Westwood MECHANICAL INC.

#10-FALL PROTECTION- SAFE JOB PROCEDURES (revised Feb. /07))

1. PURPOSE:

Fall protection is a means of minimizing the risk of injury to a worker due to a fall from elevations usually exceeding 3m. Westwood Mechanical Inc. will provide its employees the training and equipment required to reduce or eliminate the risk of injury from falls. (revised Feb. /07)

2. GENERAL:

Falls account for a very high percentage of all lost time injuries and fatalities in construction:

The following are the categories of falls:

- **Fall to work surface (i.e. slips)**
- **Fall against object**
- **Fall from moving vehicles/equipment**
- **Fall from stairs , ramps and ladders**
- **Fall from one work level to another**
- **Fall from edge of work level**
- **Fall into/through an opening.**

3. SCOPE AND DEFINITION:

Definitions:

Anchor-

A secure point of attachment for lifelines or lanyards that is capable of supporting 4000 lb. In any direction. The minimum thickness for eyebolt anchor will be ¾ inch with an 1-½ inch diameter opening.(require a 1-1/2 openeingto prevent roll out)

Carabiner-

A link with a gate that is normally closed or that automatically closes. It is used to connect components of a personal fall protection system.

Control Zone-

The area between an unguarded edge of a building or structure and a line, which is set, back a safe distances.

Fall Arrest System-

A system that will stop a workers fall before the worker hits the surface below.

Fall Protection System-

Means any of the following when used to protect workers from a fall or risk of falling:

- **Guardrails**
- **A safety belt or full body harness with a lanyard and/or lifeline and an anchor and their related equipment.**
- **A safety net**
- **A control zone.**

Travel Restraint System-

A work positioning system to prevent a worker from falling from a work position , or travel restriction system to prevent workers from travelling to an edge from which they may fall.

Free Fall Distance-

The distance from the point where the worker would begin to fall to the point where the falls arrest system would begin to cause deceleration.

Full Body Harness-

A body support device consisting of connected straps designed to "distribute" a fall arresting force over the thigh, shoulders and pelvis, with provisions for attaching a lanyard, lifeline or other components. Most harness's are rated for 300 pounds and less than 6'-3" tall.

Horizontal Lifeline System-

A system composed of synethic or wire rope, installed horizontally between two anchors, to which the worker attaches a personal fall protection and the anchors should be spaced so that there is no possibility in acting as a slingshot.

Lanyard-

A flexible line of webbing, synthetic or wire rope that is used to secure a safety belt or full body harness to a lifeline or anchor.

Vertical Lifeline-

A synthetic or wire rope installed vertically from one or more anchors to which a workers lanyard (minimum of 5/8 inch thick is attached to a rope grab.

#10-FALL PROTECTION- SAFE JOB PROCEDURES

Personal Fall System-

An individual workers fall protection system which uses a protection safety belt or full body harness to secure to an individual anchor or horizontal lifeline.

Safety Belt-

A body support device consisting of a strap with a means for securing it about the waist and for attaching it to a horizontal lifeline. Puts a lot of force on your waist where you have many organs. USED ONLY IN TRAVEL RESTRAINT SYSTEMS, POSITIONING (HYDRO [POLE) AND SHORT FALLS OF LESS THAN ONE FOOT.

Shock Absorber-

A device intended to limit deceleration of a worker during fall arrest.

Swing Fall Hazard-

The hazard to a worker of swinging and colliding with an obstruction following a fall when connected to a lanyard or lifeline that runs at an angle to vertical.

Work Procedures-

The prevention of fall injuries by means of the control zone.

Guardrails-

Is a permanent or portable structural system as per local legislation consisting of a top rail, mid rail and toe board secured to vertical posts intended to stop a worker from inadvertently stepping off a working level and falling to a level below.

Surface Opening Protection-

Surface openings in floors and other walking surfaces where workers have access, must be protected by guard railing or secured wood or metal covers. The covering must be capable of supporting all loads to which it may be subjected. The covering must also be identified that there is an opening below.

4. **PROCEDURE:**

Evaluating The Risk:

When assessing the workplace for fall hazards, it is important to undertake a complete risk evaluation. This evaluation can be done in the form of a job hazard analysis, where the work is broken down into a number of distinguishable steps. The steps are then analyzed to determine the hazards and identify preventative measures to protect against the hazards. (see section 7 of Westwood Mechanical Health and Safety Program)

Control Measures:

Control measures are a means of reducing or preventing a worker from falling from heights exceeding 3 m. The following is a list of control measures that can be taken :

Fall Protection System Categories

- **Surface protection**
- **Fixed barriers**

Surface opening protection (removable covers, guard rails)

- **Travel restraint system (safety line and belt)**
- **Fall arrest systems (safety line and harness)**
- **Fall containment systems (safety nets)**

#10-FALL PROTECTION- SAFE JOB PROCEDURES (Revised Feb. /07)

The selection of the particular fall protection system to control the hazard to the worker is dependent upon the circumstances and the job task.

Ideally , the choice of a protection system will be the one that removes the risk of falling entirely. For example , it is preferable to provide a fixed barrier to prevent a worker from falling, than personal protective equipment (safety harness and lifeline). In this way , the worker is never in a position where an actual fall may occur. Otherwise , the worker must rely on the personal protective equipment to safely arrest the fall.

Guardrails:

Guardrails shall be provided at every open edge of a floor, roof , scaffold platform, work platform, ramp, shaft or other area from which a worker may fall:

- **Into water or working machinery**
- **A vertical distance exceeding 3 m.** (Revised Feb. /07)

Surface Opening Protection:

Guardrails/Floor Coverings

When plywood is used to cover openings , the minimum thickness shall be 19mm (3/4") with proper support for the plywood.

If work must be undertaken near unprotected openings from which a worker could fall the 3 m or more , access must be restricted to proper anchorage, as soon as the necessary work is completed, guard railing or adequate covering should protect the opening. (Revised Feb. /07)

REMEMBER: IF A FIXED BARRIER OR SURFACE COVER IS REMOVED FOR ANY REASON, PROPER TRAVEL RESTRAINTS AS STIPULTED HEREIN AND WARNING SIGNS MUST BE IN PLACE OR FALL ARREST SYSYEMS MUST BE PROVIDED FOR ANY WORKER WHO BECOMES AT RISK OF FALLING.

Travel Restraint Systems:

Safety belts/lifelines/lanyards/anchorage

The restraint system is made up of a safety belt (or safety harness), lifeline and/or lanyard and anchor. The safety belt is secured to a lifeline having a fixed length, which is attached to a secure anchor. The length of the lifeline is such that the worker can only proceed to within approximately 1 meter of an opening or edge. Under no circumstances should a travel restraint system be rigged so that a worker is in a position to fall.

Lifeline anchors may be installed with the use of a ladder or a powered elevated-working platform.

Fall Arrest:

Workers exposed to a free fall of 3 m or more , without restraint or guardrails , must wear fall arresting equipment using a full body harness system.

Every worker exposed to the danger of falling:

- More than 3 m
- Into unprotected operating machinery
- Into or onto hazardous substances or objects

Shall wear a personal fall protection system attached to a lifeline or anchor.

A complete fall arrest system consists of an anchorage point , lifeline, fall arrested, lanyard, shock absorber, and full body harness.

Aerial Devices:

Fall protection system is required for all workers working at elevation from aerial devices that do not have a proper guardrail system, these devices may include:

Ladder trucks
Bucket trucks
Baskets
Aerial baskets
Crane suspended lift

A proper fall arrest system shall be incorporated in to the work procedure, consisting of a full body harness, shock-absorbing lanyard and suitable anchorage.

Safety Nets:

Safety nets shall be used where it is difficult or impossible to arrange for guarding or to provide proper anchoring and lifeline systems for fall arrest. The most common application for safety nets is bridgework and structural steelwork.

Safety nets shall be designed , installed and maintained in accordance with ANSI Standard A10.11.

The safety net shall be installed so that it extends 2.5 m beyond the edge of the work area and not further than 7.70 m below the work surface.

Control Zones:

A control zone is used for leading edge or fixed work, where:

A minimum distance from the edge of 6 feet is used to protect workers not wearing fall arrest or travel restraint systems.
Workers working within the "control zone" must use the appropriate fall arrest or travel restraint systems.

Warning lines or barriers must be installed to indicate the zone from the building edge. The lines are made up of wire , rope or chain supported on stanchions or consists of a method providing equivalent protection.
Stanchions are spaced to ensure the warning lines are between 40 to 45 inches from the work surface.

Warning lines are clearly marked with high visibility material at intervals not exceeding 6 feet.

Warning lines and stanchions must be erected to resist , without tipping a force of at least 16-lb.

Scaffold Platforms

For erection or repairs , scaffold platforms may be required, during erection of a scaffold above 3 m, workers shall be tied off to a fall arrest system anchored to a fixed support or the scaffold structure.

#10-FALL PROTECTION- SAFE JOB PROCEDURES

Installation of vertical lifelines and horizontal static lines

Workers may attach the vertical lifeline to the structure with the use of a ladder, a power elevating work platform or a crane.

The installation of horizontal static lines can be done provided that :

1) **some means of fall arrest for the workers is already in place, and**
2) **there are points of attachment on the structure such as welded lugs or punched holes) to allow for the installation of an adequate anchor (such as a shackle or turnbuckle) at the end of the static line.**

It should be noted that some means of fall arrest should be provided for workers making the connections and installing the lines. Method to consider is:

- If the location permits , using either a powered elevated work platform or crane with a platform suspended from a boom.

5. EQUIPMENT/MATERIAL REQUIRED:

Fall arrest equipment must be CSA approved as per the following:
Z259.1-1976- Fall-Arresting safety belts and lanyards for the Construction and Mining Industries.
Z259.2-M1979- Fall arresting devices, personal lowering devices and lifelines.
Z259.10-M90-Full body harness.
Z259.11-M92-Shock absorbers for personal fall arrest systems.
ANSI A10.11-Safety nets used during construction , repair around demolition.

#10-FALL PROTECTION- SAFE JOB PROCEDURES

All workers must wear the appropriate work gloves and personal protection equipment when using/installing any fall protection equipment.

Maintenance:

Clean all equipment after work is done. To clean , wipe down harness with wet sponge. For more difficult to remove stains use soap. DO NOT USE CHEMICALS OR DETERGENTS. Next rinse off soap with clean water and hang up harness to dry away from high heat , humidity and sunlight.

Store the harness by hanging it from the rear Dorsal Dee Ring, on an adapted clothes hanger , or place loosely in a container. It is critical to store the harness in a clean , dry area free from excessive heat, harmful fumes, corrosive agents or rodents.

6. SPECIAL CONSIDERATIONS

The system components of a fall arrest system must be inspected before each use. The inspection will determine if there is excessive wear, damage or deterioration. Defective components must be removed from service and replaced with new components. If the equipment has been used in a fall do not use return it immediately to the shop inventory identifying that it has been used in a fall.

Workers erecting any of the anchorage, lifelines, etc., must be trained to install and use the fall protection system being used.

All warnings and instructions must be read and understood before using the equipment.

#10-FALL PROTECTION- SAFE JOB PROCEDURES (Revised Feb. /07)

Equipment must only be used by trained personnel who understand relevant regulations and standards pertaining to fall protection. To minimize the potential for accidental disengagement, a competent person must ensure system compatibility.

Body Wear:

- **Visually check all buckles to assure proper and secure connections before use. All straps must be connected and adjusted to provide snug fit.**
- **Fall protection connecting devices should be attached to the back d-ring of a full body harness.**
- **Unless compatible, never attach non-locking snaps to a d-ring.**
- **Side , front and chest d-rings should be used for positioning work only.**

Connecting Devices:

- **Use only lanyards containing locking snap hooks or locking carabiners, otherwise a regular snap could open when your lanyard rolls over it.**
- **Always visually check that each snap hook and Carabiner freely engages d-ring or anchor point, and that its keeper is completely closed and locked.**
- **Tie –off in a manner that limits free fall to the shortest possible distance (1.2 m maximum) and always above you. Never climb above your tie off point.**

- #10-FALL PROTECTION- SAFE JOB PROCEDURES

  - **Shock absorbers can elongate up to 3 ½ feet. This elongation distance must be considered when choosing a tie-off point.**
  - **Tie-off in a manner that ensures a lower level will not be struck should a fall occur.**
  - **Do not tie knots in lanyards or wrap around itself to shorten it.**
  - **Never disable or restrict locking keeper or alter connecting device in any way.**
  - **Do not attach multiple lanyards together , or attach a lanyard back onto itself unless specifically designed for such a connection.**
  - **Do not wrap lanyards around sharp or rough edges such as beams as this tends to weaken it and reduce its capacity. Use a cross arm strap or other compatible anchorage connector and connect to lanyard snap hook.**
  - **Do not allow rope or webbing to come in contact with high temperature surfaces, welding, heat sources, electrical hazards, or moving machinery.**

  - **Inspect lanyard webbing absorbers to confirm that it has not become unstitched then it is not safe because it has already been used in a fall.**

- #10-FALL PROTECTION- SAFE JOB PROCEDURES

Anchorage's:

- **Anchorage's must meet regulatory requirements i.e. Do not anchor to barriers like handrails.**
- **Always work directly under the anchorage to avoid a swing –fall injury.**
- **Ensure that the anchorage is at a height that will not allow a lower level to be struck should a fall occur.**

Golden Rules of Fall Protection:

1. **Limit Free Fall Distance in 1 second you fall 33 feet.**
2. **Avoid Swing Fall**
3. **Consider All Surrounding Hazards & Structures**
4. **Inspect Equipment Before Each Use.**
5. **Adhere to Manufacturers Recommendations**
6. **Seek Help When in Doubt**