International Window Cleaning Association

SAFETY & TRAINING

INFORMATION PACKAGE

VOLUME 1- EDITION 3

June/July-2007

Heat Exposure

Rope Descending Systems

OSHA QUICK CARD™

Protect Yourself
Heat Stress

When the body is unable to cool itself by sweating, several heat-induced illnesses such as heat stress or heat exhaustion and the more severe heat stroke can occur, and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.
- Seizures or convulsions.

Preventing Heat Stress

- Know signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning; rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water.

For more complete information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA

OSHA 3154-07R06

OSHA DATOS RÁPIDOS

Protéjase del Estrés por calor

Cuando el cuerpo no puede bajar su temperatura mediante el sudor, pueden ocurrir varias enfermedades debido al calor, tales como estrés o agotamiento por calor e insolación o golpe de calor, las cuales pueden resultar en la muerte.

Factores que llevan al estrés por calor

Alta temperatura y humedad, calor o sol directo, movimiento limitado de aire, esfuerzo físico, pobre condición física, algunas medicinas y tolerancia inadecuada para lugares de trabajo calurosos.

Síntomas de agotamiento por calor

- Dolores de cabeza, mareos, vértigo o desmayo.
- Debilidad y piel húmeda.
- Cambios de humor como irritabilidad o confusión.
- Nauseas o vómitos.

Síntomas de insolación

- Piel seca y caliente sin sudor.
- Confusión mental o pérdida de conocimiento.
- Convulsiones o ataques.

Evita el estrés por calor

- Conozca las señales y los síntomas de las enfermedades relacionadas al calor; observese a si mismo y a sus colegas.
- Bloquee el sol directo u otras fuentes de calor.
- Utilice ventiladores (abanicos) o aire acondicionado; descanse con regularidad.
- Beba mucha agua, como 1 taza cada 15 minutos.
- Vístase con ropa ligera, de colores claros y no ajustada.
- Evite el alcohol, bebidas con cafeína o comidas pesadas.

Qué hacer en caso de enfermedades relacionadas al calor

- Llame al 911 (u otro número local para emergencias) inmediatamente.

Mientras espera por ayuda:

- Mueva a la persona a un lugar fresco y sombreado.
- Suéltele o quítele la ropa pesada.
- Ofrézcale agua fresca para beber.
- Abanique y rocíe con agua a la persona.

Para información más completa:

OSHA **Administración de Seguridad y Salud Ocupacional**

Departamento del Trabajo de EE.UU.

www.osha.gov (800) 321-OSHA

Protecting Yourself in the Sun

Sunlight contains ultraviolet (UV) radiation, which causes premature aging of the skin, wrinkles, cataracts, and skin cancer. The amount of damage from UV exposure depends on the strength of the light, the length of exposure, and whether the skin is protected. ***There are no safe UV rays or safe suntans.***

Skin Cancer

Sun exposure at any age can cause skin cancer. Be especially careful in the sun if you burn easily, spend a lot of time outdoors, or have any of the following physical features:

- Numerous, irregular, or large moles.
- Freckles.
- Fair skin.
- Blond, red, or light brown hair.

Self-Examination

It's important to examine your body monthly because skin cancers detected early can almost always be cured. The most important warning sign is a spot on the skin that is changing in size, shape, or color during a period of 1 month to 1 or 2 years.

Skin cancers often take the following forms:

- Pale, wax-like, pearly nodules.
- Red, scaly, sharply outlined patches.
- Sores that don't heal.
- Small, mole-like growths—melanoma, the most serious type of skin cancer.

If you find such unusual skin changes, see a health care professional immediately.

Block Out UV Rays

- **Cover up.** Wear tightly-woven clothing that blocks out light. Try this test: Place your hand between a single layer of the clothing and a light source. If you can see your hand through the fabric, the garment offers little protection.
- **Use sunscreen.** A sun protection factor (SPF) of at least 15 blocks 93 percent of UV rays. You want to block both UVA and UVB rays to guard against skin cancer. Be sure to follow application directions on the bottle.
- **Wear a hat.** A wide brim hat (not a baseball cap) is ideal because it protects the neck, ears, eyes, forehead, nose, and scalp.
- **Wear UV-absorbent shades.** Sunglasses don't have to be expensive, but they should block 99 to 100 percent of UVA and UVB radiation.
- **Limit exposure.** UV rays are most intense between 10 a.m. and 4 p.m. If you're unsure about the sun's intensity, take the shadow test: If your shadow is shorter than you, the sun's rays are the day's strongest.

OSHA 3166-06R 2003

Preventing Skin Cancer

For more information about preventing,detecting, and treating skin cancer, check out these sources:

American Cancer Society
www.cancer.org
1-800-ACS-2345

Centers for Disease Control and Prevention
www.cdc.gov/ChooseYourCover
1-888-842-6355

The Skin Cancer Foundation
www.skincancer.org
1-800-SKIN-490

OSHA **Occupational Safety and Health Administration**

www.osha.gov U.S. Department of Labor

High Rise-Rope Descending System Operations

When you see a window cleaner sitting on a small board hanging from a rope on a tall building, what do you think ?

At first, many feel that the worker is just plain crazy. Some confirm the amount of bravery that's required and assume the employee is paid a million dollars an hour. Ultimately, most realize that it's an occupation left well enough alone and a select group is certain that high rise window cleaners on ropes have a death wish.

How Safe Is It ?

In the grand scheme of things, performing window cleaning from a rope and chair system is still safer than driving a car, flying in a plane and even climbing a ladder. The occupation of window cleaner is not even listed in the top 100 most dangerous occupations in this country. Millions of descents (times a worker goes down the side of a building) are performed each year and the ratio of accidents to the amount of use is obviously not alarming.

Where Did It Come From ?

For many years, industry standards and regulations that have applied to window cleaning only addressed block and tackle systems for suspended operations. This equipment required the user to hoist themselves up the building before going down to clean. As time progressed, industry standards gradually included the use of powered equipment particularly, suspended scaffolds.

While standards and regulations may have recommended that all buildings incorporate some type of permanent equipment to allow safety for exterior building maintenance, the facts show that most buildings in this country are ill-equipped when it comes to adequate anchors or other types of permanent equipment.

This scenario caused the window cleaning industry to develop new means and methods which considered safety, transportability and practicality. Sometime in the late 1960's is when the concept of descending a building from the roof down to stop at every floor and clean a window was born. Window cleaning company owners realized the benefits of transporting and mobilizing a rope descent system versus the use of a suspended scaffold or a block and tackle system.

The fact that less components were required, less trips to the roof during setup and takedown, and that workers only needed to access a buildings windows instead of the entire façade helped reduce the amount of labor involved with a window cleaning operation. When one company in a city started using rope systems, others followed suit and quite rapidly. By the mid 1980's rope descent systems had become the most popular means of providing high rise window cleaning services in the United States. At the time, California and New York were the only two states that did not recognize the use of this equipment.

Almost simultaneously the use of rope descending systems had become just as popular for window cleaning in Canada, the United Kingdom, Australia and several European countries.

How Is It Regulated?

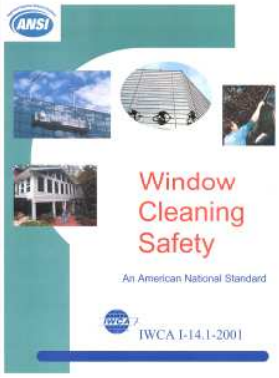
In the late 1980's the only standard devoted to window cleaning, the ANSI/ASME A39.1, discussed the topic of this "new" piece of window cleaning equipment. Several members made an effort to investigate the use of ropes and chairs and presented their findings to the entire committee. The A39 Committee found the report to be inconclusive and felt that basic safety parameters were missing when the equipment was considered for buildings that were not yet designed or constructed. Ultimately, the A39 Committee prohibited the use of "emergency descent systems" for window cleaning operations.

Not long after this, Federal OSHA saw the need to regulate rope and chair systems because of its extensive use. At first, OSHA was going to adopt the A39.1 Standard in the same manner they have adopted other ANSI Standards when developing new regulations. OSHA notified affected parties of their intentions.

The window cleaning industry became alarmed with the news that OSHA may adopt a safety standard which prohibited the singular most popular piece of access equipment in the country. Letters were sent, phone calls were made and OSHA felt the need to hold a public hearing to address this new piece of equipment. Ultimately, OSHA found rope descending systems to be a safe and viable means to clean a buildings windows. In 1991 a letter was distributed to all regional offices of OSHA explaining that a regulation would be promulgated. In the meantime, compliance officers were to enforce at least 8 simple safety precautions when the equipment was being used.

As time went on, users and regulatory agencies found the eight steps to be limited. The International Window Cleaning Association developed and published Safety Guidelines for Window Cleaning. In this small but effective pamphlet, window cleaners were given guidelines on the safe use of a variety of access equipment. The section on ropes and chairs had 25 safe practices to follow when the equipment was used. Because the State of California is self-regulated, they too set out to develop a section to their codes which encompassed "Controlled Descent Apparatus". The new addition to the States General Safety Orders Title 8 was recently published in August of 1998.

The ANSI/ASME A 39 Committee made several attempts to develop a section for their standard on the safe use of rope systems for window cleaning. Unfortunately, the committee could not achieve a consensus and ultimately was disbanded by the American Society of Mechanical Engineers. ASME then formed a new committee, the A41.1, to address the use of manual equipment for access to buildings. Simultaneously, the IWCA began the formation of a committee to address window cleaning safety. This committee will also consider the use of rope systems however, it will be specific to window cleaning. Recently, the IWCA applied to the American National Standards Institute to have this new committee accredited. On October 25, 2001, the American National Standards Institute approved the ANSI/IWCA I 14.1 Window Cleaning Safety Standard.

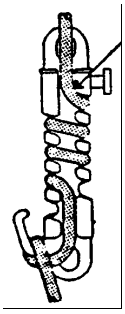


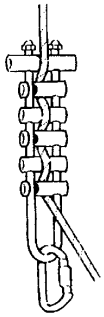
What is a rope descending system ?

Quite similar to all transportable suspended access systems, a rope descending system (RDS) consists of components that when assembled allow a worker to access the façade of a building. As with any transportable equipment, a RDS must consider the building as an integral part of the system mainly because the equipment is so easily transportable from one location to another.

When used correctly a RDS functions by allowing a worker to access the system on the roof, manuever outboard and slowly descend the workface with gravity as the power source. The rate of descent is controlled by the number of friction points that are placed onto the rope from the descending device. The amount of friction is substantial because in most cases, a descent is easily stopped by changing the direction of the working line by lifting it upward. To lock the system for an extended period, the user simply wraps the lifted working line around the top of the device which is usually pre-grooved for this purpose. There are some descending devices which automatically lock by using a tension spring to push the rope into a groove.

There are two basic types of descending devices which provide an adequate level of safety for the worker; the cylinder device and the rack and bar device. The cylinders were designed specifically for industrial applications while the rack and bar devices came from the sport and rescue industries.

Cylinder 

 Rack and Bar

The cylinder devices apply friction to the working or primary line in an elliptical fashion. As you can see by the illustration, the rope wraps around the cylinder several times and because it is a metal composite, quite a bit of friction is applied at each point the rope contacts the device. The rack and bar system applies the friction to the rope in a vertical fashion. The bars on a rack pivot in and out of position allowing the user to easily place the device onto a rope. The user has a choice of either aluminum or stainless steel bars. Each device and their sub-components are generally tested from 8000 to 10,000 lbs. at their respective factories.

ROPE

The type of descending rope being used is dependent upon the type of descending device. Cylinder type devices prefer rope that is loosely braided. The most common size of this type of rope is ½" in diameter. Solid braided nylon is often used and newer types of rope consist of a parallel core of synthetic strands surrounded by a woven outer cover or "sheath" of the same. These type of ropes are more forgiving to the elliptical effect placed upon them by the cylinder devices which means less backturning or "hockling" of the rope below the descending worker.

Because the rack and bar descenders come from the sport and rescue industries, they work best with the ropes most commonly used in these applications. Static kernmantle performs best when friction is applied in a vertical manner. The inner core of static kernmantle is generally parallel strands of synthetic fibers. This type of construction reduces the amount of stretch in a line considerably. The outer sheath of kernmantle is tightly woven strands which give the line a noticeable stiffness. The most common size of kernmantle used for descending is 7/16" although ½" is gaining in popularity.

The majority of rope used today by the building maintenance industries consists of nylon, polyester and or polypropylene fibers. These fibers greatly reduce damage from exposure to ultraviolet light (sunlight). They also are more resistant to abrasion and chemical abuse. Average tensile strength among these sizes and types of rope is generally over 6,500 lbs.

There are no set criteria as to what constitutes when a descending rope should be discarded. It is very rare that a rope just breaks without the help from a sharp building component or serious over abuse. Things to look for in a worn rope are excessive outer fraying, significant change in the diameter, chemical damage, cuts or abrasion and stiffness the whole way through.

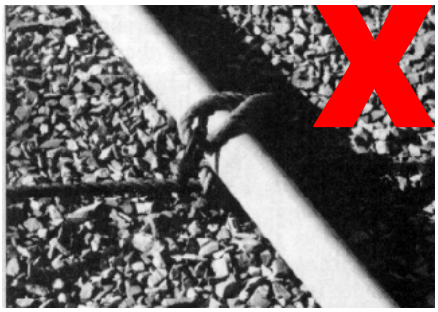
When on the roof of a building, a worker should lower their safety line, then their descending line. Once in place the worker can place the descending device onto the rope while standing on the roof. A seatboard which consists of a piece of wood and a 1 ½" nylon webbing strap is hooked to the descender with a locking d-ring or carabiner. Both of these components support well over 5000 lbs. Coupled with a backup safety system consisting of a rope, harness, lanyard and rope grab, the user is ready to descend to perform their work.

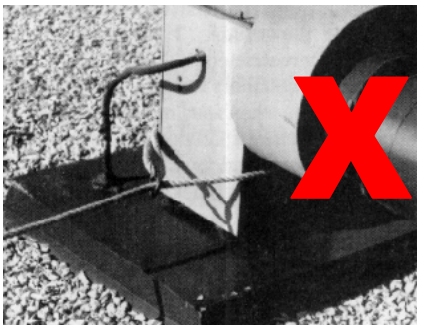
When it comes to using transportable equipment whether it is a rope descending system or swingstage, OSHA requires that all tiebacks, lifelines or main lines be secured to an anchor capable of supporting 5000 lbs.

When is the last time you saw something that even comes close to meeting this requirement on a roof you were rigging or planning to rig ?

The number one reason for fatalities in the exterior building maintenance industries is consistently due to falls from equipment that is poorly rigged. If it's not the primary rigging itself which fails, it is the secondary or backup fall arrest equipment.

Workers are regularly subjected to the real life game of jeopardy as they attempt to find adequate anchor points at each drop location on the roof of a building. The photographs show typical scenarios where workers relied on building components which are totally unacceptable however in their mind, were all that was available.





As you can see, danger thrives in the everyday world of exterior building maintenance. Experts agree that OSHA created more of a problem by requiring tie backs and lifelines be secured to adequate anchors without designating a specific responsibility for providing them. Although there are many ingenious and creative contractors out there, the home made or job made rigging equipment they use is not a substitute for basic engineering principles, which are crucial to supporting this kind of equipment. By it's very nature and design,

transportable equipment needs to rely on the building or structure it is being used on as an integral component of the system.

While there may be a slowly developing increased awareness by property owners and managers with regards to the installation of adequate anchorage points on their facilities, the majority of buildings in this country remain unequipped for the safe performance of exterior maintenance services.

This simple fact is one of the primary reasons rope descending equipment quickly developed into the system of choice for the professional window cleaning industry. Contractors felt much more confident when they only needed to rig a system which; a) only operated in the down direction and; b) applied one fifth of the loading of a suspended scaffolding and; c) consisted of less components and less rigging requirements. Secondary reasons are based upon efficiency issues since window cleaning only requires workers to access part of a buildings façade. And of course, once a company in town started using rope systems others followed suit to remain competitive.

Aside from these issues the simple truth remains. Numerous building maintenance industries have developed over the years with little attention to one of the most important safety requirements involved. Contractors across the country are physically unable to provide "anchors capable of sustaining 5000 lbs" on buildings where none exist. Transportable rigging equipment can be brought to a work site however, the need for tieback and independent lifelines remains. The fact of the matter is that property owners and managers need to realize their responsibilities in this area. It is their property and if they desire that contracted exterior maintenance be performed safely, they may have to do a little more to insure a safe workplace is provided.

Anchorage points may be also be an important component of a fall arrest or fall protection system on the roof of a building. Property management employees are at risk when performing routine maintenance on a roof that is not equipped for fall protection. This is one of the primary focus points in the new ANSI/IWCA I-14.1 Window Cleaning Safety Standard.

Rope Descending Systems

Employees shall be trained in the use and care of rope descent systems before they are permitted to use such equipment. Training shall include but not be limited to understanding the manufacturer's instructions, inspection of components, accepted rigging practices, identifying anchorages, descending, fall arrest requirements, rescue consideration and a full understanding of safe working conditions considering as a minimum, correct rigging, rope use, inspection and care and the effects of wind on suspended operations.

1. When such equipment is used for window cleaning applications, its design, use and maintenance shall conform to industry standards for rope descent systems and in accordance with the manufacturer's instructions. Only equipment designed in accordance with industry standards and intended for use in commercial applications shall be used.

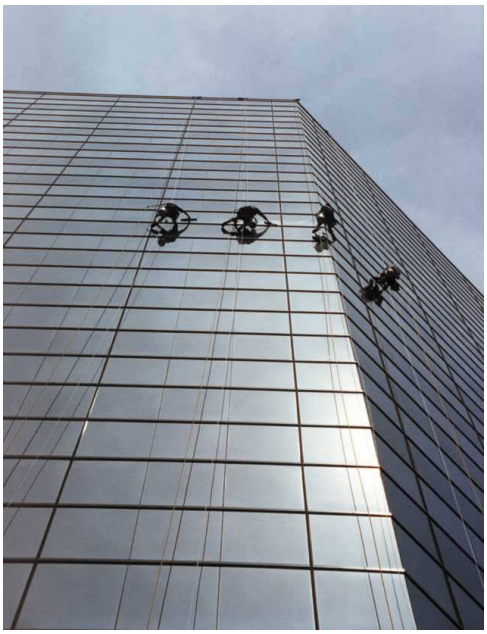
Many of the components of an RDS must meet specific safety requirements. Be smart when selecting a system. Find out if the equipment meets industry standards with regards to being used in a commercial application. Don't use equipment that looks like something it's not.

2. Prior to assembling, the operator shall inspect the components of the rope descent system and all safety devices including ropes, harnesses, rope grabs, lanyards, descent devices, chairs and hardware 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.

Make sure the synthetic rope and webbing is flexible and not stiff or hard. Check for tears, cuts or abrasions that may weaken the rope. Insure that metal hardware such as carabiners, buckles, and descending devices are free from cracks, splits or other damage. Be sure that your carabiners operate fully and LOCK.

3. Rope descent systems shall be stored in such a manner as to provide ease of access or inspection and to prevent danger of an 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. Ropes shall be stored in a cool, dry, dark environment.

4. 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.



It's very important to use the buddy system when performing RDS work. Sudden wind gusts or changes in the weather can be very dangerous. Have a plan to avoid that danger. In between long descents, take a break and move your legs. Do some stretching of your back and legs to stay loose.

Bring along an extra RDS to the job. This way if a co-worker does get stranded or needs assistance while suspended, someone can quickly set up this extra system for prompt rescue.

5. Prior to making a descent, 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 RDS or associated fall protection rigging. When used, padding shall be secured to prevent its dislodging from the surface to be protected. These measures shall be incorporated into the plan of service.

ALWAYS USE ROPE PROTECTION !!!! ***Most of the accidents with RDS involve the main lines being cut but a building object and careless workers. Use rope protectors and always have more on hand than you think you'll need for the job. It pays to have extra.***

6. Workers shall wear and completely assemble their personal fall arrest equipment prior to approaching the point of suspension. The worker shall be secured within the seatboard and fall arrest equipment prior to being suspended. Workers shall maintain their connection to a primary descent system and fall arrest system at all times when suspended. Disconnecting from either system while suspended is strictly prohibited.

WEAR YOUR HARNESS AND ATTACH YOUR GRAB ***before going over the side.***

Always stay connected to both main and backup systems.

7. Rope shall be rigged through the descent device with the appropriate number of wraps or friction points so as to ensure a controlled rate of descent. The diameter and construction of the rope used shall correspond to the manufacturer's specified rope diameter. Descent devices shall be connected to a seatboard using a double acting carabiner of manual or auto locking design. The attachment point on the descent device shall be of one piece construction with no gates or openings.

8. While suspended, window cleaners shall not reach further than six (6) feet (1800 mm) in any direction as measured from the plum line of the suspension point on the bearing point on the building. Rapid descents, excessive swinging and sudden stops are prohibited.

Don't try to do big overhangs or multiple windows in one descent. This is not safe and the risk is definitely not worth it.

9. 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. On descents higher than 130 feet (40m), provisions shall be made for stabilization. Such provisions may include:
a) continuous;
b) intermittent;
c) work station. (suction cups)
Descents shall not exceed 300 feet (91m) above grade unless the windows cannot be safely and practicably accessed by other means.

10. Operators of rope descent systems shall continuously monitor the condition of all components of the system. Any components subject to constant friction and wear shall be inspected regularly. Manufacturer's instructions with regards to maximum allowable wear points shall be followed. 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.

11. Extreme care shall be taken when using descent equipment around electrical service or heat sources and turbulent areas such as air vents.

12. Prior to using a rope descent system for window cleaning, proper danger signs and barricades shall be in place in accordance with industry standards. Where it may be a danger to the public, window cleaning tools shall be secured by tool lanyards or other similar methods in order to prevent them from falling.

13. Working lines shall not be used longer than two (2) years from date first placed in service or three (3) years from date of manufacture.

14. 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.

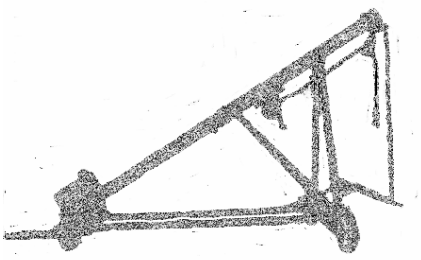
SEE PAGE 15 on how to tie and use the Figure 8 knot.

15. All ropes shall be protected from contact with any surface that may abrade, sever, weaken or damage it.

16. Ropes shall be inspected and a method shall be provided by the employer to identify the use of descent lines and lifelines. Rope shall be removed from service as recommended by the manufacturer or if one of the following conditions is evident or occurs: a) braids are cut; b) excessive abrasion has worn fibers; c) there is hardness or stiffness; d) dirt or grit has clogged the fibers; e) rust, tar or grease is present; f) line size has been reduced; g) subjected to a shock load; h) exposed to chemicals that affect their strength; i) exposed to excessive ultra violet degradation; or j) working lines that have been subjected to a rapid descent.

<u>Supporting Equipment</u>

1. 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 industry standards.



ANOTHER LEADING CAUSE OF RDS ACCIDENTS ***has always been related to workers attaching their work lines and or life lines to something on the roof that they guessed would hold them. When it comes to high rise and rope descending work, GUESSWORK is dangerous. Don't guess on anchor points, have the building verify what you're attaching lines to will hold you.***

2. Portable support devices shall be inspected by a competent person before, during and after daily use. Operator shall as a minimum, check for cracks, bends, missing pins/bolts and other items that may affect the support capability of the device. Those components which have defects shall be immediately removed from

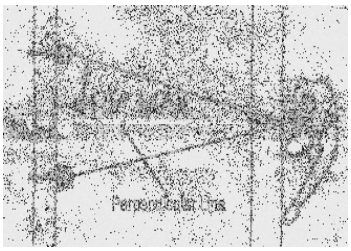
service, tagged or marked with a label which states, “Dangerous, Do Not Use”, then restored or destroyed. Improvised repairs are prohibited.

3. Portable support devices shall be assembled according to the manufacturer’s instructions and specifications and shall provide a minimum 4 to 1 ratio against overturning. Weights used to counterweight a transportable support device shall be non-flowable and secured to the device using means for positive engagement. Portable support devices shall be tied-back to a certified anchorage on the building with a rope equivalent in strength to the suspension rope.

ONLY USE WEIGHTS ***designed for a transportable outrigger. Sandbags or anything that could flow out or off the outrigger is*** **DANGEROUS.**

ALWAYS TIE YOUR PORTABLE ROOF RIGGING BACK !!!! ***and make it so that your tiebacks and safety lines are in a straight line.***

4. 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 photo] with the area being accessed. The anchorage shall comply with industry standards. 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. 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 their fulcrum point that rest on the building parapet are prohibited.

6. Horizontal movement of a worker 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 4 to 1;
c) its tie-back anchorage and safety line anchorage are independent of each other and have been specifically designed for such movement and repositioning under load and;
d) a method is used to protect the suspension lines and lifelines from abrading horizontally against the roof edge, parapet wall or other building feature or appurtenance;
e) employees moving transportable devices shall be tied off with a personal fall protection system in accordance with industry standards.

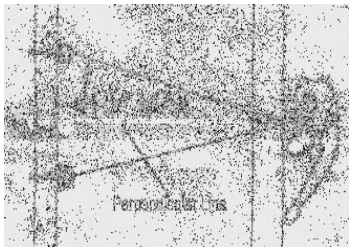
HORIZONTAL MOVEMENT OF A SUSPENDED WORKER IS DANGEROUS!!! ***In fact, for several years it has been the leading cause of window cleaning accidents. The only way it can be done safely is by at least following the guidelines above. If they cannot be followed, then it should*** **NOT BE DONE.**

7. Attaching lifelines or suspension lines to or through free standing or free hanging weights is strictly 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 a rope descent system shall wear a full body harness with the attachment in the upper torso located either in the front or back. In the case of an upper torso front attachment, the overall lanyard length shall not exceed 24 inches (610 mm). In the case of an upper torso rear attachment, the overall lanyard length shall not exceed 48 inches (1200 mm).

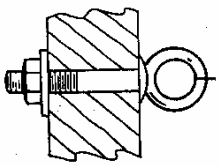
6. Fall arrest equipment shall remain engaged when the worker is exposed to a fall and during the entire length of the descent and shall not be removed until the worker has reached the ground or safe working level.

Safety Hazards Under Jurisdiction of Building Owner/Management

Fall Protection

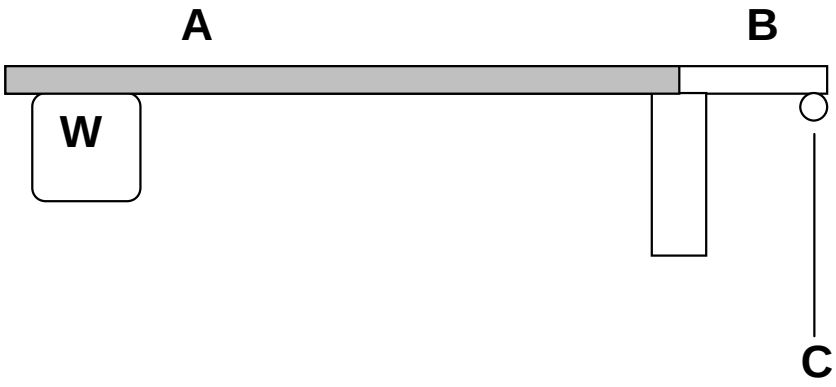
Fall protection, perimeter guarding, personal fall arrest systems or a personal fall restraint system (as applicable) shall be provided for all work areas (with the exception of working from a ladder supported at grade or using a window cleaner's belt and window cleaner's belt anchors) that expose a 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 load

Since C is typically around 250 pounds, the formula might look like this on an RDS portable rig.

12 foot beam, with 2 feet extended outboard from the fulcrum.

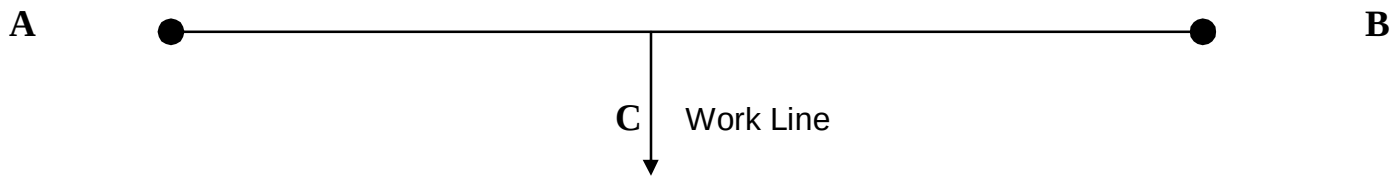
W=? A= 10 B= 2 C=250 x 4

(B) (C) (OSHA)

Therefore, $W = \frac{2 \times 250 \times 4}{10}$ W = 200 lbs. of counterweights per beam

(A)

Side Loading and Static Lines



Side Loading

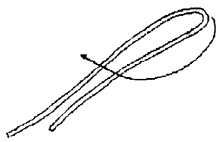
A rigging practice that has occurred for many years is the use of a horizontal or static line as pictured above. Window cleaners have often "stretched a line" from one anchor point to another and then attached their main working or descending line in an opposite and perpendicular direction.

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).

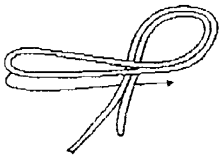
When a horizontal or static line is used in this manner, the force or load in pounds which is generated to points A and B is incredibly high. A horizontal line stretched completely straight with the loading of a 180 pound person will generate 5, 294 pounds to each anchor point.

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.

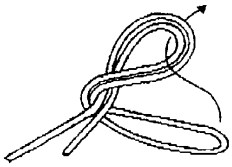
Tying the Figure 8 Knot to use as a termination for Descending Lines and Life Lines.



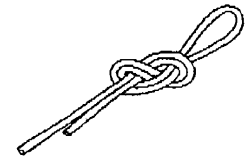
Step 1. Take the end of the rope and make a single loop at least 24" (2') in length.



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.

SHORT QUIZ

1. An RDS is powered by:
   a) Gasoline
   b) Kerosene
   c) Xylene
   d) Electricity
   e) Gravity

2. What slows the speed of a person on a RDS?
   a) Friction
   b) Tar
   c) Gloves
   d) The person
   e) None of the above

3. More wraps of rope on a cylinder descending device will:
   a) Make you go faster
   b) Make you go slower
   c) Make you go home
   d) Damage the device

4. The most common size of lines used for RDS are:
   a) 5/8 and/or ¾ of an inch
   b) ½ and/or 7/16 of an inch
   c) 2 inch
   d) 16 mm
   e) b, c and d
   f) All of the above

5. Tying or attaching a work line or safety line to an anchor may only be done when it can be proven the anchor will hold:
   a) 2 tons
   b) 2 guys
   c) 5000lb
   d) 2500lb
   e) None of the above

6. The number one cause of fatalities in the building maintenance industry when suspended equipment is used is poorly rigged equipment.
   a) True
   b) False

7. You can probably get all you need from the local sports and outdoor shop to create a Rope Descending System.
   a) True
   b) False

8. Synthetic fiber rope should be taken out of use when the fibers and the rope itself become very hard.
   a) True
   b) False

9. What wears out a synthetic fiber rope the most?
   a) Friction
   b) Electricity
   c) Sunlight
   d) Moonlight
   e) None of the above

10. When using a Rope Descending System to clean windows on a building, how many ropes does a window cleaner need ?
   a) Two
   b) One
   c) Three

11. While working on the roof of a building and the parapet wall at the edge is 40" high, you need to attach your fall arrest equipment when you're within how many feet from the edge ?
   a) 5 feet
   b) 10 feet
   c) 6 feet
   d) 42 inches

12. It's okay to remove your rope grab from your safety line when you get down to the second floor of a ten story drop.
   a) True
   b) False

13. Using a rope protector when doing a descent is most important when
   a) The boss says so
   b) The boss is at the job
   c) You have one with you
   d) Your ropes may be cut, abraded or damaged
   e) All of the above

14. When using a counterweighted beam to hang a Rope Descent System, the 4 to 1 ratio that you need means
   a) You need 4 weights per 1 person on the beam
   b) You need 4 wheels on each rig
   c) You need 4 times the weight of the person the beam is holding
   d) You need 4 times the total load that the beam will be holding

15. Which is the best type of knot to use for anchoring a synthetic fiber rope?
   a) Bowline
   b) Half Hitch
   c) Figure 8

ANSWERS

1	E
2	A
3	B
4	B
5	C
6	A
7	B
8	A
9	A
10	A
11	C
12	B
13	D
14	D
15	C