) reviews the standard to ensure that a fair and equitable hearing was provided.

The Building Owners and Managers Association (BOMA) supports the standard, and has published the following comments on the standard:

“BOMA International supports development of a national safety standard for window cleaning operations. BOMA fully supports the approach that the ANSI IWCA I 14.1-2001 Committee has taken and will continue working with the International Window Cleaning Association (IWCA) to develop a consistent and comprehensive safety standard.

Although ANSI IWCA I 14.1-2001 standards do not have the force of law, they are cited in court as the standard of care any reasonable business would use in conducting its affairs. On December 18, 2001 BOMA issued a press release applauding the ANSI IWCA I 14.1-2001 Committee, stating that the standard addresses safety in a manner that is fair, reasonable, achievable and cost effective and in which safety regulations were based on reliable data, not market forces.”

It is the opinion of this firm that all new buildings as well as existing structures should have their fall protection and exterior building maintenance systems analyzed for compliance under this standard. Non compliance with serious life-safety issues require immediate action. Non conformity with other sections of the Standard, have a five year phase-in period to achieve compliance. Many buildings will require action ranging from extensive rooftop anchor retrofit to minor upgrades or inspections. All buildings are required to perform a site hazard assessment and have on file a written safety plan of service.

With this action, Building Owners and Managers will certainly provide for a safer workplace and may actually save lives. Compliance under the I 14 shall also provide reduced liability exposure and may reduce operating costs over the long term.

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The following document is an excerpt from the ANSI IWCA I 14.1-2001 Window Cleaning Safety Standard. This excerpt contains many of the important sections of the standard that apply directly to Building Owners and managers and other professionals involved in the design of safety systems for window cleaning. Please note this is **not** the complete document. This Document is also reviewed and revised periodically by the committee.

The ANSI/IWCA I-14.1 Window Cleaning Safety Standard is a two-part document. Part A focuses on safety guidelines for the use of window cleaning access equipment, while Part B is geared toward those who manufacture, design or install the equipment. Some of the access equipment addressed in the Standard includes rope descent systems (also known as RDS, CDE or CDA), transportable and permanent suspended scaffolds, ladders and man-lifts. The Standard also serves as a guide for regulatory agencies, architects, building owners and window cleaning contractors.

We encourage you to purchase the entire document, as there are many parts of the complete document that may apply to your property that are **not** included in this excerpt.

Copies and periodic updates can be purchased from:

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The following is an excerpt from the:

**International Window Cleaning Association
WINDOW CLEANING SAFETY
An American National Standard
Approved October 25, 2001
American National Standards Institute
ANSI IWCA I 14.1-2001 IWCA I-14.1-2001**

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American National Standards Institute
IWCA I-14.1-2001
Secretary, ANSI IWCA I 14.1-2001/IWCA I-14.1 Committee**

1.2 Purpose

- 1.2.1. The purpose of this Standard is to provide safety to window cleaners and to others, such as passerby, where window cleaning operations are in progress, by specifying equipment with practical and adequate safety factors and features, and requiring safe use, design and maintenance of such equipment.
- 1.2.4. This Standard is designed for reference by regulatory governmental agencies or to serve these agencies as a guide in the formation of safety rules and regulations and is for use by registered professional engineers and architects and by manufacturers of window cleaning equipment and devices.

1.3 Application

- 1.3.1 This Standard applies to all window cleaning operations performed on the inside and/or outside of any building in which the window cleaner is working from a level that is located more than 48 inches (1200 mm) above grade or above an adjoining flat roof or other flat surface.
- 1.3.2 This standard is also applicable to tools including extension devices and such other hand held equipment as may be used in window cleaning operations.

1.6 Assurances

- 1.6.1 Window cleaning contractors shall provide to building owner and/or their operating agents the following assurances:
 - a) The window cleaning contractor shall meet all applicable local, state and national/federal licensing and/or registration requirements.
 - b) The window-cleaning contractor shall strictly adhere to all applicable local, state and federal labor laws and safety codes and standards.
 - c) The window-cleaning contractor shall utilize workers trained in accordance with paragraph 3.4, Part A of this Standard.
 - d) Where the window-cleaning contractor provides transportable or person fall protection equipment, that equipment shall be designed maintained and inspected in accordance with this Standard.
- 1.6.2. Building owners and/or their operating agents shall provide window cleaning contractors with the following written assurances:
 - a) That the installation or structure has been inspected, tested and maintained in compliance with the requirements of this standard.
 - b) That all equipment dedicated to the building meet the requirements of Part B.
 - c) That specified load ratings, intended use and limitations for fixtures permanently dedicated to the buildings; and
 - d) Manufacturer's instructions for installations, anchorages and fixtures permanently dedicated to the building.
- 1.6.3. Window cleaning contractor shall not permit employees to perform window cleaning prior to receiving assurance from the building owner that the installation meets the requirements of this standard.

1.7. Plan of Service

A written plan developed by the window cleaning contractor or qualified person shall be provided that will inform the building owner or their operating agents when window to be cleaned are located in areas where workers may utilize suspended equipment or; where workers are exposed to falls and other known hazards or; where the public may be exposed to overhead equipment operations. The plan shall include among its conditions, the identification of hazardous areas, drop zones, safety features and areas requiring public protection.

The plan shall be readily available for use by the building owners or its operating agent, window cleaners, enforcing authorities, and emergency personnel. The use of a written plan applies to a dwelling house over 3 full stories high or occupied by more than 3 families.

PART A – GENERAL AND PERFORMANCE REQUIREMENTS

3 GENERAL REQUIREMENTS FOR ALL WINDOW CLEANING OPERATIONS AND APPARATUS

3.2 Equipment Design Requirements

All equipment shall be engineered, designed and approved by the manufacturer for use in the window cleaning conforming to all the requirements of Part B of this Standard. Alterations to the characteristics of a unit's design or capacity to safely support the equipment and its operators shall be prohibited unless specifically approved in writing by its original manufacturer or a registered professional engineer.

3.3 Safety Equipment

Employers shall provide their window-cleaning employees with safety equipment and devices conforming with the requirements of this Standard, and shall maintain such equipment in safe operating condition at all times.

3.4 Training, Instruction and Supervision

3.4.1. Employers and employees shall be proficient in safe working procedures and proper use of equipment. Employers shall be qualified in the instruction and supervision of safe and proper working procedures and practices. Enforcing authorities may require evidence that workers are proficient and capable of safely carrying out their tasks.

3.8 Fall Protection

Fall protection, perimeter guarding, personal fall arrest systems, or a personal fall restraint system (as applicable) shall be provided for all work areas (with the exception of working from a ladder or using a window cleaner belt and window cleaner anchors) that expose a worker to a fall hazard when approaching within 6 feet (1800mm) of an unguarded edge or unguarded skylight. The means or methods used shall comply with the requirements found in section 9.2 of this standard.

3.9 Anchorages

Building owners and window cleaning contractors shall not allow suspended work to be performed unless it has been determined that the building has provided, identified and certified anchorages complying with section 9 or 10 for: independent safety lines; tie-backs for outriggers, parapet clamps, and cornice hooks;

primary support anchorages for powered and manual boatswain's chairs; primary support anchorages for rope descent systems; horizontal (rope) lines or lifelines; and wherever else required.

4 Building Requirements

4.1 Applicability

4.1.1 All buildings where window cleaning is performed employing suspended equipment shall be equipped with roof anchorages or other approved devices that will provide for safe use of the equipment in conformance with the provisions of this Standard.

4.2 Means and Methods

- 4.2.1 Buildings erected or substantially remodeled in areas where window cleaning may be affected after the adoption of this Standard shall be equipped with the appropriate means and methods necessary to comply with the provisions of this Standard.
- 4.2.2 Existing buildings without the means and methods to safely clean its windows shall be provided with such a system and/or employ methods complying with the provisions of this Standard.
- 4.2.4 Buildings with an existing window cleaning system shall provide and maintain the means and methods to access its façade in accordance with the Standards in force at the time of the building's original construction and shall provide fall protection for window cleaners complying with Section 9.2 of this Standard.
- 4.2.5 Building with a permanent installation system shall not have the system diminished unless it has decayed beyond its ability to be renovated. In such cases an equivalent or alternate system approved by a registered professional engineer experienced in such design shall be installed in strict accordance with the applicable sections of part B of this Standard.

5.5 Aerial Work Platforms (Vehicle Mounted and Manually Propelled)

5.5.2 Employees shall be trained in the use and care of an aerial work platform before they shall be permitted to use such equipment. Training shall include but not be limited to understanding the manufacturer's instructions, inspection, site assessment, proper operational procedures, basic electrical understanding, fall protection and a full understanding of safe working conditions considering as a minimum, unlevel surfaces and wind. In the event the aerial lift is rented, it shall be the responsibility of the rental company to familiarize the operators with its use.

5.7 Rope Descent Systems (RDS)

5.7.11 Anyone using a rope descent system, should have available at the jobsite at least one other co-worker equally proficient in the use of the system and rescue procedures. When performing descents over 130 feet (40 m), special attention shall be given to prevent against the danger associated with the following industry recognized hazards:

- a) the potential of sudden climactic changes such as wind gusts, micro bursts or tunneling wind currents;
- b) the ability of the RDS to function without the user having to apply excessive force;
- c) the length of time workers are suspended;
- d) the re-rigging and movement of main suspension and safety lines;
- e) the ability to provide a prompt rescue in the event of an emergency.

5.7.12 Operators of rope descent systems shall continuously monitor wind speeds and weather conditions throughout the course of operation. Rope descent systems shall not be used for window cleaning when wind speeds become excessive in accordance with section 3.7 of this standard. On descents higher than 130 feet (40m), provisions shall be made for stabilization. Such provisions may include:

- a) continuous (examples and reference to Part B)*
- b) intermittent (examples and reference to Part B)*
- c) work station (suction cups)

Descents shall not exceed 300 feet (91m) above grade unless the windows cannot be safely practicably accessed by other means.

5.7.17 Suspension Devices for Rope Descent Systems (RDS)

- a) A rope descent system may be suspended from equipment or anchorages permanently dedicated to the building or equipment that is transported from building to building, providing that the design of the support apparatus and the part of the structure where it is placed has been approved by a registered professional engineer for all loads that will be imposed in accordance with Section 9 and 17 of this Standard.
- d) Every primary line, lifeline and tie-back line, shall be attached with minimal slack to an identified anchorage in line (within 15 degrees of perpendicular) [see appendix} with the area being accessed. The anchorage shall comply with Section 9 of this Standard. Tie-back lines shall be constructed of wire rope or static fiber rope with minimal stretch characteristics whose breaking strength is greater than or equal to that of the primary suspension line.

5.8 Transportable Suspended Power Platforms (single and multiple suspension)

5.8.1. When such equipment is used for window cleaning applications, its design, use and maintenance shall conform to the provisions of Section 15 of this Standard for permanently installed powered platforms and in accordance with the manufacturer's instructions.

5.8.2 Employees shall be trained in the use and care of suspended scaffolding before they are permitted to use such equipment. Training shall include but not be limited to understanding the manufacturer's instructions, inspections, assembly of components, accepted rigging practices, motor use, steel wire use, fall arrest requirements, rescue consideration and a full understanding of safe working conditions considering as a minimum, correct rigging, basic electrical concepts and care and the effects of wind on suspended operations.

5.8.6. Operators of a transportable suspended scaffold shall utilize and be safely secured to an independent fall arrest system complying with Sections 3.8, 5.8.4,9.2.2 and 15.2.

5.8.7. Operators of the scaffolding shall have a means of communication to a point inside the building or to a company representative.

5.8.8. Operators of transportable suspended scaffolding shall continuously monitor wind speeds and weather conditions throughout the course of operation. Transportable suspended scaffolding shall not be used for window cleaning when wind speeds become excessive in accordance with Section 3.7 of this Standard. On elevations higher than 130 feet (40m), provisions shall be made for stabilization. Such provisions may include:

- a) continuous; (examples and reference to Part B)*
- b) intermittent; (examples and reference to Part B)*

- c) work station and or angulated roping; (examples) When only work station and or angulated roping stabilization is possible, descents shall not exceed 300 feet (91m).

*Note: These provisions are under development and consideration.

- 5.8.21 a) Transportable powered platforms may be suspended from equipment or anchorages permanently dedicated to the building or equipment that is transported from building to building, providing that the design of the support apparatus and the part of the structure where it is placed has been approved by a registered professional engineer for all loads that will be imposed in accordance with Section 9 and 17 of this Standard. Suspension to permanent equipment or anchorages shall be in a straight line with no more than 15 degrees angulation [see appendix] in either direction.

d) Support devices requiring a tie-back shall be attached with minimal slack to an identified anchorage located in line (within 15 degrees of perpendicular) [see appendix] with the support device. The anchorage shall comply with Section 9 of this Standard. Tie-back lines shall be of wire rope whose breaking strength is greater than or equal to that of the primary suspension line.

5.9 Permanently Installed Powered Platforms

- 5.9.1 When such equipment is used for window cleaning applications, its design, use and maintenance shall conform to the provisions of Section 16 of this Standard for permanently installed powered platforms and in accordance with the manufacturer's instructions.

- 5.9.3 It shall be the building owner, manager or operating agents responsibility to have the installation inspected on a regular basis in compliance with OSHA 29 CFR 1910.66. A copy of the inspection shall be given to the window cleaning contractor prior to the equipment being used. The employer shall not permit employees to use the installation prior to receiving assurance from the building owner that the installation meets the requirements contained in this Standard.

- 5.9.4 Prior to use, the platform shall be inspected by a competent person. Specifically, the components of the powered platform and all safety devices including motors, brakes, wire rope, stirrups/hangers, decking, guardrails, electrical devices, rigging equipment, ropes, harnesses, rope grabs and lanyards shall be checked for their general condition. Those components that have defects shall be immediately removed from service, tagged or marked with a label that states, "Dangerous, Do Not Use", then restored or destroyed. Improvised repairs are prohibited. The unit shall not be used until repairs have been made and the platform re-inspected.

PART B – BUILDING AND EQUIPMENT DESIGN REQUIREMENTS

7 BUILDING REQUIREMENTS

Part A and Part B of this standard are interdependent. Although specific references may not be provided, designed features provided in part B must be implemented in accordance with provisions contained in Part A.

7.1 Applicability

- 7.1.1 All buildings where window cleaning is performed in accordance with section 1.3 and employing suspended equipment shall be equipped with roof anchorages or other approved devices that will provide for safe use of the equipment in conformance with the provisions of this Standard.

- 7.2.4 Buildings with an existing window cleaning system shall provide and maintain means and methods to access its façade in accordance with the Standards in force at the time of the building's original construction and shall provide fall protection for window cleaners, complying with section 9.2 of this Standard.
- 7.2.5 Buildings with a permanent installation system shall not have the system diminished unless it has decayed beyond its ability to be renovated. In such cases an equivalent or alternate system approved by a registered professional engineer experienced in such design shall be installed in strict accordance with the applicable sections of part B of this Standard.
- 7.2.6 Existing buildings without provisions for a window cleaning system may provide a combination of building supplied fall and anchorages plus window-cleaning contractor supplied transportable equipment or a window cleaner anchor belt system. Where such a decision is selected; roof anchorages, supporting fixtures, window cleaner belt anchors and or transportable equipment shall be designed, manufactured, installed, operated and maintained in accordance with applicable portions of Part B. Fall protection provisions shall comply with section 15.1.13.

8 INSPECTION AND TESTING

8.1 General Inspections

- (a) All aspects of the installation shall be serviced and maintained in strict accordance with its manufacturer's frequency and instructions and shall be further inspected, maintained and tested in accordance with Section 7.3.
- (b) If testing is deemed necessary, a registered professional engineer shall prescribe a test procedure and shall certify its results.
- (c) Upon completion of the inspection and testing, a thorough description of findings and/or test results shall be entered into the equipment's logbook, signed and dated.

8.1.1 Newly Installed Equipment

- (a) before initial use by the window cleaner(s), the following equipment (as provided for a specific building) shall be successfully demonstrated by the vendor with the rated load under the complete range of operation and be so certified in writing:
 - (1) permanently installed access platform(s) or it's supporting fixtures;
 - (2) anchorages;
 - (3) window cleaner's belt anchors;
 - (4) fall protection systems;
 - (5) wind sway protection systems.
- (b) Portable support equipment such as davits, outriggers, parapet clamps, cornicehooks, etc. shall be tested in the shop on the building's roof. Shop testing shall be performed at least 2.5 times the rated load of the apparatus. Designated equipment targeted for post-installation testing of such equipment shall not exceed twice their rated load. Deflection in the equipment's primary support member shall be measured during the test and compared to the theoretical design values at equivalent loading.

8.1.2 Inspection and Re-Testing of Existing Equipment and Systems

- (a) Before each use, all components of a window cleaning equipment support system permanently dedicated to the building shall be visually inspected by a competent person. Any signs of excessive wear, weld or material cracks, bent distressed or rusted metals, corrosion or abraded fibers shall be cause for more extensive testing before continued use.
- (b) Any missing components shall be documented and the system shall not be used until such components are replaced or repaired by the equipment owner. Replacement of parts or components shall be of like strength, finish and durability of that originally provided. A record of all inspections, testing certifications, modifications and repairs shall be documented in a dedicated log book.
- (c) The certification record shall include the date of the inspection and test and the signature of the inspector.

8.1.3. Minimum Inspection and General Testing Criteria

- (a) Fall arrest components shall be inspected and tested as prescribed by ANSI IWCA I 14.1-2001 Z359.1.
- (b) Anchorages shall be inspected in accordance with Section 8. Designated anchorages targeted for post-installation testing by applying a minimum static load of twice the design load in each (primary) direction that a load might be applied. For example, anchorages designed for a 5000-pound (2268 kg) ultimate load shall be tested at 2500 pounds (1134 kg).
- (d) Powered equipment permanently dedicated to the building shall be inspected and tested by a qualified person in strict accordance with manufacturer's instructions and in accordance with ASME A120.1.
- (e) Transportable equipment, particularly powered hoists, shall be inspected and tested by a qualified person in strict accordance with manufacturer's instructions and as follows:
 - 1) each day, before initial use, the hoist shall be tested in the lifting direction with the intended load to make certain it has sufficient capacity to raise and lower the operators plus any additional live load; and
 - 2) at intervals not exceeding one year, special inspections and tests of the governor and secondary braking system shall be made as follows:
 - (a) and testing shall include a verification that the initiating device for the inspection the secondary braking system operates at the proper over-speed;
 - (b) if any hoisting machine or initiating device for the secondary brake is removed from the equipment for testing all reinstalled and directly related components shall be reinspected prior to returning the equipment to service;
 - (c) if adequate tests can not be made in the field or where hoists are stored, the initiating device may be removed from the equipment and sent to a shop equipped to make such tests.

8.1.4. Inspection and Testing of Window Anchors

- (a) Inspection of window anchors, fittings and their attachments on buildings shall be conducted routinely, at least annually. Special attention shall be given to older buildings that still have cast bronze or brass anchors. The tendency of cast anchors to fail drop tests requires the periodic removal of a sampling of these style anchors for their drop testing.
- (b) For each building requiring anchors to be certified as acceptable, a protocol shall be established for the testing of a representative sampling of each type of anchor installation each face of the building containing anchors. Only anchors that conform to the requirements of this Section shall be tested. Anchors not conforming to the requirements of this Standard shall be considered substandard and shall no longer be used. To pass the testing process, a window anchor must withstand the drop test specification in Section 10.2.4.

(c) Window anchors that are to be abandoned for use when operable windows are permanently sealed or replaced with fixed windows but are to be reclassified as intermittent stabilization anchors shall be tested as follows:

- 1) A representative sampling each type of anchor on each face of the building shall be selected and subjected to a pull test of 300 pounds (136 kg) in each outward direction.
- 2) Failure of any one anchor, including bending or loosening from its mooring, shall be cause for an increased test sampling.

9 ANCHORAGES and FALL PROTECTION

9.1 Design Criteria

9.1.1 Anchorages shall be capable of sustaining a 5000-pound (2268kg) minimum load, or a minimum 4-to-1 safety factor, whichever is greater, in any direction that a load may be applied.

9.1.9 Anchorages shall be inspected annually by a qualified person. Anchorages shall be re-certified when re-roofing or renovating (pertinent to the window cleaning system), or at periods not to exceed 10 years. The report of this inspection shall be included in the building's logbook. If, during the anchorage's annual inspection, an area of suspicion is identified a test procedure if necessary, shall be performed under the approval of a registered professional engineer.

9.2 FALL PROTECTION

9.2.1 Perimeter Guarding

- a) Perimeter guarding shall consist of a parapet, guardrail or combination parapet guardrail system not less than 42 inches (1.1m) above its adjacent surface and capable of withstanding a minimum lateral force of 50 pounds (23kg) per linear foot between any two stanchions (applied at its uppermost elevation) or a minimum of 200 pounds (91kg) of lateral force concentrated at any point along its length at its uppermost elevation. Parapets and guardrails, which may be subjected to additional loading such as lifelines, power cables, etc., shall be designed to consider these added loads.
- b) Buildings with tall parapets, those exceeding 6 feet (1800mm) in height, shall have either:
 - 1) a catwalk;
 - 2) an inboard mobile access tower; or
 - 3) an engineered fall protection or fall arrest system.

Item (2) may be provided by the window-cleaning contractor. Perimeter guarding for permanent roof carriage installations shall be designed in accordance with applicable provisions of ASME A120.1. Parapets over 48 inches (1200 mm) in height present a falling hazard to the inboard roof surface as fall arrest systems only perform when the fall is away from their anchorage or outboard. Care must be exercised to prevent such a fall.

13.3.1 An anchorage used for a personal fall arrest system shall be independent from the anchorage used for the suspension system. Fall arrest anchorages shall be provided by the building owner and comply with sections 9 and 16 of this Standard.

15.1.13 Suspension and Wind Sway Protection

Buildings with service drops exceeding 130 feet (40m) in height shall provide a wind sway protection system, consisting of either, continuous mullion track guides, intermittent stabilization, work station stabilization or angulated roping. When only work station or angulated roping stabilization is possible, descents shall not exceed 300 feet (91m).

Wind sway protection systems shall provide the greater of: a) 600 pounds (270kg) of resistance (includes a four-to-one safety factor in any outward direction) or, b) shall be design for an operating wind of 25 mph and design wind of 50 mph, to be applied to the units full sail area. Standing lines are specifically prohibited for use as wind sways *protection* unless there is not other system of stabilization that could be practically and safely employed. If there is not other alternative to a standing line system then it is to; be designed by, or under the direction of a registered professional engineer; permanently dedicated to the building.