

MODULE 5

HEALTH & SAFETY PRACTICES



1. Lecture notes

Safe execution of roofing work. Prevention and protection measures

In the construction sector, and particularly in green roofs, falls from heights are among the main causes of accidents. Very often the accident is attributable to a lack of prevention and protection measures or failure to enforce regulations.

It is clear that without proper attention and a proper preliminary study, it is difficult to plan and manage the production process safely.

During the execution of works, regardless of the planning, in many cases a lack of risk perception is evident, which is conditioned by a variety of factors, such as the training received by workers and the organization of the company.

Learning unit 1: occupational health & safety standards

When carrying out work on roofs, appropriate measures must be taken at their edges, from a fall height of 2m, to prevent falls from above. In addition, roof surfaces that are not break-resistant must be secured.

If access to the roof of a newly constructed commercial, industrial or public building (e.g. halls, schools or sports facilities) is required at least once a year, the roof in question must be designed and constructed so that it has permanently installed internal or external access points. If an existing building does not have permanently installed roof access, safe temporary access points must be provided (e.g. a tower ladder for scaffolding).

Walking or working on roofs is not permitted without a special permit.

- In order to walk on the roof (visits, inspections,...etc.), personnel must be trained and the route to be followed must have been defined, secured and protected according to
- In order to carry out work on roofs, it is necessary to follow the procedure defined by current regulations

All roof entrances must be closed with a no-entry sign

Walking/working on the roof must take place safely;

- Firstly, collective protection systems must be used to prevent roof collapses (complete floors resting on beams) and falls due to the risks inherent in the elevated position (protective barriers, handrails, handrails, manhole covers).
- If this is not possible, safety nets can be used under the roof (collapse) or on the end of the roof (fall from a high position).
- If this is not possible, lifts or suspended baskets by means of cranes may be used. In these two cases, personnel are required to wear fall protection equipment and, in the second case (basket), a lifting plan must be drawn up.
- If this is not possible, personnel must be equipped with suitable fall protection devices (approved full body harness, energy-absorbing lanyard

if the fall potential is more than 4 metres) or short restraint lanyard (if the fall potential is less than 4 metres), self-locking spring hooks (or karabiners) and secure anchorage points. Alternatively, a full body harness and fall arrest system can be used.

In order to correctly identify the risks associated with green roof work, it is necessary to distinguish between two concepts:

- **FALL FROM HEIGHT**
event involving a risk of a person falling regardless of height
- **WORK AT HEIGHT**
work activity that exposes the worker to the risk of falling from a height of more than 2 m above a stable surface.

The prevention of accidents due to falls from height begins with the presence of adequate collective fall protection measures. When it is not possible to provide collective protection, it is necessary to use Category 3 fall protection PPE, to prevent the fall, arrest it or keep the worker in a safe position. Fall arrest systems with arrest or brake function are personal protective equipment that prevent the worker from colliding with the ground, structure or any other obstacle during a free fall. They must not only arrest the fall, but also absorb the impact force exerted on the worker's body. Indeed, the forces generated during a fall from height can be very high and impact on the body at the moment of sudden cessation of movement. Therefore, fall arrest systems must ensure that the impact forces on the worker's body are limited to the maximum value accepted as non-hazardous, i.e. 6 KN.

The planning of interventions, the choice of fall arrest PPE and its use must be entrusted to suitably trained personnel with specific technical knowledge. It is essential to determine the position and quantity of anchorage points, assess the free fall space and the minimum risk of pendulum effect.

PPE against falls from heights requires a careful choice and must always be

- suitable for the task to be performed;
- composed of several elements necessary to ensure security;
- CE marked;
- guaranteed by inspections and proper maintenance.

Rigid or flexible, all fall arrest systems from above are classified as non-permanent devices, since they are not permanently installed on the structure, but are only fitted during operational and inspection activities. Like all PPE, any fall arrest system must guarantee ergonomics and freedom of movement.

Learning Unit 2: Safety and protection equipment

During work at height, and thus in the construction of green roofs, it is necessary to define additional types of risk due to the occurrence of accidental events such as 'falling'.

The effects of a fall can be:

- Impact: worker reaching the ground with harmful consequences for his physical integrity:
- Pendulum effect: When the operator, who is properly harnessed and connected to the anchorage system, is subject to a fall, whether "conscious" or "unconscious", a lateral movement may in all probability be triggered with consequent oscillation, thus producing the pendulum effect. Since the oscillation is uncontrollable, it is clear that evaluations must intervene to avoid lateral impacts on present objects such as terraces and the like or even on neighbouring façades; the pendulum effect has its worst development in the corners of the roof, also in consideration of the fact that in the event of a fall, the rope itself suffers wear due precisely to rubbing against the edge of the latter.
- Inert suspension following loss of consciousness can induce the so-called 'suspension syndrome', which consists of a rapid deterioration of vital functions in particular physical and pathological conditions. the suspension of a slinged and immobile subject results in a 'blockage' of the blood to the lower limbs with no return to the heart due to the absence of a muscular pump (as the legs are not moving, they no longer perform the function of pumping blood to the heart). In addition to this, the compression of the hamstrings causes a slowing of the heart and a decrease in blood pressure. All this results in cardiovascular failure, which leads to death within minutes from cerebral insufficiency/ischemia.
- Rescue: if the injured person is unable to rescue himself, the intervention of specialised personnel must be requested. Rescue work can also be carried out by duly trained teams present on site or by external professionals. Rescue manoeuvres must be immediate, to try to get the injured and/or suspended worker back on the floor. While waiting for rescue, if the worker involved is conscious and has the possibility, he can try to move his limbs or relieve the pressure of the harness by reaching a rest area or by using the PPE he has and specific manoeuvres. Thus, rescue systems for work at height include specific recovery and abseiling devices that are carefully attached to the workers' harnesses and allow them to descend to the ground by sliding a rope, specifically connected to an anchorage point.

Free fall: is a fall where the fall distance, before the fall arrest system begins to catch the load, is greater than 0.6 m either in a vertical direction or along a slope on which it is not possible to walk without the assistance of a handrail. The maximum permitted free fall height is limited to 1.5 m

Restricted free fall: is a fall where the free fall distance, before the fall arrest system starts to catch the load, is 0.6 m or less either in a vertical direction or on a slope on which it is not possible to walk without the assistance of a handrail

Contained fall: is a fall where the person falling is held by the combined action of a suitable anchor position, length of lanyard and restraining device (harness). In this type of fall, the maximum arrest distance, under any conditions, may not exceed 0.6 m, either in a vertical direction or on a slope where it is possible to walk without the assistance of a handrail.

Fall totally prevented: situation in which the condition of total prevention of the risk of falling from a height is achieved, by means of a restraint system that prevents the worker from reaching the area where the risk of falling from a height exists

The fall factor

The fall factor (**FDC**) is defined as the ratio between the free fall of a body and the length of the fixed lanyard connecting it to an anchorage point.

- ✓ The FDC has a value < 1 when the anchorage point is placed above the harness attachment ring (which is normally placed 130/150 cm from the walking surface).
- ✓ The FDC has a value $= 1$ when the anchor point is placed at the same height as the harness attachment ring.
- ✓ The FDC has a value > 1 when the anchor point is below the point of the harness attachment ring

If we add 1 (one) metre tolerance to the fall space, we have defined the air draught. The air draught is the minimum distance required to allow a fall without reaching the ground or other obstacles. The assessment of the air draught is part of the risk analysis that the designer must carry out in order to identify the most suitable fall arrest system. The air draught must be calculated taking into account the characteristics of each fall arrest system and the type of anchorage point used. To prevent the operator from hitting the ground, the air draught must be less than the fall height.

Learning Unit 3: Pre- and post-operational checks

When there is a risk of a fall near one end of a flexible anchor line, it can happen that the mobile anchor device slides along the flexible line towards the centre of the line, dragging the worker with it. The latter will be subjected to the pendulum effect and the possible fall trajectory must be carefully assessed in relation to the possible presence of obstacles. In some cases, it is preferable to use a rigid guide instead of an anchor line.

The pendulum effect, during a fall from height, is an uncontrolled rotation and oscillation movement from which a 'risk of violent impact' against lateral or ground obstacles arises.

In order to eliminate the risk of falling and also the pendulum effect, it is necessary to use fall-arrest systems with a second anchorage point to which an additional lanyard can be attached (fig. 1) or to use a deflection point on the restraining rope (fig. 2). The USE prescriptions for the fall arrest system are provided by the client and must be adhered to.

In order to protect the lives of workers working on green roofs, it is necessary that the protective equipment used is always efficient.

Why perform periodic checks?

- All equipment, in particular safety equipment, must be kept efficient and regularly inspected.
- Failure to carry out periodic checks can lead to the ineffectiveness of the protection system and the lapse of liability on the part of the manufacturer.
- In the event of an accident, if maintenance has not been properly carried out, the owner of the anchorage system (owner, building manager, employer, etc.) takes full responsibility.

Lifelines:

Lifelines are safety devices, to be precise they are fall arrest anchorage devices. They are regulated by European laws UNI EN 795:2012 and UNI 11578:2015, i.e. by standards specifying the performance, requirements and test methods of anchor devices. Life-lines fall into the category of fall arrest devices and are therefore necessary for the safety of certain work activities such as: assembly, maintenance, roofing work, green roofs, etc.

The maintenance of lifelines is a much-discussed topic of fundamental importance to ensure the safety of workers and to avoid unpleasant penalties for the responsible party. There is an obligation for periodic inspection and maintenance on lifelines for various reasons, two of which are of paramount importance:

- ✓ The purpose of this check is to verify that the facility has not been damaged, tampered with or dropped out of sight.

- ✓ To avoid civil and criminal liability in the event of a fall: civil and criminal liability should not be underestimated when it comes to safety. For this reason, proper maintenance relieves the owner or safety officer of all liability.

Maintenance includes all the checks necessary to ensure that the devices can continue to be used and that they can last for years.

Inspections fall into three main categories:

1. Pre-installation inspections: i.e. all the necessary checks and inspections to ensure that the anchorage surface is suitable for the lifeline.
2. Inspections before using the device: Following installation, the device must be inspected to ensure that it is safe.
3. Periodic inspections: Periodic inspections to allow the fall arrest device to be used safely over the years.

The checks carried out include inspections of all lifeline components:

- Checking for wear, oxidation and corrosion
- Checking abnormal rope deformation
- Checking component deformation
- Clamp tightening
- Tightening of nuts and bolts: check with torque spanner the tightening torque of the bolts (as per the metric prescription of the various threads/bolts)
- Checking cable tension
- Condition of moving parts, if any

How often should audits be carried out?

Each lifeline or anchorage system must be inspected at regular intervals (generally annual) recommended by the manufacturer of the devices. However, the technical standards prescribe that the interval between two inspections must not exceed 2 years for inspections of the anchorage system and 4 years for inspections of the support structure and anchors.

How to Wear a Harness

1. Grab the harness by the back loop. Shake it so that the straps fall into place
2. If the braces, leg loops and/or positioning belt are tied, loosen and untie them
3. Slide the shoulder straps over the shoulders so that the 'D' ring is in the middle of the back between the shoulder blades
4. Pass a thigh strap between the legs and connect it to the other end. Repeat with the other leg strap. In the case of a harness with a belt, close it and adjust it after adjusting the leg loops.
5. Attach the front strap by placing it in the centre of the chest. Tighten to ensure correct fit of the shoulder straps
6. Make the adjustment so that the harness is snug while still allowing for movement.

Learning Unit 4: First aid techniques

SPINAL COLUMN INJURIES

A spinal cord injury can involve only the bony structure or it can affect the spinal cord contained within the spinal canal.

Suspect this lesion if:

- the injured person complains of back pain;
- if they complain of tingling, electric shocks, a feeling of heat or cold in their extremities;
- if he fell from a height, or standing from a height of more than 2 metres;
- if he suffered head and/or facial trauma above the collarbone.

The absence of pain does not exclude that there may be a spinal injury.

WHAT TO DO

The rescuer must first check and safeguard vital functions and avoid handling the casualty.

- Call for help promptly;
- do not move the injured person;
- Try to keep the patient's head immobile in a neutral position;
- control respiratory activity.

Even minimal movements of the injured person can be dangerous.

Only in the case of immediate danger, where it is essential to move the injured person, and if there are at least three or four people present, the move can be carried out as follows:

- the first rescuer grabs the head with one hand under the chin and the other under the nape of the neck, pulling the head along the axis of the body;
- the second grabs the ankles and pulls them in the opposite direction;
- the others place their hands under the thighs, pelvis, kidneys and shoulder blades;
- everyone lifts the casualty on command, trying to move the head, neck and torso en bloc, keeping him in traction, and places him on a rigid stretcher, even a makeshift one.

CRANIC TRAUMA

Head injury is defined as any event that has contributed to altering the anatomo-functional balance of both the skull and the brain.

Head trauma can cause various types of injuries such as **contusions**, scalp **abrasions** or **swellings**, **wounds** and, finally, **fractures of the vault** and skull base; **internal injuries**, ranging from **contusion**, **concussion** to **cerebral haematoma**.

It is always of particular significance and in severe forms, there may or may not be: **loss of consciousness**, projectile **vomiting** (without nausea), **dizziness**, **intense headaches**, **asymmetry of the pupils**, scalp **injuries**, **bleeding** from the nose (epistaxis), mouth or ears (otorrhagia), **paralysis of the limbs** or one side of the body.

In the case of a severe head injury, the appearance of a trickle of blood (otorrhagia) from one or both ears is strongly indicative of a fracture of the skull base (petrous fracture).

WHAT TO DO

When rescuing a head injury victim, the state of consciousness and respiratory function must be immediately assessed.

- Check for consciousness and normal breathing (beware of the risk of vomiting);
- if there are no suspicions of spinal trauma or other complications, it is advisable to **place the casualty in a safe position**: supine if the patient is conscious, keep the head in a slightly elevated position;
- in the case of bleeding from the nose, mouth and ears: do not block blood from flowing out of the orifices; it should drain;
- urgently call advanced rescue;
- monitor the patient while waiting for help.

ABDOMINAL TRAUMA

- It is a trauma that can cause severe damage to internal organs in the abdomen, with possible internal bleeding difficult to detect by a first responder.
- Signs of local abdominal trauma may be evidenced by **skin lesions**, **wounds**, **haematomas**, **ecchymosis**, spontaneous **abdominal pain** and on palpation.
- Symptoms of internal bleeding may be evidenced by signs of shock, paleness and sweating.

WHAT TO DO

Traumatised persons experiencing pain in the abdomen should be stretched out; their vital functions, particularly cardiovascular function, should then be assessed, and this assessment should continue until medical follow-up.

- Alerting Advanced Rescue;
- in the case of an abdominal wound, cover it with sterile dressing material, in the case of bleeding of the abdominal wall, try a compressive dressing, which is useless in the case of externalised internal bleeding;

- In the case of leakage of the intestines, one must absolutely not try to reposition them inside the abdominal cavity but must cover the viscera with a cloth, as sterile as possible;
- if an external object is embedded, it must be left in place and an attempt must be made to stabilise it for subsequent transport;
- Position the casualty in dorsal decubitus with the head slightly raised and the lower limbs flexed;
- cover the patient.

CHEST TRAUMA

Violent shocks or strong compressions of the rib cage can cause bone injuries associated or not with internal injuries. They may suggest thoracic trauma:

- head injuries and associated abdominal injuries;
- asymmetry in the expansion of the rib cage.

Obvious wounds do not always occur.

An injured person with chest trauma usually manifests:

- **pain during** deep breathing, or with coughing, or which increases with palpation of the chest;
- **laboured breathing**, which is subjectively felt as 'hunger/need for air' (dyspnoea);
- **cyanosis or pallor of the skin, sweating, agitation, rapid pulse.**

WHAT TO DO

In the traumatised person with chest pain, respiratory and cardiovascular function in particular must be assessed.

- *If the patient is stable, have the subject assume a semi-sitting position to facilitate the descent of the diaphragm and improve ventilation;*
- *in the case of a foreign body penetrating the chest, leave the object in place;*
- *cover the injured person;*
- *monitor vital parameters;*
- *alerting advanced helpers*

HEAT STROKE / SUNSTROKE

Prolonged stay in overheated environments can cause different pathologies, which are grouped under the term 'heat-related diseases'.

Heatstroke and sunstroke consist of an excessive increase in body temperature caused by high ambient temperature and the hindered dispersion of heat from the body.

The main signs and symptoms are:

- high body temperature (over 40°);
- congested face and red complexion;
- mental confusion, possible loss of consciousness, convulsions;
- dry and very hot skin;
- impaired breathing (rapid, laboured breathing) and rapid pulse;
- occasional occurrence of nausea and vomiting.

WHAT TO DO

- Control and possible support of vital functions with basic techniques;
- call for help;
- transport the injured person to a cool, ventilated area and in any case away from the source of heat;
- Place the subject lying down with shoulders slightly raised;
- undress it and cool the surface of the body:
 - with fresh sponges;
 - spraying or pouring water;

- wrapping it in wet towels or cloths on which to pour water;
- if available, placing ice (also synthetic) wrapped in a cloth, under the armpits, knees, groin, wrists, ankles.

Do not give alcohol and iced drinks

HYPERTHERMIA (Hypothermia)

Hypothermia is due to the individual's **stay in environments with intense and prolonged cold**, and is favoured by head trauma and intoxication by alcohol, carbon monoxide, prolonged fasting, bone marrow damage, and metabolic damage.

It consists of lowering the body temperature below 34°, which exceeds the body's thermoregulatory capabilities.

Cerebral vasoconstriction is at the root of the disorders experienced by the subject, who shows **tachycardia, physical and mental sluggishness, irritability, difficulty with vision and speech, sluggishness in reasoning** to the point of torpor.

It presents the main symptoms such as:

- initial chills, increased respiratory rate;
- impaired speech and movements, disinterest in the situation, hypersomnia;
- muscle rigidity;
- alterations in consciousness to the point of coma.

BASIC PRINCIPLES OF RESCUE AT THE SCENE

- Timeliness of intervention;
- prevent the patient from cooling down further, protection from the wind:
 - transport the subject to a dry, warm, but not excessively heated environment;
 - remove clothing if wet or frostbitten, try to warm the patient with massage and warm, dry cloths, without approaching heat sources directly;
 - give lukewarm-warm sugary drinks (absolutely no alcohol);
- control and possible support of vital functions with basic techniques;
- alerting the rescue services

2. Practical exercises 1

Data:

Lanyard $L = 2 \text{ m}$

Distance between anchor and sling = 1.2 m

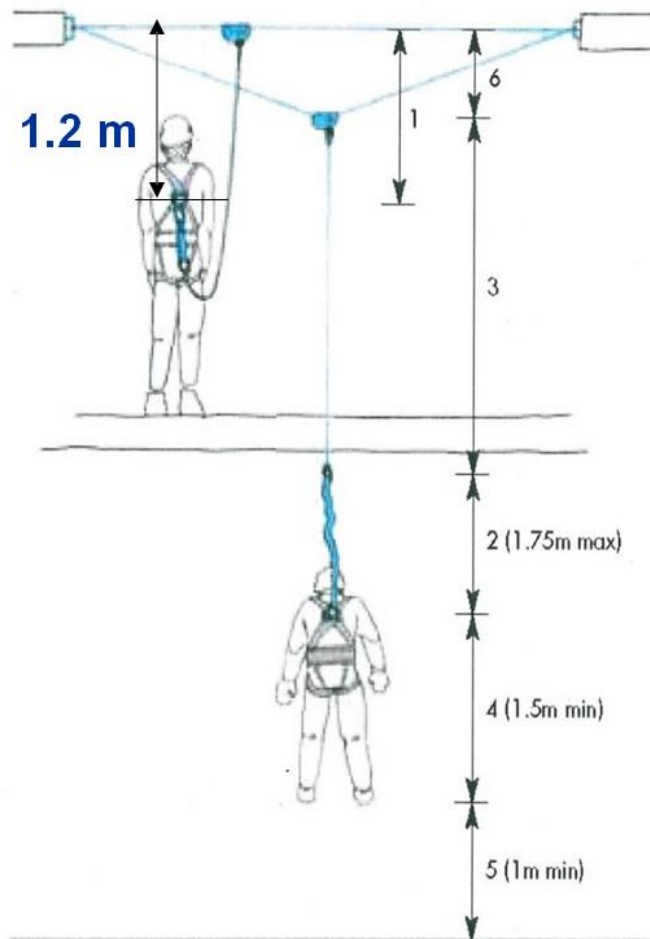
Max. absorber length = 1.75 m

Anchorage deformation = $..??$ (e.g. 0.9 m)

Fall $C = 1+2+6$

$C = (2-1.2) + 1.75 + 0.9 = 3.45 \text{ Mt}$

maximum expected fall



d) horizontal anchor line with energy lanyard

the minimum falling space/stopping distance is 3.45 Mt

3. Practical exercises 2

Data:

Lanyard $L = 2 \text{ m}$

Distance between anchorage and sling =

1.5 mt Max. absorber

extension =

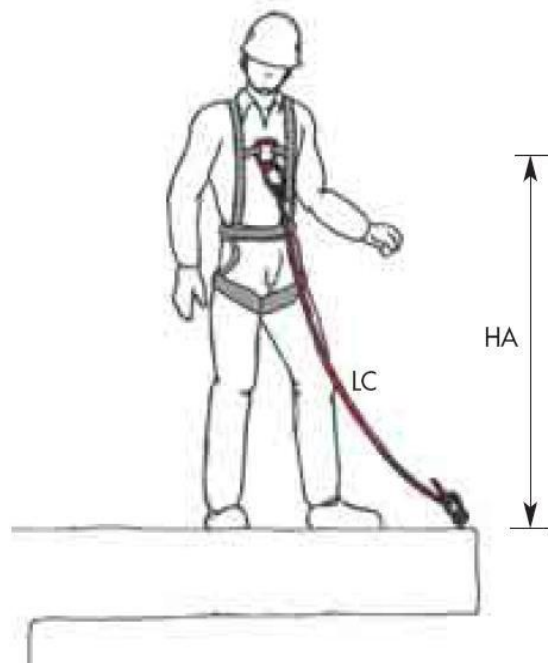
1.75 mt Anchorage

deformation = 0 mt

Fall $C = L_c + \text{attachment height} + \text{absorber}$

$$C = (2 + 1.5) + 1.75 = 5.25 \text{ Mt}$$

maximum expected fall



the minimum falling space/stopping distance is 5,25 Mt

3. Case Study 1

Type of accident: person falling from height / skylight breakthrough and workman's fall

Work: construction / asbestos roofing removal and replacement

Injury description

Context

For the installation of a [photovoltaic](#) system on an industrial building, the old asbestos roofing was replaced. The under-roofing consisted of a reinforced concrete slab with skylights made of corrugated plastic sheets, for the natural lighting of the site, which had, due to the degradation of time and the action of atmospheric agents, become very similar in colour to concrete. When the injured person arrived, the removal of the old asbestos roofing had already been carried out by other colleagues and it was being replaced of the same roofing with new plates.

Accident dynamics

The injured person, after having reached the roof of the shed by means of the scaffold, walked along a few metres onto the concrete slab and, placing one foot on a non-walkable slab of corrugated plastic, he broke through it, plunging (first onto a piece of furniture and then to the ground) inside the shed from a height of approximately 7 metres.

Contact

Between the body and the floor

Trauma outcome

- Head trauma - polyconcussion - incomplete fracture lower limb - 9th rib right
- Total days of injury: 20
- There are no permanent sequelae

Why did the accident happen?

Determinants of the event:

- The worker was walking on the under-coverage and stepped on a non-walkable structure (corrugated plastic sheets similar in colour to the concrete slab);
- the worker was not secured to the lifeline during work operations;
- lack of protection of skylight openings (dowelled or ballasted parapets,
- provision of metal nets or grids certified against the [risk of falling from a height](#), to be installed between the slab and the support perimeter, or inside the skylight frame or dowelled at the support perimeter).

Contact (positive) modulator:

- Presence of a piece of furniture in the shed at the fall trajectory of the injured person, which cushioned the fall to the ground.

Organisational criticalities underlying the event:

- Absence of specific training of the injured person for asbestos removal workers;
- Failure to survey the state of the roof and identify the correct working procedures, including the use of the lifeline present.

How to prevent

- Carry out a proper risk assessment indicating collective and individual prevention and protection measures;
- acquire the file of the work or the technical elaboration of the roof (if any), useful for planning the correct prevention measures;
- Prepare a Working Procedure Operating Instruction Prepare suitable walkways over the non-walkable portion of the roof with the relevant procedure;
- When work is to be carried out on roofs, priority must always be given to collective protection measures, such as
 - fixed metal scaffolding;
 - protective parapets along all sides towards the void;
 - axes to close the skylights and openings on the roof;
 - safety and service sub-floors;
 - walkways on non-load-bearing roofs;

Alternatively, when it is the only possible technical solution, adopt:

- safety nets
- use of [personal protective equipment](#) (PPE) against falls.
- implement proper worker-specific training for asbestos removal workers as well as training and instruction in the use of PPE

4. Questions and Answers

Q1: What is meant by total stopping or falling distance (h)

A1: The arrest fall is defined as the distance covered by the worker from the point where the fall begins to the point of complete vertical arrest, excluding oscillations, given by the sum of the free fall and the braked fall: $h = h_{cl} + h_{cf}$

Q2: What is the pendulum effect (on point anchorage)

A2: The pendulum effect is the oscillation of a worker in relation to his anchorage point as a result of a fall from height that has occurred offset from the line passing through the anchorage point and perpendicular to the falling edge

Q3: What are parapets?

A3: Parapets are collective protection devices (CPD) intended to protect people and/or objects against falls from height. They are made up of at least two uprights to which the main beam, the intermediate beam and the toeboard are fixed, which can be made of different materials (e.g. wood, steel, etc.).

A normal railing must fulfil the following conditions:

- A) must be made of rigid and resistant material in a good state of preservation;
- B) must have a useful height of at least one metre;
- C) must consist of at least two beams, with the middle one placed about halfway between the upper one and the floor;
- D) must be constructed and fixed in such a way that it can withstand, as a whole and in each of its parts, the maximum stress to which it can be subjected, taking into account the environmental conditions and its specific function.

Q4: What is meant by anchoring?

A4: Anchorage means the combination of three elements: the support structure, the anchor and the element to be fixed.

The anchor is the element that enables the connection between the element to be fixed and the supporting structure, while the element to be fixed is the component of the anchoring system designed to be fixed to the supporting structure.

The item to be anchored is connected to the individual fall protection system.

Q5: What is the air gap?

A5: The clearance is the free space, from the point of the worker's fall, required to compensate for both the free fall (h_{cl}) and all elongations/deformations of

the anchorage system and the fall arrest system, without the worker colliding with obstacles during the fall, and which includes any safety margin (r).

Q6: What is meant by a retention system?

A6: A restraint system prevents a fall from height by restricting the movement of the user so that he cannot reach the fall zone, it is not suitable for arresting a fall from height, and if there is a risk of a fall, it must be used in conjunction with an independent fall arrest system (e.g. work on pitched roofs). A restraint system generally consists of:

- a restraint belt or a harness with an integrated restraint belt;
- a restraining lanyard;
- of the connectors;
- an anchorage.

Q7: What does a rescue system consist of in case of work at height?

A7: A rescue system is an individual fall protection system by which a person can save himself or others in such a way that a free fall is prevented. A rescue system includes:

- a harness
- a rescue lifting device
- a lifeline
- connectors
- an anchorage

Q8: What is meant by fall factor?

A8: Fall factor (FDC) means the ratio of a body's free fall to the length of the fixed lanyard connecting it to an anchorage point.

The FDC has a value < 1 when the anchorage point is located above the harness attachment ring (which is normally 130/150 cm from the walking surface)

The FDC has a value $= 1$ when the anchor point is at the same height as the harness attachment ring

The FDC has a value > 1 when the anchor point is below the point of the harness attachment ring

Q9: What are the symptoms resulting from a spinal cord injury?

A9: A spinal cord injury may involve only the bony structure or it may affect the spinal cord contained within the spinal canal.

- Suspect this lesion if:
- the injured person complains of back pain;
- if they complain of tingling, electric shocks, a feeling of heat or cold in their extremities;
- if he fell from a height, or standing from a height of more than 2 metres;
- if he suffered head and/or facial trauma above the collarbone.

The absence of pain does not exclude that there may be a spinal injury.

Q10: What is a head injury?

A10: Head injury is defined as any event that has contributed to altering the anatomo-functional balance of both the skull and the brain. Head trauma can cause various types of injuries such as: contusions, scalp abrasions or swellings, wounds and, finally, fractures of the vault and skull base; internal injuries, ranging from contusion, concussion to cerebral haematoma.

It is always of particular significance and in severe forms, there may or may not be: loss of consciousness, jet vomiting (without nausea), dizziness, intense headaches, asymmetry of the pupils, scalp injuries, bleeding from the nose (epistaxis), mouth or ears (otorrhagia), paralysis of the limbs or one side of the body.

Q11: What is an abdominal trauma?

A11: Abdominal trauma is a trauma that can cause severe damage to internal organs in the abdomen, with possible internal bleeding difficult to detect by a first responder. Signs of local abdominal trauma may be evidenced by skin lesions, wounds, bruising, spontaneous abdominal pain and palpation.

Q12: Can prolonged stay in overheated environments cause illness?

A12 yes, Prolonged exposure in overheated environments can cause illnesses defined as sunstroke or heat stroke. Heat stroke and sunstroke consist of an excessive increase in body temperature caused by high ambient temperature and the hindered dispersal of heat from the body.

Q13: What is hypothermia?

A13: Hypothermia is due to the individual's stay in environments with intense and prolonged cold; it is favoured by head trauma and intoxication by alcohol, carbon monoxide, prolonged fasting, bone marrow damage, metabolic damage.

It consists of lowering the body temperature below 34°, which exceeds the body's thermoregulatory capabilities.

A14: What is an energy sink?

A14: An energy absorber is an anchorage system element or component designed to dissipate the kinetic energy developed during a fall from height

Q15: What is the technical cover sheet and what elements does it contain?

A15: The technical drawing of the roof is a document that contains the design, technical indications and certificates of conformity necessary to prevent and protect those carrying out work on the roof from the risks of falling from height. The elaborate must contain the following documents:

- the illustrative technical report (with verification of fall protection

systems)

- the anchorage calculation technical report
- the plans of the roof.

5. MCQs

QUESTION 1

To be able to walk on the roof

- A The route to be followed must have been defined, secured and protected according to HIRA
- B Personnel must be trained and the route to be followed must have been defined, secured and protected according to HIRA.**
- C It is sufficient that the personnel have been properly trained according to current legislation

QUESTION 2

Falling from height is

- A An event involving a risk of a person falling regardless of height**
- B An event involving a risk of a person falling from a height of more than 2 m
- C An event involving a risk of a person falling from a height of more than 5 m

QUESTION 3

Drop factor (FDC) means

- A The relationship between the free fall of a body and the height of fall
- B The relationship between the probability of a fall and the magnitude of the fall
- C The ratio of a body's free fall to the length of the fixed lanyard connecting it to an anchor point.**

QUESTION 4

The Pendulum effect is

- A An uncontrolled rotational movement resulting in a 'risk of violent impact' against side or ground obstacles.
- B An uncontrolled turning and swinging movement from which a 'risk of violent impact' against side or ground obstacles arises.**
- C A turning movement controllable by a lanyard from which a 'risk of violent impact' against side or ground obstacles arises

QUESTION 5

The guarantee of a fall arrest system is closely linked to:

- A Trained and informed personnel on the correct use
- B Correct and regular maintenance**
- C Type of make and model

QUESTION 6

The check on a structural anchor (mechanical dowel, threaded rod, anchor

screws) must be performed

A Directly on the anchors, otherwise on the posts, exerting a minimum force of 5 kN (500 kg) for 15 seconds, check by means of a dynamometer that the test value does not decrease.

B Directly on the anchors, otherwise on the posts, exerting a minimum force of 3 kN (300 kg) for 10 seconds, check by means of a dynamometer that the test value does not decrease.

C Directly on the anchors, otherwise on the posts, exerting a minimum force of 7 kN (700 kg) for 15 seconds, check by means of a dynamometer that the test value does not decrease.

QUESTION 7

An injury to the spinal column may involve

A Bone structure

B The bone structure and necessarily also the spinal cord contained within the vertebral canal.

C The bone structure or spinal cord contained within the vertebral canal.

QUESTION 8

What are the symptoms of internal bleeding?

A Nosebleed

B Abdominal pain and bruising with nosebleeds

C Skin lesions, wounds, bruises, abdominal pain

QUESTION 9

Work at height is defined as

A A work activity that exposes the worker to the risk of falling from a height of more than 2 m above ground level

B A work activity that exposes the worker to the risk of falling from a height of more than 2 m above a stable surface.

C A work activity that exposes the worker to the risk of falling from a height of more than 3 m above a stable surface.

QUESTION 10

Before accessing a cover, it is essential to

A ensure that the floor is load-bearing and does not present a risk of collapse due to the weight of people and materials

B ensure that the floor will hold and that there is no risk of it collapsing due to the weight of people and materials

C ensure that the floor is load-bearing and that there is an anchorage point

QUESTION 11

To eliminate the risk of falling, it is necessary to

- A Use prevented-fall systems with a second anchorage point to which an additional lanyard can be attached or use a rope deflection point**
- B Use prevented fall systems with an anchorage point to which a lanyard can be attached or use a rope deflection point
- C Use prevented fall systems with a second anchorage point to which an additional lanyard can be attached

QUESTION 12

The components of installed flexible anchor lines can have variable warranty periods

- A Up to 3 years
- B Up to 5 years
- C Over 10 years**

QUESTION 13

How many years of warranty from the date of installation does the anchoring device installation have?

- A 1**
- B 2
- C 3

QUESTION 14

While waiting for help to arrive, one must

- A maintain a calm attitude and reassure the injured person by intervening promptly to improve his or her psychophysical condition
- B maintain a calm attitude, only carry out interventions that are strictly necessary, assess the person's condition, reassure the injured person, do not administer drugs**
- C maintain a calm attitude, only carry out interventions that are strictly necessary, assess the person's condition, do not talk to the injured person so as not to traumatise them, and administer any medication available

QUESTION 15

Hypothermia is the lowering of body temperature below

- A 35°
- B 34°**
- C 30°