IWCA Safety Certification Program

COURSE STUDY PROGRAM

For Window Cleaner Safety Certification

High Rise-Suspended Scaffolding Operations

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High Rise-Suspended Scaffolding Operations

Transportable Ground Rigged Suspended Scaffolding

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.

Transportable ground rigged suspended scaffolding is more commonly referred to as a swing stage or powered platform. It is a collection of components that when assembled correctly, enable one or more workers to utilized electrically powered motors to climb up and down steel wire rope on the side of a building or workface. This type of access equipment has been used for high rise window cleaning since the 1950's.

This section of the training will explain the safe use of the equipment. You'll at least learn the basic information to ensure that a swing stage is properly rigged, used and that workers are adequately protected from known hazards. On the Job Training after the review of this material will help you apply what you've learned here and gain valuable field experience.

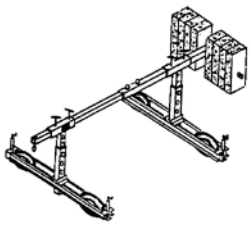
Before you use a swing stage, you need to know what it is and what it does. On the Job Training will aid in showing how it works.

A transportable ground rigged suspended scaffold is a system that will be used to gain access to sides of a building for the purpose of cleaning windows. Because swing stages are transportable, the building on which they are mobilized, also becomes a part of the system. All systems consist of various components that are equally important for the safe and effective use of the system. Special care and consideration must be given to the building and work location mainly because these are the components of a swing stage that can change on a regular basis.

In the case of a swing stage the following components make up the system:

a) Support system- this is the part that holds the swing stage and may consist of building components, parapet clamps, outrigger beams or davit arms (permanently mounted outriggers). All rely on the strength of the building which enforces the fact that a building is a critical component of a swing stage operation.

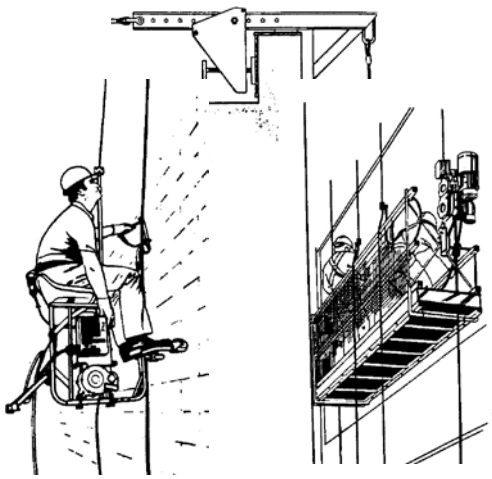
Counterweighted
Parapet

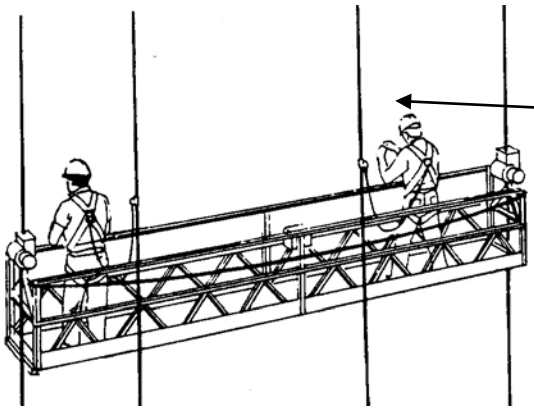


Clamp

Outrigger

b) Suspended system- this is the part that hangs from the support system. It usually consists of steel wire ropes, powered hoists or motors and a work platform as well as all the hardware which holds it together.





c) Fall Arrest system- this is the component that ensures the safety of the swing stage operators. It consists of a lifeline anchor point, lifeline, lanyard and rope grab and a full body harness.

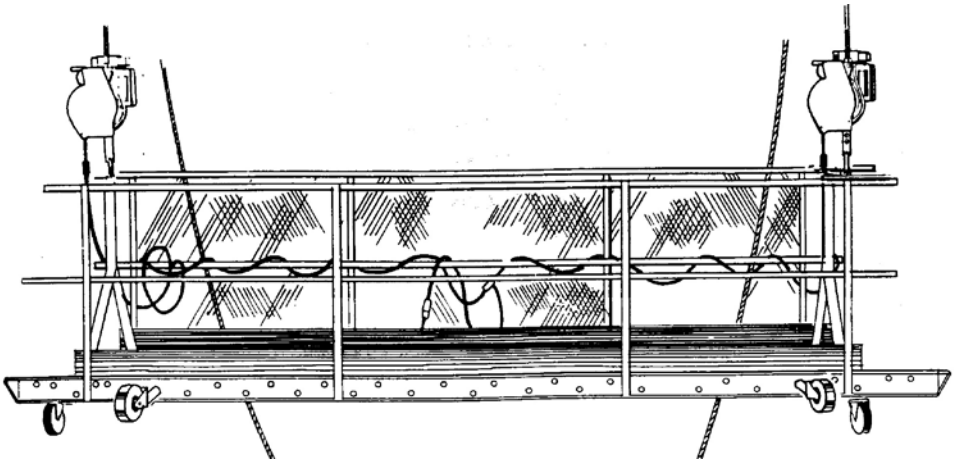
1. All components of suspended scaffolding including the personal fall protection systems are to be of approved design and used for their intended purpose only.

2. Suspended scaffolding should be assembled according to the manufacturer's specifications, Federal State and Local regulations.

3. Prior to assembling, a competent person shall inspect the components of the suspended scaffolding and all safety devices including motors, brakes, wire rope, stirrups/hangers, decking, guardrails, electrical devices, rigging equipment, ropes, harnesses, rope grabs and lanyards for their general condition. Those components which have defects shall be immediately removed from service, tagged or marked with a label which states, "Dangerous, Do Not Use", then restored or destroyed. Improvised repairs are prohibited.

4. All repairs or replacements should be made by the manufacturer or according to manufacturer's specifications.

5. Suspended scaffolding and its components shall be stored in such a manner as to provide ease of



access or inspection and to prevent danger of accident when withdrawing the equipment for use. Components shall be stored at a location where they will be protected from the elements. Working surfaces shall be kept free from grease, oil or other slippery substances. Wire rope shall be stored in a dry environment away from corrosive materials, coiled with its lay and tied to prevent uncoiling.

6. Prior to accessing the facade, the building exterior shall be visually inspected and, where necessary, appropriate measures shall be taken to ensure that building features, such as sharp edges of parapets, window frames, open projected windows and cornices or overhangs cannot impair the structural integrity of the suspended scaffolding or associated fall protection rigging. These areas should be noted in the plan of service.

During the use of transportable suspended scaffolding methods shall be used to eliminate 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 re-rigging and movement of main suspension and safety lines;
c) the ability to provide a prompt rescue in the event of an emergency.

Transportable ground rigged suspended platforms shall not be used above 300 feet unless the platform can be continuously stabilized.

7. Any one operating suspended scaffolding should be proficient in self-rescue techniques. Operators of the scaffolding shall have a means of communication to a point inside the building or to a company representative.

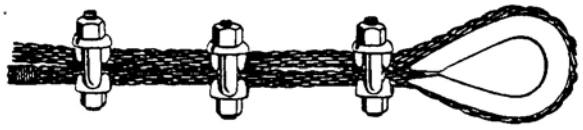
8. When rigging suspended scaffolding on the roof, if the workers are closer than 6 feet to the edge of the roof their personal fall protection should be engaged unless the parapet wall or guardrails are 42" or higher.

9. All roof hooks, parapet clamps, outrigger beams must be rigged to provide a support factor of 4 to 1 against the maximum hoist load. The strength of the building where it supports this equipment should be verified. All portable support equipment must be tied back to a sound anchorage.

10. On a counter weighted beam, the amount of weights shall provide a 4 to 1 ratio against the maximum hoist load. The weights must be non-flow able and secured to the beam.

11. Suspended scaffolding and its components should not be loaded beyond the manufacturer’s specifications.

12. The number of J-clamps on each support cable shall be at least 3 and spaced evenly. They should be checked regularly. U-clamps should not be used. Remember to always use at least 3 "J" clamps at the end of the steel cable. Space them evenly. Industry standards say to provide 30 foot-pounds of force to tighten them. They should be checked every day, before and after using the scaffolding. The vibrations caused by the scaffolding ascending and descending as well as building vibrations can cause them to loosen.



13. Spacing of suspension points are vital. The distance from motor to motor and motors to the workface should be in line.

14. When operating suspended scaffolding, workers shall use a personal fall protection system. It should consist of a body harness, shock absorbing lanyard, rope grab and lifeline anchored independently from the scaffolding supports. This system should be engaged at all times while on the scaffolding. The rope grab should be maintained at shoulder height on the lifeline unless it is a trailing model.

15. Lifelines shall be long enough to reach grade and should be padded wherever contact with the workface may cause abrasion. Lifelines may be stabilized by weighting the tail end or partially securing them to the suspended scaffold during the operation by Velcro straps or similar methods.

16. Knots should only be used in lines designed to accept the stress of a knot. Knots should be checked regularly to insure that they are secure.

17. It is recommended that a rope descending device be attached to the workers body harness so that a self rescue can be performed if necessary. If this isn't possible, a descent device should at least be available on the platform. Often times, it's best to have a complete RDS at the jobsite in case an emergency arises.

18. Unless the scaffolding deck has been modified correctly, the worker should not step off the deck or go beyond the motors to perform their work.

19. All electrical lines should be padded wherever contact with the building surface may cause abrasion. Electricity should be disconnected when not in use.

20. The control lever of any motor should never be tied back during operations.

21. If the scaffolding is left suspended when not in use, it shall be securely lashed or tied in to the building or workface.

22. Extreme caution should be taken when using suspended scaffolding around electrical lines or devices.

23. 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. On elevations higher than 130 feet (40 m), provisions shall be made for stabilization. Such provisions may include:

a) continuous;
b) intermittent;
c) work station and or angulated roping;

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

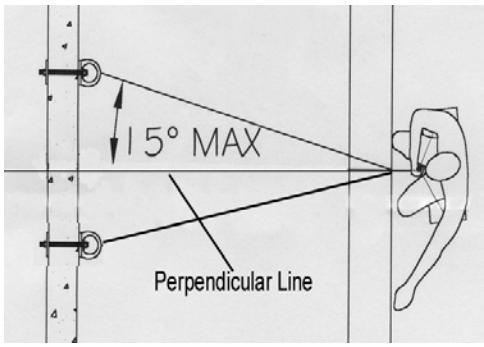
24. When operating scaffolding over public areas, all window cleaning tools should be secured either to the scaffolding or the worker.

25. Before, during and after the operation of a suspended scaffold, proper danger signs and barricades should be in place.

Supporting Equipment

1. 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 industry standards. Suspension to permanent equipment or anchorages shall be in a straight line with no more than 15 degrees angulation [see photo] in either direction.

2. Portable support devices shall be inspected by a competent person before, during and after daily use. Operators should check for cracks, bends, missing pins/bolts and other items which may affect the support capability of the device. Those components which have defects shall be immediately removed from service, tagged or marked with a label which states, "Dangerous, Do Not Use", then restored or destroyed. Improvised repairs are prohibited.



3. Portable support devices shall be assembled according to the manufacturer's instructions and specifications and shall provide a 4 to 1 ratio against overturning. Weights used to counterweight a transportable support device shall be non-flow able and secured to the device using means for positive engagement.

4. 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 photo] with the support device. The anchorage shall comply with industry standards. Tie-back lines shall be of wire rope whose breaking strength is greater than or equal to that of the primary suspension line.

5. A portable support device which uses the parapet wall for support is acceptable under the following conditions:
a) the support capability of the parapet has been approved by a registered professional engineer;
b) the support device meets the requirements of industry standards;
c) the location(s) on the parapet have been identified in the plan of service.\;
d) The use of portable outriggers with wheels at its fulcrum point that rest on the building parapet are prohibited.

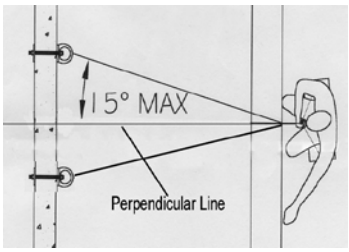
6. Horizontal movement of a worker or platform suspended from a transportable device is strictly prohibited unless:
a) it is designed to be rolled under load without disassembly and re-assembly;
b) it maintains an overturning stability of at least four to one;
c) its tie-back anchorage and safety line anchorage have been specifically designed for such movement and repositioning under load with a means to protect the suspension lines and lifelines from abrading horizontally against the roof edge, parapet wall, building features or appurtenances.

7. Attaching lifelines or suspension lines to or through freestanding weight(s) is prohibited.

Fall Arrest Equipment

1. The components of an independent fall arrest system shall comply with the requirements found in industry standards. Components of the fall arrest that do not meet these requirements are strictly prohibited.

2. The lifeline of the system shall always be anchored in line (within 15 degrees of perpendicular) [see photo] with the suspended worker or platform.



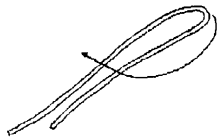
3. Anchorage of the lifeline should be independent of any portable support device.

4. The lanyard and rope grab assembly shall limit a free fall of no more than 6 feet (1800 mm) and shall have shock absorbing characteristics.

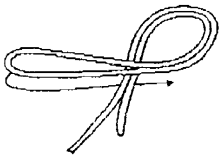
5. Operators of transportable suspended scaffolding shall wear a full body harness with the attachment in the upper middle back.

6. Fall arrest equipment shall remain engaged the entire time that workers are suspended by the platform and shall not be removed until the workers have reached the ground or safe working level.

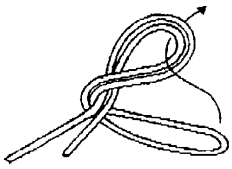
Tying the Figure 8 Knot for Lifelines



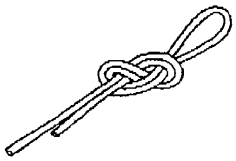
Step 1. Take the end of the rope and make a single loop at least 24" (2') in length.



Step 2. Take the middle of that loop and make another loop in the rope that is at least 18" in length. Now you have a doubled loop in the end of the rope. Take the end of the loop and go over the top of the doubled rope.



Step 3. After going over the top, come around the bottom of the rope with the loop and then from over the top insert the end of the loop into the first loop. This will look like a figure 8. Pull this tight. It is recommended to insert a "thimble" into this loop for ease of using locking D rings and for protection of the rope.



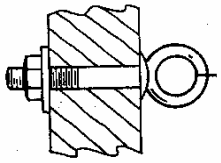
<----------Insert a thimble here.

Safety Hazards Under Jurisdiction of Building Owner/Management

Fall Protection

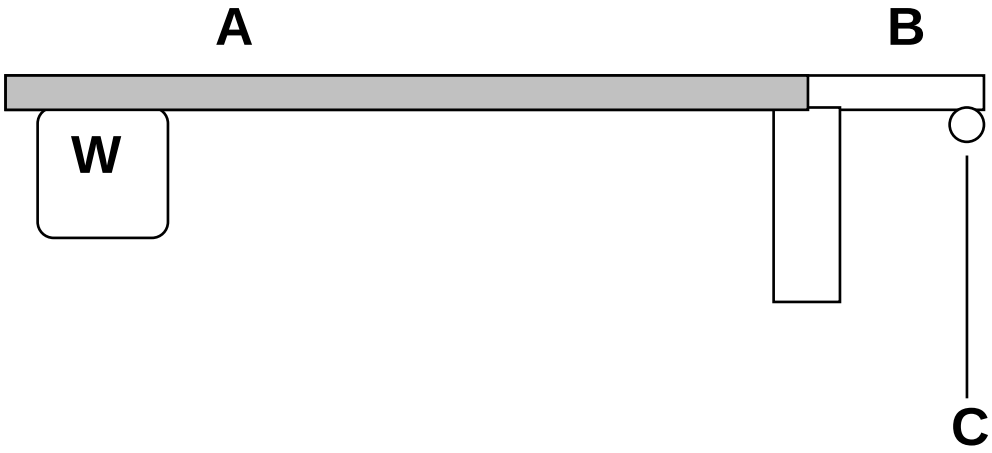
Fall protection, perimeter guarding, personal fall arrest systems or a personal fall restraint system (as applicable) shall be provided for all work areas (with the exception of working from a ladder supported at grade or using a window cleaner's belt and window cleaner's belt anchors) that expose a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

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 industry standards 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.

FORMULA FOR DETERMINING HOW MANY COUNTERWEIGHTS ARE REQUIRED FOR A PORTABLE OUTRIGGER BEAM.



$$W = \frac{B \times C \times 4}{A}$$

W= Number of counterweights

A= Distance inboard from fulcrum (front end of beam where it rests) to the point on the beam where the counterweights hang.

B= Distance outboard from the fulcrum point to the suspension point

C= Load rating of the hoist

x 4= OSHA's requirement of a 4 to 1 safety factor against the hoist load

Since C is always at least 1000 pounds, the formula might look like this in a typical situation.

1000 lb. hoist load
A 12 foot beam, with 2 feet extended outboard from the fulcrum.

W=? A= 10 B= 2 C=1000

$$\text{Therefore, } W = \frac{\overset{(B)}{2} \times \overset{(C)}{1000} \times \overset{(OSHA)}{4}}{\underset{(A)}{10}}$$

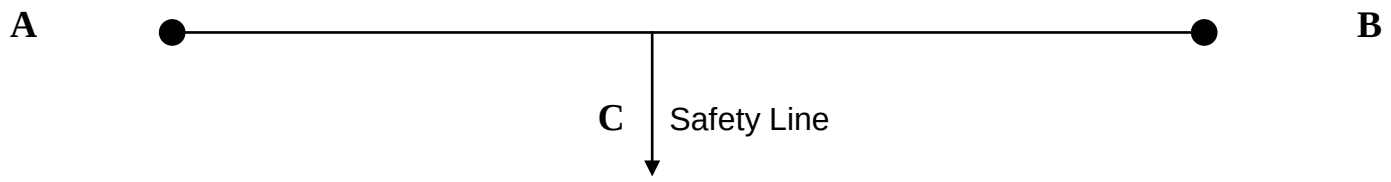
W = 800 lb of counterweights per beam

Even more common is the use of a 16 foot beam with only 1 1/2 feet of beam sticking out from the fulcrum.

$$W = \frac{1.5 \times 1000 \times 4}{14.5}$$

W = 415 lb of counterweights per beam

Side Loading and Static Lines



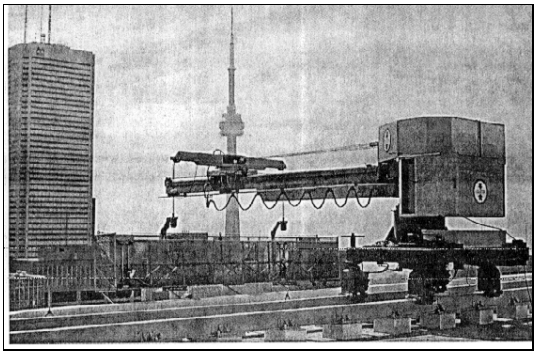
Side Loading

A rigging practice that has occurred for many years is the use of a horizontal or static line as pictured above. Window cleaners have often "stretched a line" from one anchor point to another and then attached their safety line in an opposite and perpendicular direction.

This is a VERY DANGEROUS technique because of the effects of side loading. Side loading occurs because the line is stretched and anchored from point A to point B. Putting a load on the rope in this manner is fine, until another load is placed on the rope and in a different direction (C).

When a horizontal or static line is used in this manner, the force or load in pounds which is generated to points A and B is incredibly high. A horizontal line stretched completely straight with the loading of a 180 pound person will generate 5, 294 pounds to each anchor point.

This is why industry standards suggest that only licensed professional engineers design and install horizontal lines. It's best to understand that adding slack to the static line will significantly reduce the loading that will occur at the anchors. More important is knowing the ability of the anchorage points to hold such rigging. Because of the complexity of trying to determine what slack is acceptable or what a typical anchor will hold, it is best that a licensed engineer design and/or approve a horizontal line.



Permanent Installations

A permanent installation is essentially a suspended scaffold that has been engineered and designed to remain on the building on which it has been installed.

Employees shall be trained by a competent person in the use and care of suspended platform 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. The training will be validated and a copy kept on file by the window cleaning contractor and be readily available to the building manager upon request.

1. It shall be the building owner, manager or operating agent's 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 industry standards.

2. Since the operation of a permanent installation begins on the roof, workers should have their personal fall protection engaged while placing the scaffolding in position. If lifelines are being used they should be anchored independently of the davits used for support. If a tag line is being used its connections should be checked regularly.

3. The intermittent stabilization system should be placed in operation when the scaffold is in the work position. It must be monitored during the operation to prevent any snagging. If any snagging occurs, the motors must be shut off immediately.

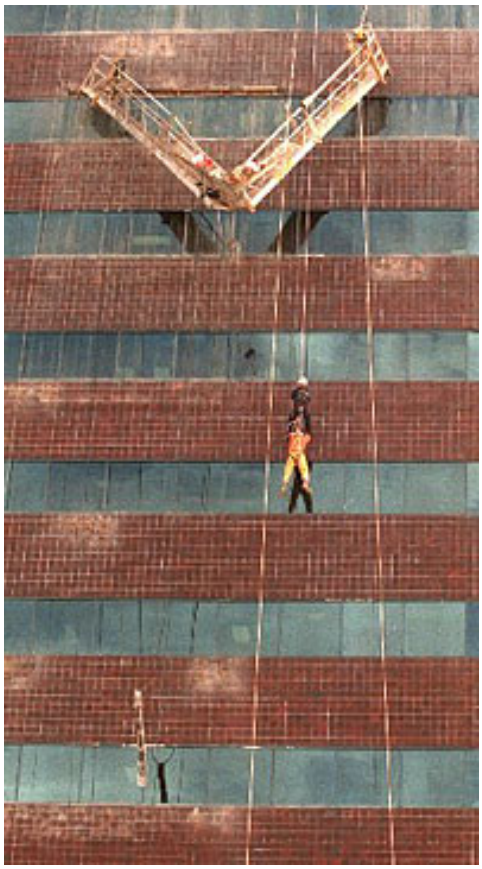
4. If the installation is equipped with steel cable winding drums, they must be monitored constantly during the operation. If they become tangled or jammed the motors must be shut off immediately.

5. If lifelines are being used it is recommended that the workers have available a controlled descent device to effect their rescue in the event of an emergency or malfunction. If there is a tag line in use, the phone on the scaffolding must be in good working condition.

6. Permanent installations should not be used when wind speeds or other weather conditions may affect the safety of the workers or public.

7. When working on or around any public areas, all window cleaning tools should be secured to prevent them from falling.

8. Before, during and after operating a permanent installation proper danger signs and barricades should be in place.



Fall Protection

Fall protection is of utmost importance to those engaged in professional window cleaning operations. In the past, there have been no guidelines for fall protection for general industry. The only existing regulation for some type of fall protection is found in OSHA CFR 1910.66 Appendix C, which covers fall arrest equipment as it relates to permanently installed powered platforms.

With the publication of the ANSI/IWCA I 14.1 Window Cleaning Safety Standard, window cleaners and property owners/managers now have at least a guideline on what equipment may protect workers from a fall from elevations.

Fall protection is divided into four subgroups. They are a) perimeter guarding; b) fall arrest; c) fall restraint and; d) warning line system. Excerpts from the ANSI/IWCA I 14.1 Window Cleaning Safety Standard are shown below.

Members of the industry hope that buildings will assess their roof or other areas where fall protection may be required and institute one of the following methods in order to create a safe place to work for window cleaning contractors. Remember, workers must stay at least 6 feet away from an unprotected fall hazard.

Perimeter Guarding

(a) Perimeter guarding shall consist of a parapet, guardrail or combination parapet guardrail system not less than 42 inches (1.1 m) above its adjacent surface and capable of withstanding a minimum lateral force of 50 pounds (23 kg) per linear foot between any two stanchions (applied at its uppermost elevation) or a minimum of 200 pounds (91 kg) 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 (1800 mm) 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.

Simply put, perimeter guarding is generally just a parapet wall that is at least 42 inches in height. It could also be a guardrail that's 42 inches high. There are cases where perimeter guarding is a little of both. Several feet of parapet wall with a metal guardrail on top of it creating the 42 inch barrier.

Personal Fall Arrest System

A personal fall arrest system describes those components that when assembled, stop the fall. In other words, the worker has already fallen. Fall arrest equipment will prevent them from falling further than 6 feet and typically consists of a lifeline, harness, lanyard and rope grab. Below are the requirements for such a system.

(a) All workers shall use a full body harness as a part of their complete fall arrest system and all components of that fall arrest system shall comply with ANSI Z359.1 with the following exceptions:

1) window cleaner's belts used during the cleaning of operable windows.

(b) In addition to complying with ANSI Z359.1, rope grabs used for fall arrest shall include by design, an anti panic stop feature.

(c) All components of the fall arrest system shall be compatible.

(d) Components of the fall arrest system subjected to an impact load shall be immediately removed from service and shall not be used again for employee protection.

(e) Lifelines shall be protected from contact with any surface that may abrade, sever, weaken or damage it. Ropes shall be inspected according industry standards and a means shall be provided by the employer to identify and log the use of lifelines. The securing of a rope to an anchor with a knot is permitted providing the specific knot does not decrease the initial breaking strength of the rope below 5000 pounds (2268 kg) considering the operators intended deceleration and the reduction of tensile strength over the course of daily use.

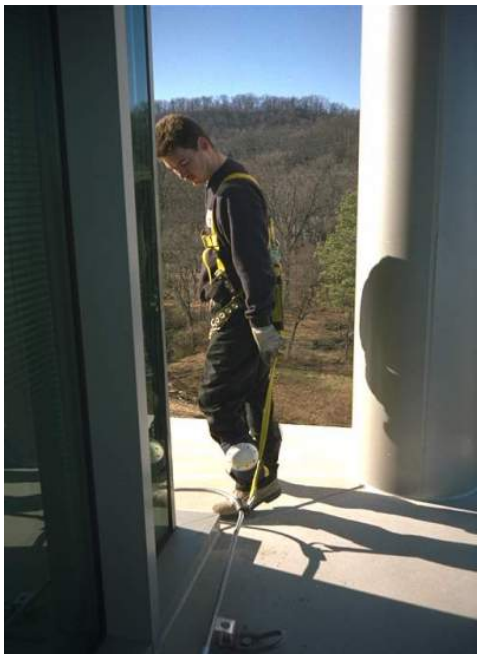
Rope shall be removed from service as recommended by the manufacturer or if one of the following conditions is evident or occurs:

1) braids are cut, or
2) excessive abrasion has worn fibers, or
3) there is hardness or stiffness, or
4) dirt or grit has clogged fibers, or
5) rust, tar or grease is present, or
6) line size has been reduced, or
7) subjected to a shock load, or
8) exposure to chemicals that affect their strength, or
9) exposure to excessive ultra violet degradation.

(f) Personal fall arrest systems shall not be attached to guardrail systems, nor shall they be attached to hoists.
(g) Personal fall arrest systems, when stopping a fall shall:
1) limit maximum arresting force on an employee to 1800 pounds (8 kN) when used with a body harness;
2) be rigged such that an employee can neither free fall more than 6 feet (1800 mm), nor contact any lower level;
3) bring an employee to a complete stop and limit maximum deceleration travel distance of an employee to 42 inches (1067 mm);
4) have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet (1800 mm), or the free fall distance permitted by the system, whichever is less.
(h) Anchorages used as a part of the personal fall arrest system shall comply with industry standards.

Personal Fall Restraint System

A fall restraint system describes that equipment that protects workers using the "dog on a leash" method. This enables workers to move on or around however, as they approach the fall hazard like the edge of the roof, the equipment prevents them from going near or being exposed to the hazard.



(a) Positioning devices shall be rigged such that an employee cannot free fall more than 24 inches (610 mm).

(b) Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

(c) Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

(d) Connectors shall have a corrosion resistant finish and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

(d) Positioning devices shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

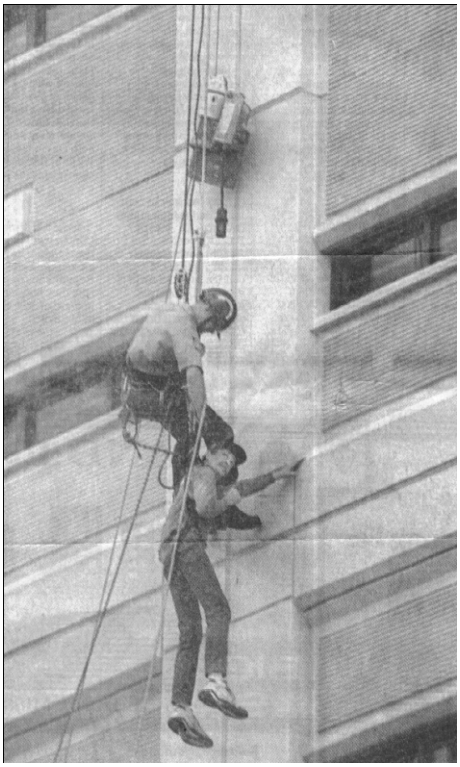
Warning Line System

A warning line system is typically a temporary barrier, much like a ground barricade, that is erected to keep workers from entering the "danger zone". In the case of a falling hazard, the danger zone is measured from the fall area to a safe surface and is usually 10 feet. In other words, workers must stay at least 10 feet away from an unprotected fall hazard when a warning line system is used.

(a) Warning line systems, used as a physical barrier to keep workers outside a fall hazard zone, shall comply with the following provisions:
1) shall be erected around all affected roof work areas at a distance of at least 10 feet (3 m) from the roof edge which is parallel to the warning line;
2) warning lines shall consist of ropes, chains or wires and supporting stanchions erected as follows:

A) the rope, chain or wire shall be flagged at not more than 6 foot (1800 mm) intervals with high-visibility material;
B) the rope, chain or wire shall be rigged and supported in such a way its lowest point (including sag) is no less than 34 inches (864 mm) from the walking/ working surface and its highest point is no more than 39 inches (1 m) from the walking/ working surface;
C) after being erected, with rope, wire or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (7.25 kg) applied horizontally against the stanchion, 30 inches (762 mm) above the walking/ working surface, perpendicular to the warning line, and in direction of the floor, roof or platform edge;

D) the rope, wire or chain shall have a minimum tensile strength of 500 pounds (227 kg) and after being attached to the stanchions shall be capable of supporting without breaking, the loads applied to the stanchions as prescribed in para. 9.2.4 (2)(C) of this Section;
E) the line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
3) no employee shall be allowed in the area between a roof edge and a warning line unless the employee is equipped with a complete fall arrest system.



Emergency Rescue

The following section is a compilation of information and techniques that address the requirements of OSHA pertaining to the rescue and self-rescue capabilities of employees in the event of an emergency situation while working on suspended scaffolding.

Not one of the techniques for rescue described herein should be attempted until workers are trained by a qualified person. All rescue methods should only be used if other means have been ineffective and the safety of the workers is at risk.

What Can go Wrong ?

Suspended Scaffolding whether it is transportable or permanent is an operation that requires quite a bit of initial set-up and rigging. There are many steps involved with the use of this equipment. This fact requires the users to know what they are doing, and they should take their time doing it.

With all the operation procedures involved, there is an increasing possibility that one of them will be overlooked or forgotten. This statement applies more to transportable equipment. However, there is no guarantee on permanent installations. Permanent Equipment normally sits outside on the roof for extended periods of time and without proper care and maintenance could develop problems. Also, since permanent installations are designed for the building that they are on, there are specific techniques that should be followed when using the unit. If they are not, problems can result.

Once again, the knowledge in this manual should reduce your exposure to these situations dramatically. To completely cover all aspects, we are going to trouble shoot this equipment as it is used in the workplace and discuss problems which may occur during the operation.

What is a Rope Descending System?

A rope descending device is part of a system of components that when used, provide a method of exterior building access similar to suspended scaffolding with one major difference. A rope descending system (RDS) operates primarily in the down direction only. These systems incorporate the use of synthetic ropes as the working lines and the descent device travels down the rope itself. The rate of descent is controlled by the number of points of contact that are placed on the device by the rope. Some descent devices operate by wrapping the rope around a cylindrical shaft. Others use a vertical travel of the rope through metal bars that provide the necessary friction. Whichever device is used, it should be noted that the more points of contact between the rope and device, the slower the rate of descent. This should be remembered when applied to a rescue situation. All descent devices can be locked off so that the worker can safely remain suspended at a work station.

RDS has become popular in the window cleaning and building maintenance industries in the past 25 years. Federal OSHA has no existing regulations concerning this equipment but will be releasing a standard devoted to descent equipment in the near future. In the meantime, Federal OSHA has published a set of interim rulings which must be followed when using controlled descent equipment. They are as follows:

1. Training of employees in the use of the equipment before it is used.

2. Inspection of equipment each day before use

3. Proper rigging, including sound anchorages and tiebacks in all cases, especially when non-permanent anchorages are used.

4. Use of a separate fall arrest system (which includes a harness, lanyard, rope-grab and a lifeline which is anchored independently of the friction device and it's support.

5. All lines installed, are capable of sustaining a minimal tensile strength of 5,000 pounds.

6. Provisions are made for rescue.

7. Ropes are effectively padded wherever building contact or other obstructions may cause abrasion.

8. Provisions are made for stabilization for descents in excess of 130 feet.

The above statements are the laws by which descent equipment must be used during a work operation. A rescue is not considered a work place environment; however, the above laws should apply when applicable. In particular, numbers 1, 3, 5 and 7. Number 4 may or may not be available depending on the type of rescue being performed.

Most of the manufacturers of descent equipment have recommendations on the safe and correct use of their equipment, and these too should be followed.

Why Perform a Rescue?

Again, the prompt rescue of employees who have just sustained a fall, or are left stranded on the side of the building is an opportunity to protect the health and well being of the employees. Any one who has not had proper training in the use of descent equipment, or rescue techniques should not do a rescue.

A tactical rescue team associated with a Fire Department can provide this assurance. These people undergo this type of training on a regular basis, in most cases.

Other reasons to consider a rescue is the fact stated earlier that a human body could endure only so long while suspended in a body harness. Removing a person from such a position would insure the safety of the individual. And the need for a prompt rescue may be lost while waiting for a Fire Departments Tactical Rescue team to arrive.

How to Perform a Rescue

If one end of a powered platform fails, the result is the workers being suspended in their body harnesses attached to a lifeline. This is the most serious of predicaments and should be attended to immediately.

The rescuer will need to lower a descending line for the suspended worker. The rescuer should set up their own rope descending system along side of the person being rescued. They should descend to the person and determine if the person can cooperate both physically and mentally.

If so, the rescuer will then place the descent device on the working line above the worker. They should then assist the worker in to the seatboard and attach it to the descent device. The worker now needs to disconnect from their engaged lanyard, rope-grab. Once a rope grab is engaged, it is difficult to disengage because of the weight of the suspended worker. The tension applied to the rope grab will have to be relieved before the rope grab can be moved. One method of doing this is to place an overhand loop knot in the lifeline at a point where the suspended worker can place a foot in to it and stand up. This relieves the tension on the rope grab and it can be slid down to the worker. Since the worker is on a seatboard and descent line, this process can be performed quite comfortably. The main reason for the seatboard is the comfort of the person being rescued. An alternative to the seatboard is available and recommended. There are body harnesses which have rescue straps built into them. When used, these straps keep the user in an upright (sitting) position. After the worker has removed the tension from the rope grab, they will be in a sitting position and ready to descend to the ground, working both the rope grab on the lifeline and the descent device on the descending line. Again, if the worker is unsure of the descent device, the rescuer can operate this for them.

Rescuing an Unconscious or Injured Worker

If the worker is suspended in their fall protection equipment and has either been rendered unconscious, or sustained an injury, the rescuer must take means to perform the rescue as quickly and safely as possible without further injuring the worker. Obviously, the worker will not be able to cooperate.

The rescuer must set up their rope descending system. Since the injured worker is on the lifeline, no additional lines will be used for this type of rescue. It is important to remember that unconscious or injured people should be moved as little as possible until medical help arrives. The rescuer needs only a descent device, additional lanyard, and a sharp knife to rescue this worker. The rescuer now descends to the worker and places the descent device on the lifeline above the worker. Then the additional lanyard should be attached to the device and then to the ring on the back of the workers harness, where the lanyard from the rope grab is already attached. The descent device should be placed on the lifeline so that there is no slack in the lanyard because the lanyard which is holding the worker to the rope grab is going to be cut and the least amount of movement for the injured person should be considered. The descent devices will be locked off by the rescuer and the original lanyard can now be cut. Once this is done, the worker will be suspended by the lanyard, descent device. The rescuer now unlocks the descent device and controls the descent for both rescuer and worker.

DEFINITIONS

accept, accepted, acceptable- a practice, design or method recognized by the industry or the authority having jurisdiction.
access platform- a platform used to gain access to an area of the building.
anchorage- a secure point of attachment.
angulated roping- a suspension method where the upper point of suspension is closer to the building than the attachments on the suspended unit causing the suspended unit to bear against the face of the building.
approved- accepted as satisfactory by a duly constituted administrative or regulatory authority.
bearing point- is a location on the surface of a building where the suspension line contacts the building.
boatswain's chair- a seat for one person, suspended by a single line or tackle, which is designed to be raised and lowered by the user or his/her assistant.
body harness- a design of simple or compound straps that may be secured about the wearer in such a manner as to distribute the stopping forces over the thighs, buttocks, chest and shoulders, or any combination thereof, and with provisions for attaching a lanyard.
cable- a conductor or groups of conductors enclosed in a weather proof sheath, that may be used to supply electrical power and/or control current for equipment or to provide voice communication circuits.
certified- accepted by design, evaluation or inspection by a registered professional engineer or legal jurisdiction.
competent person- a person who by way of training or expertise is knowledgeable of applicable standards, is capable of identifying workplace hazardous or dangerous conditions relating to the specific operation, is designated by the employer and has the authority to take appropriate actions.
controlled descent apparatus/controlled descent equipment- see RDS.
davit- a device used for suspending a platform or seat board from work, storage or rigging locations on the building being serviced. Unlike an outrigger, a davit reacts its operating load into a single roof socket or carriage attachment.
drop- a vertical area or work zone accessed by the worker or piece of equipment during one descent.
drop line- a vertical line from a fixed anchorage, independent of the work surface, to which the lanyard is affixed.
fall hazard- greater than 48 inches (1200 mm).
fixture- attachments, anchors, anchorages, tie backs or support equipment permanently dedicated to a given site.
grade- the ground, the floor, the sidewalk or any other approximately level, solid surface of sufficient area and having sufficient structural strength to be considered a safe work place.
guy- (standing rope) a supporting rope which maintains a constant distance between the points of attachment to the two components connected to the rope.
horizontal lifeline- a means of providing a certified anchorage for a personal fall arrest system, designed by a registered professional engineer.
in line- perpendicular with an area being accessed; a straight path between anchorage and suspended worker or between tieback anchorage and suspension device; parallel position of equipment or lifeline to work-face.
inside, from the- all of the window cleaner's body except one arm shall be on the interior side of the plane of the window frame.
installation- all equipment and all effected parts of a building which are associated with the performance of building maintenance.

lanyard- a flexible line to secure a wearer of a safety belt or harness to a drop line, lifeline or fixed anchorage.
level- a flat horizontal working surface.
lifeline- see drop line.
mobile scaffold, manual- a scaffold assembly supported by casters and moved manually.
outside, from the- more than a single arm of the cleaner's body is outside of the plane of the window frame
perpendicular- at a right angle to parapet or in line with an area being accessed.
platform- a working surface fabricated for persons that is capable of being elevated.
plumb line- is the shortest imaginary line that is formed from an elevated point to level ground.
portable equipment- equipment that is manually relocated from work position to work position on a given building.
power platform- a manned platform which is suspended by wire rope and operates by power to access areas of a building in the up or down direction for the purpose of building maintenance.
primary support/suspension- a working line or approved anchorage used for attachment of a working line.
professional engineer- one who has professional experience in the practice of design and installation of permanent window cleaning equipment, window cleaning devices, glass curtain wall and temporary scaffold rigging devices. Engineer must be familiar with all pertinent codes and standards and hold a valid license issued by the state in which he practices.
qualified person- a person who, by possession of a recognized degree or certificate of professional standing or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.
RDS (Rope Descent Systems)- an assembly of components that when properly configured will provide means to descend a drop in a manner whereby the acceleration forces of gravity are controlled, permitting the operator to slow or halt his/her descent on a synthetic fiber rope at any desired moment (aka, CDE, CDA).
rated load- the combined weight of men, tools, equipment and other materials which the device is designed and installed to lift and support.
safety line anchor- see anchorage.
sit harness- a design of simple or compound straps that may be secured about the wearer in such a manner as to distribute the stopping forces over the thighs, buttocks or any combination thereof, and with provisions for attaching a lanyard in the front waist.
shall- indicates the rule is mandatory and must be followed.
should- indicates a recommendation, the advisability of which depends on the facts in each situation.
sill- a component or group of components of the building or structure's exterior or interior, immediately below the window and of sufficient width and design to safely support a window cleaner while positioned by a window cleaner's belt.
slack- without tension or applied load.
standing line- a means to wind stabilize a work platform utilizing vertical lines strung between a fixture at the roof level and a ground anchorage.
static kernmantle- synthetic rope constructed of continuous filament strands woven into a dense cover over a unidirectional filament core and maintains low elongation (aka, static fiber rope, static rope).
swinging scaffold, manual- a platform suspended by two or more lines, designed to be raised and lowered by users and is independent of the building, except for attachment at the roof, parapet or other supporting fixture.
tie-back anchor- see anchorage.
transportable equipment- equipment that is relocated from property to property.
window cleaner- a person who by occupation and training is proficient in window cleaning.
window cleaner's belt anchor- specially designed fall preventing attachment points, permanently affixed to a window frame or to a building part, immediately adjacent to the window frame, for direct attachment of the terminal portion of a window cleaner's belt.

window cleaning- the operation of cleaning or restoring windows, wiping, or other methods of cleaning windows, window frame or curtain wall sections, spandrel panels, etc.
working line- a rope which is suspended vertically from an anchorage and is used for accessing parts of a building to provide maintenance (aka, drop line, main line).

END OF HIGH RISE SUSPENDED SCAFFOLD STUDY SECTION