<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Item</th>
<th>Amended by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2010</td>
<td>FP2010</td>
<td>Initial release</td>
<td>Tim Gondek</td>
</tr>
<tr>
<td>Nov 28, 2012</td>
<td>FP2010-Rev01</td>
<td>2012 OH&amp;S updates and content edits</td>
<td>Tammy Palmer</td>
</tr>
<tr>
<td>Dec 20, 2012</td>
<td>FP2010-Rev01</td>
<td>3.1.3 renamed Work Positioning Systems</td>
<td>Joy Hawman</td>
</tr>
<tr>
<td>Jan 14, 2013</td>
<td>FP2010-Rev01</td>
<td>Control Zones section added under 3.1(Formatting)</td>
<td>Joy Hawman</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

1.0 PURPOSE .......................................................................................................................... 4
2.0 FALL PROTECTION BASICS ............................................................................................. 6
3.0 FALL PROTECTION SYSTEMS ......................................................................................... 8
4.0 FALL PROTECTION SYSTEM'S COMPONENTS ............................................................... 10
5.0 PROFICIENCY TESTING ................................................................................................... 11
6.0 RE-CERTIFICATION PROCESS ....................................................................................... 13
APPENDIX I – DEFINITIONS .............................................................................................. 14
APPENDIX II – CALCULATIONS .......................................................................................... 17
1.0 PURPOSE

The purpose of this standard is to clearly establish the minimum acceptable content requirements for fall protection training programs, provided by accredited Training Providers recognized by the Oil Sands Safety Association (OSSA).

For definitions referencing this standard, see Appendix I.

Exceptions to this standard must be endorsed by the Board of Directors of the OSSA.

1.1 Disclaimer

The information in this publication is solely for general illustration and instructional purposes and does not, in any way, create a business or professional services relationship between the OSSA members and employees and the training providers, instructors, contract instructors, employees trained by accredited training providers, or any other organization. This standard will not apply to every circumstance. This standard is not (and is not intended to be) a definitive guide to the Alberta OH & S Act or the accompanying Regulation and Codes and regardless of the standards set out herein, each reader and user is solely responsible for their own compliance with all applicable Legislation, including the Alberta OH & S Act. The OSSA assumes no obligation to update the standard set out herein or advise on further developments concerning the topics mentioned herein.

The occupational health, safety and training of Organizations and competency of their respective employees in the workplace remain the responsibility of each employer and employee.

The OSSA and its employees, agents and contractors and the members of the OSSA (collectively the “OSSA members and employees”) as well as any organization (or member thereof) who accepts or acknowledges this standard, are not responsible for the contents of this standard, for any errors or omissions herein, or for the results obtained from the use of the information contained in this standard or for any training or safety programs that may be developed from the use of the information in this standard. Each training provider is completely responsible for its own training programs whether or not they are training programs approved by the OSSA. All information set out in this standard is provided “as is,” with no guarantee of completeness, accuracy, timeliness or of the results obtained from the use of this standard. There is no warranty of any kind, express or implied, including, without limitation, warranties of performance, merchantability and fitness for a particular purpose. In no event will the OSSA members and employees or any organization (or member thereof) who accepts or acknowledges this standard, be liable to the reader, user or anyone else for any decision made or action taken in reliance on the information in this standard or for any consequential, special, or similar damages (including, without limitation, personal injury), even if advised of the possibility of such damages, arising or resulting from the information contained in this standard or for any violation by such user, reader or other person of any Legislation.

Certain words, phrases, names, designs or logos used in this standard may constitute trademarks, service marks or trade names of the OSSA and its member organizations. The display of any such marks or names in this standard does not imply that a license has been granted by the OSSA or any of its members to use such marks or names.
1.2 **Introduction**

Participants required to utilize fall protection equipment must be trained and competent in its proper use, care and maintenance. This Fall Protection Training Standard has been established to guide the Training Provider on the minimum training program content requirements to meet the needs of the OSSA member companies.

It should be noted that the training required to meet this standard focuses on the needs of the “workers”. Additional fall protection training may be required for, but not limited to, the following:

- Supervisors and engineers to reflect their responsibilities;
- Manufacturer's specific equipment;
- Manufacturer's periodic equipment inspection & recertification requirements;
- Installation of fall protection equipment;
- Specialty equipment (e.g. control descent devices, safety nets, self-rescue devices, etc.); and
- Other applications (high angle rescue, pole climbing, rope access work, etc.).

This is the **minimum** standard that must be met for a Training Provider to have their program receive accreditation as an OSSA Fall Protection Training Provider.

1.3 **Program Scope**

The scope of an accredited program will include, at a minimum, the following content:

- Compliance with all relevant provisions of the Alberta OH&S Act, Regulation and Code;
- Training providers must ensure their program requires the inclusion of a confirmation from each participant that they are physically capable of performing the controlled weight transfer;
- The safe execution of the controlled weight transfer is a mandatory requirement to receive the OSSA fall protection credential; and
- All programs submitted for accreditation must at a minimum meet the requirements specified in each section of this standard.

Subject to the previous sentences, all programs submitted for accreditation must at a minimum meet the requirements specified in each section of this standard.

1.4 **Training Material Information**

Training programs must, at a minimum, contain the following materials and/or meet the following requirements:

1.4.1 The training program must be at a minimum 8 full hours.

1.4.2 A detailed lesson plan (the instructing process, timelines, and the section learning objectives each instructor is to follow).
1.4.3 All slides, overheads and booklet/pages must be numbered.

1.4.4 All printed training and presentation material including references to weights and measurements must be expressed in both imperial and metric units;

1.4.5 A participant user guide and / or workbook outlining basic fall protection concepts and calculations, to be kept by the participant upon successful completion of the program.

1.4.6 Copies of the applicable sections of the current Alberta OH&S Act, Regulation & Code regarding fall protection, including but not limited to current Alberta OH&S Code Parts 2, 7, 8, 9, 22, 23, must be made available to the participants during training.

1.4.7 CSA approved lanyards and Group A harnesses (minimum of 1 harness per 2 students), must be made available for use by the instructor and participants for classroom exercises and during proficiency testing.

1.4.8 Approved Group D, E, L and P (or equivalent) rated harnesses approved to current Alberta OH & S Code requirements, and must be made available for demonstration purposes.

1.4.9 Other approved connecting components approved to current Alberta OH&S Code requirements, and must be made available for demonstration purposes including, but not limited to:

   a) Double locking snap hooks;
   b) Carabiners;
   c) Fall Protection manufactured wire rope (cable wraps, anchorage connectors, etc.) and synthetic webbing;
   d) Life safety rope and fall arresting device; and
   e) Self-retracting devices (SRD’s).

1.4.10 Additional training aids may be used as determined by the provider. Examples include but are not limited to (to be included on the Appendix ‘D’ of the Correlation Matrix):

   a) DVD’s or videos;
   b) Models (a horizontal lifeline);
   c) Pictures & posters (safety net); and
   d) Audio visual equipment.

2.0 FALL PROTECTION BASICS

2.1 Minimum Program Content

The training program must provide a balance between theoretical instruction and practical application with frequent, hands-on exercises performed by all participants both individually and in groups. The training program must have, at a minimum, the following content:

2.1.1 Introduction that covers, at a minimum, the following:

   a) The different fall hazards and the effects on the individual (i.e. falls from the same level, lower level, ladders, stairs. etc.);
b) A brief review of the Legislative requirements covered in the current Alberta OH&S Act, Regulation and Code, including the responsibilities of the worker and employer (Part 2 of the Act); and

c) Reference to the most recent statistical information on fall injuries and fatalities from Alberta Workplace Health and Safety. In addition, Providers may choose to provide statistics from other sources. Statistical sources and examples must be identified and dated. To reflect best practices examples provided must be current within the last three (3) years.

The program content must be updated at least annually to reflect current statistics.
(Note: This updating will not require re-submission of the program as a content change to the OSSA)

2.1.2 Fall Protection Planning Instruction that includes, at a minimum, all requirements listed in Part 9 of the current Alberta OH & S Code and the following:

a) Development and application of a basic fall protection plan, in addition to Part 9 requirements, must include:

   i. Method(s) of hazard identification;

   ii. Hazard Assessment and control including a practical exercise to be conducted during class; and

   iii. A review of the hierarchy of hazard controls (elimination, engineering, administrative, personal protective equipment, Part 2 of the Alberta OH&S Code).

b) Review of basic rescue and escape planning components including:

   i. Identifying an emergency contact;

   ii. Identifying basic rescue equipment needs;

   iii. Identifying methods of communication for various fall scenarios and work locations (remote location versus plant site);

   iv. Suspension trauma hazard (i.e. orthostatic incompetence);

   v. Self-rescue hazards (i.e. entanglement, accidental release, etc.);

   vi. Post fall protocols/options (Part 9 Alberta OH&S Explanation Guide); and

   vii. Practical exercises in emergency response procedures (i.e. table top exercise that includes a scenario and filling out an Emergency Response Plan).

c) The importance of the inspection of all equipment and system components, both the pre-use visual inspection, including reporting of deficiencies, removal from service and manufacturer's requirement for recertification inspection.

2.1.3 Fall Arrest Force & Clearance Calculation intended to increase hazard and injury prevention awareness by providing an understanding of what happens to a human body when it falls and the personal fall protection equipment deploys.

This will include, at a minimum, the following:

a) The training programs must utilize the calculation formulas defined in Appendix II and include theory, instruction, and in class exercises on the following topics:

   i. Maximum Arrest Forces (MAF) including:
• definition;
• current Alberta OH & S Code Part 9 MAF limit;
• physical effects on a fallen worker;
• impact on fall protection system components including the anchor point.

ii. Importance of equipment selection in reducing MAF:
• shock/energy absorbers;
• lanyard with and without shock absorbers;
• lanyard length lanyard type (synthetic webbing or rope versus wire rope);
• how to assess and select suitable fall protection anchors. (permanent or temporary/engineered or non-engineered);
• location of anchor point; and
• choice of fall protection system.

iii. Free fall distance (FFD) including:
• definition;
• the effect FFD has on the worker, anchor point and system components;
• relationship to MAF; and
• methods of minimizing FFD and MAF.

iv. Fall clearance calculations (see Appendix II) including definitions of:
• total fall distance (TFD);
• swing fall hazard; and
• required minimum clearance (CR).

v. Class exercises and theory test questions requiring each individual participant to demonstrate the ability to calculate the following:
• free fall distance (FFD);
• total fall distance (TFD); and
• required minimum clearance (CR).

vi. Calculation exercises (minimum of 2) must include a variety of anchor connection heights and lanyard length scenarios.

3.0 FALL PROTECTION SYSTEMS

3.1 Minimum Program Content

Program must include instruction on the following "Fall Protection Systems:"

3.1.1 Personal Fall Arrest System:

a) A brief review of the system applications, definition and critical components;
b) The design purpose of each system. This section must cover at a minimum the proper usage and limitations to each system;

c) Each system section must include specific end-user "pre-use visual inspection" requirements;

d) Where applicable, each system section must include information on manufacturers’ inspection, re-certification requirements and removal from service protocol;

e) Typical hazards associated with each system must be discussed and participants must be able to describe processes of identifying and controlling those hazards; and

f) Actual systems present for participants to complete a practical exercise (how to choose proper equipment for various scenarios {minimum of 2}), and handle, in order to understand how to use and inspect them.

3.1.2 Travel Restraint System i.e. horizontal lifeline:

a) A brief review of the system applications, definition and critical components;

b) The design purpose of each system. This section must cover at a minimum the proper usage and limitations to each system;

c) Each system section must include specific end-user "Pre-use visual inspection" requirements;

d) Where applicable, each system section must include information on manufacturers’ inspection, re-certification requirements and removal from service protocol;

e) Typical hazards associated with each system must be discussed and participants must be able to describe processes of identifying and controlling those hazards; and

f) Actual systems present for participants to complete a practical exercise (how to choose proper equipment for various scenarios {minimum of 2}), and handle, in order to understand how to use and inspect them.

3.1.3 Work Positioning Systems i.e. ladder:

a) A brief review of the system applications, definition and critical components;

b) The design purpose of each system. This section must cover at a minimum the proper usage and limitations to each system;

c) Each system section must include specific end-user "Pre-use visual inspection" requirements;

d) Where applicable, each system section must include information on manufacturers’ inspection, re-certification requirements and removal from service protocol;

e) Typical hazards associated with each system must be discussed and participants must be able to describe processes of identifying and controlling those hazards; and

f) Actual systems are not required in the classroom; however models, DVD’s, videos, pictures, etc. must be utilized when actual systems are not used.

3.1.4 Control Zones:

a) A brief review of the system applications, definition and critical components;

b) The design purpose of each system. This section must cover at a minimum the proper usage and limitations to each system;

c) Each system section must include specific end-user "Pre-use visual inspection" requirements;
d) Where applicable, each system section must include information on manufacturers’ inspection, re-certification requirements and removal from service protocol;

e) Typical hazards associated with each system must be discussed and participants must be able to describe processes of identifying and controlling those hazards; and

f) Actual systems are not required in the classroom; however models, DVD’s, videos, pictures, etc. must be utilized when actual systems are not used.

### 3.1.5 Safety Nets (must include that safety nets are not used as an only means of fall protection on OSSA member sites):

a) A brief review of the system applications, definition and critical components;

b) The design purpose of each system. This section must cover at a minimum the proper usage and limitations to each system;

c) Each system section must include specific end-user "Pre-use visual inspection" requirements;

d) Where applicable, each system section must include information on manufacturers’ inspection, re-certification requirements and removal from service protocol;

e) Typical hazards associated with each system must be discussed and participants must be able to describe processes of identifying and controlling those hazards; and

f) Actual systems are not required in the classroom; however models, DVD’s, videos, pictures, etc. must be utilized when actual systems are not used.

### 3.1.6 Instruction must include a statement on the ban of the use of safety belts on all OSSA member sites.

### 3.1.7 As per Alberta OH & S Code, training must include practice in inspecting, fitting adjusting and connecting fall protection systems and components.

### 3.1.8 Practice exercises could include table top (illustrate a scaled version of a control zone) or practical classroom exercises to set up a control zone.

### 4.0 FALL PROTECTION SYSTEM'S COMPONENTS

### 4.1 Minimum Program Content

The training for each of the systems listed in section 4.1.1, 4.1.2 and 4.1.3 must contain at a minimum, the following topics:

a) Definitions for each component;

b) Design purposes of each component including at a minimum:

   i. Limitations - ultimate load/breaking strength vs. working load;

   ii. Uses;

   iii. Types;

   iv. Compatibility; and

   v. Fit as appropriate.

c) Pre-use visual inspection of each component that must include specific requirements including care, maintenance, storage and removal from service; and
d) Component hazards with opportunities for participants to identify and control those hazards (roll out, false connection, adverse environments, etc.).

Note: Examples of both useable and defective components must be available and participants must be able to identify the difference between usable and defective components. Defective equipment must be distinguished from the useable in a way that is clear to the instructor to ensure no participant actually attempts to use or don defective equipment.

The program must include instruction on the following Fall Protection System components:

4.1.1 Type A, D, E, P, and L (or equivalent) **Full Body Harnesses**.

4.1.2 **Connecting components**:

   a) Double locking snap hooks;
   
   b) Carabiners;
   
   c) Life safety rope and fall arresting device;
   
   d) Self-retracting devices SRD, (Type 1SRD, Type 2 SRD and Type 3 RSRD);
   
   e) Manufactured or engineered horizontal lifelines; and
   
   f) Lanyard (shock and/or energy absorbers, adjustable lanyards).

4.1.3 **Anchors**:

   a) Permanent; and
   
   b) Temporary/ Improvised (Engineered / Non-engineered).

Upon completion of the instruction, participants must be able to pass a theory and/or practical test for successful proof of knowledge and understanding on each of the components listed in the above section.

5.0 **PROFICIENCY TESTING**

Although described under each of the previous sections of the standard, it is important that the following tests be administered as described in order to ensure that participants are proficient upon completion of the fall protection training program.

5.1 **Knowledge Evaluation**

The participant must complete a written examination to confirm knowledge and understanding of course content as required by this standard and as identified on the content correlation matrix. This knowledge evaluation is to be done individually, not as a group exercise. The knowledge evaluation is to be closed book with a minimum of 80% required to pass.

5.2 **Practical Test**

Prior to this practical test the Instructor must inform each Participant that if at any time the participant feels discomfort, they are to place their feet back on the ground and stand. During the practical test an individual must never be lifted and freely suspended while in the full body harness nor must any individual be dropped.

5.2.1 Each instructor, at a minimum, must successfully demonstrate the following:

   a) Proper pre-use visual inspection of the full body harness, anchor point and connecting components to confirm it is in a condition for safe use; and
b) Proper harness donning (including how to adjust the harness, what constitutes a properly adjusted harness and the body landmarks used to assess proper adjustment), doffing and storage techniques.

5.2.2 Each participant, at a minimum, must successfully demonstrate the following:

a) Proper pre-use visual inspection of the full body harness, anchor point and connecting components to confirm it is in a condition for safe use.

b) Proper donning and adjustment of the full body harness (include buddy check).

c) The controlled weight transfer of their body weight to the full body harness by:
   i) connecting their full body harness to an approved anchor point (i.e. tripod assembly); and
   ii) lifting their feet from the floor and transferring all weight to the full body harness, then immediately returning to a standing position.

5.2.3 At a minimum the instructor must observe and coach each participant (one on one) during the entire practical test, on the following:

a) Observe the participant performing a pre-use visual inspection of the full body harness, anchor point and connecting components.

b) Verify that the full body harness is properly fitted:
   • Instructor must check each participant individually; and
   • Instructor must observe the participants completing the “buddy check” and instruct them on what to look for.

c) Ensure correct anchor hook up;

d) Monitor each participant at all stages of the controlled weight transfer exercise; and

e) Proper doffing and storing of full body harness.

The above must include a check sheet for the instructor to note that all areas were completed fully one-on-one and then signed off before issuing credential.
6.0 **RE-CERTIFICATION PROCESS**

6.1 **Proficiency Timeline**

Certification for fall protection training is valid for a period of three (3) years from the initial certification date.

Training providers submitting new programs must submit a proficiency check process.

Participants may complete a proficiency check as described in 6.2 of the standard but then must take a full course prior to next expiry date.

6.2 **Proficiency Check Process for Re-Certification** *(Minimum of 4 hours)*

6.2.1 The purpose of the proficiency check process is to allow the participant who currently has a valid OSSA credential in fall protection to demonstrate the ability that they have maintained their knowledge and demonstrated proficiency in this subject area to receive a new credential (clearly marked as a re-certification credential).

6.2.2 If the participant is unable to demonstrate their knowledge and proficiency in either the theory or practical requirements, they must take a full OSSA fall protection course.

6.2.3 The process shall include the following:

a) Verification that the participant has a current OSSA fall protection credential that will expire within at least three (3) months;

b) Upon successful completion/demonstration of all requirements of 5.2 of the standard excluding the controlled weight transfer, the participant will then complete the theoretical test;

c) The theoretical test will be used to determine the participant has maintained their knowledge in the following areas (at a minimum):

   i) Fall arrest forces & calculations (MAF, FFD, TFD, CR);

   ii) Fall protection hazard identification, assessment & control;

   iii) Fall protection & rescue planning; and

   iv) Suspension trauma.

d) Upon successful completion of the above, provider shall review the following (at a minimum):

   i) Changes to fall protection theory;

   ii) Changes to Legislation or standards (22.2 kN changed to 16 kN for anchor strength); and

   iii) Changes/improvements to equipment/components (E6 lanyard, flemish eye splice for manufactured fall protection anchorage slings).

e) Participants are issued a credential which is valid for three (3) years. To renew their credential after this re-certification course participants are required to repeat a complete OSSA fall protection course.
APPENDIX I – DEFINITIONS

1. **Alberta OH & S Act, Regulation and Code**: the Alberta *Occupational Health and Safety Act*, (RSA 2009), Chapter 0-2, as amended, and all regulations and codes enacted or adopted there under.

2. **Anchor**: an engineered component for coupling a fall arrest or travel restraint system to an anchorage.

3. **Anchorage**: a structure, or part of a structure, that is capable of safely withstanding any potential forces applied by a fall protection system.

4. **Accreditation** or **Accredited**: authorization, in writing, from the OSSA that a training provider's program meets the minimum requirements of a particular Safety Training Standard. Accreditation may be withdrawn by the OSSA at any time. In order to be a Safety Training Provider of a standard, an organization's accreditation status must be current.

5. **Board of Directors**: the owners of the OSSA that provide, in writing, endorsement status and approval for any revisions or exceptions to a Safety Training Standard and/or a Regional Code of Practice.

6. **Carabiner(s)**: a connecting component that:
   a) generally consists of a trapezoidal or oval body having a self-locking gate that requires at least two (2) consecutive, deliberate actions to open to permit the body to receive an object and that, when released, automatically closes and locks to prevent inadvertent opening; and
   b) has an ultimate tensile strength of at least 22.2 kN.

7. **Control Zone**: the area within 2 meters (6 feet) of an unguarded edge of a level, elevated work surface that has a slope of no more than 4 degrees.

8. **Donning**: the act of putting on a full body harness which includes pre-inspection, adjustment using body landmarks, and correct fit.

9. **Doffing**: to remove the full body harness.

10. **Fall Arresting Device(s)**: a part of a worker's personal protective equipment that stops the worker's fall and does not allow the worker to fall farther.

11. **Fall Arrest System(s)**: an assembly of components when properly assembled and used together and when connected to a suitable anchorage will arrest a worker's fall:
   a) without striking a lower surface; and
   b) without exceeding an MAF, established by the Alberta OH & S Code.

12. **Free Fall Distance**: the vertical distance between the points from which a worker falls to the point at which deceleration begins because of the action of a personal fall arrest system.

13. **Fall Restrict Equipment**: a component of a fall restrict system that, when combined with other subcomponents and elements, allows the climber of a wood pole to remain at his or her work position.
with both hands free, and that performs a limited fall arrest function when the climber loses contact between his or her spurs and the pole.

14. **Fall Restrict System**: a combination of work positioning systems and fall restrict equipment.

15. **Fall Protection Standard** or **Standard(s)**: the minimum training standards set out in OSSA’s Fall Protection Standard as amended by the OSSA from time to time.

16. **Fall Protection System**: 2009 Alberta OH & S Code now defines Fall Protection System as:
   
   a) a personal fall arrest system;
   b) a travel restraint system;
   c) fabric or netting panels intended for leading edge protection;
   d) a safety net;
   e) a control zone;
   f) use of procedures in place of fall protection equipment; or
   g) another system approved by an Alberta OH & S Director of Inspection.

17. **Full Body Harness**: a body support consisting of connected straps designed to distribute force over at least the thighs, shoulders and pelvis to which a lanyard or lifeline or connecting components can be attached.

18. **Horizontal Lifeline System**: a system composed of a synthetic or wire rope, secured horizontally between two (2) or more anchor points, to which a worker attaches a personal fall arrest system or travel restraint system.

19. **Lanyard(s)**: a flexible line of webbing or synthetic or wire rope that is used to secure a full body harness or safety belt to a lifeline or anchor point.

20. **Leading Edge**: the edge of a floor, roof, or form work for a floor or other walking/working surface which changes location as additional floor, roof, decking, or form work sections are placed, formed or constructed.

21. **Legislation**: all municipal and local laws, statutes. Ordinances, by-laws and regulations, orders, directives and decisions rendered by any ministry, department or administrative or regulatory agency relating in any way to the health and safety of workers in the Province of Alberta.

22. **Lifeline**: a synthetic or wire rope, rigged from one or more anchor points, to which a worker's lanyard or other part of a personal fall arrest system is attached.

23. **Maximum Arresting Force**: the short duration (milliseconds to tenths of a second), peak dynamic force acting on a workers body as the workers fall is arrested.

24. **Members**: the member or subscriber organizations of the OSSA and includes their respective employees, officers, directors, shareholders, ownership groups and successors and assigns, including, without limitation, Shell Albian Sands, Canadian Natural Resources Limited, Syncrude Canada Ltd., and Suncor Energy.

25. **Organization(s)**: includes any individual, corporation, partnership, firm joint venture, syndicate, association, government, governmental agency or board or commission or authority.
26. **Personal Fall Arrest System(s):** personal protective equipment that will stop a worker's fall before the worker hits a surface below the worker without exceeding the MAF established in Alberta OH & S Code.

27. **Participant** (for this standard): a worker that is required to use the equipment.

28. **Re-Certification:** the process of verifying that a worker continues to maintain the proficiency requirements as specified in the original accredited training program. This process will include re-testing of knowledge requirements and/or challenging a proficiency exam;

29. **Regulatory Legislation and Related Standards:**
   - ANSI - American National Standards Institute;
   - ASSE - American Society of Safety Engineers;
   - CEN - European Committee for Standardization;
   - CSA - Canadian Standards Association;

30. **Shock Absorber(s):** a device intended to reduce the force on a worker when a personal fall arrest system is operating.

31. **Safety Training Standard** or **Training Standard:** the training standards approved, from time to time, by the Board of Directors of the OSSA and published as a training standard of the OSSA. Each training standard is subject to review and amendment by the OSSA from time to time.

32. **Steering Committee:** the committee appointed by the OSSA to provide, in writing, accreditation status to an organization.

33. **Swing Fall:** a pendulum motion experienced by the worker, using a fall arrest system resulting from the anchorage not being directly above the user at the onset of a fall.

34. **Total Fall Distance (TFD):** the vertical distance from the point at which a worker falls to the point where the fall stops after all fall arresting system components have extended (as per CSA Z259.16-04 TFD is determined as the displacement of the dorsal D ring on the full body harness and is the sum of the free fall and the deceleration distance, also includes any applicable swing fall distance).

35. **OSSA Accredited Training Provider(s):** those Organizations that have received Accreditation status, in writing, from the OSSA to provide a Safety Training Program.

36. **Travel Restraint System:** a type of fall protection system, including guardrails or similar barriers that prevent a worker from traveling to the edge of a structure or to a work position from which the worker could fall.

37. **Unusual Possibility Risk of Injury:** falling a vertical distance of less than 3 meters (9 feet) if there is an unusual possibility of injury (the injury may be worse than an injury from landing on a solid, flat surface).

38. **Work Positioning System:** a system of components attached to a vertical safety line and including a full body harness, decent controllers and positioning lanyards used to support or suspend a worker in tension at a work position.
APPENDIX II – CALCULATIONS
The following information is based on CSA Z259.16-04 “Design of Active Fall Protection Systems”.

Acronyms
TFD: Total fall distance
FFD: Free fall distance
CR: Required minimum clearance
SM: Safety Margin between bottom of feet a level below (typically 2' {0.6 meter}) or 3' {0.9 meter})
SAE: Extension of shock absorber
DS: Slippage of D-ring
L: Length of lanyard, shock absorber & connecting hardware
B: Distance from the feet to the full body harness D-ring
C: Distance between working level & anchorage level

Calculation Formulas
Free Fall Distance (FFD): \( L + B - C \)
Total Fall Distance (TFD): \( FFD + DS + SAE \)
Required Minimum Clearance (CR): \( TFD + B + SM \)

The following examples are based on a fixed anchor point and a fall arrest harness with a 6 foot /1.8 meter shock absorbing lanyard.

Free Fall Distance (FFD)
When a fall occurs the free fall distance equals the distances between the heights of the D ring (C) before the fall begins to the point where the fall protection equipment begins to arrest the fall (note: solid anchor point).

Example 1: Anchor below D Ring
C = Anchor point height above surface = 0 (located at surface)
B = D Ring height from the feet = 5 feet / 1.5 meters
L = Lanyard length 6 feet / 1.8 meters
FFD = L + B - C

Imperial Metric
FFD = 6 feet + 5 feet – 0 feet \( \text{FFD} = 1.8 \text{ meters} + 1.5 \text{ meters} - 0 \)
FFD = 11 feet \hspace{0.5cm} FFD = 3.3 meters

**Example 2:** Anchor same height as D Ring

C = Anchor point height above surface = 5 feet / 1.5 meters

B = D Ring height from the feet = 5 feet / 1.5 meters

L = Lanyard length 6 feet / 1.8 meters

FFD = L + B - C

<table>
<thead>
<tr>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFD = 6 feet + 5 feet - 5 feet</td>
<td>FFD = 1.8 meters + 1.5 meters - 1.5 meters</td>
</tr>
<tr>
<td>FFD = 6 feet</td>
<td>FFD = 1.8 meters</td>
</tr>
</tbody>
</table>

**Example 3:** Anchor Point 2 feet / 0.6 meters above D Ring

C = Anchor point = 7 feet / 2.1 meters

B = D Ring height = 5 feet / 1.5 meters

L = Lanyard length 6 feet / 1.8 meters

FFD = L + B - C

<table>
<thead>
<tr>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFD = 6 feet + 5 feet - 7 feet</td>
<td>FFD = 1.8 meters + 1.5 meters - 2.1 meters</td>
</tr>
<tr>
<td>FFD = 4 feet</td>
<td>FFD = 1.2 meters</td>
</tr>
</tbody>
</table>

**Total Fall Distance (TFD)**

The TFD is the distance the full body harness D Ring has traveled after the fall has been arrested.

TFD = FFD + DS + SAE

TFD = (L + B - C) + DS + SAE

C = Anchor Point Height = 5 feet / 1.5 meters

B = D Ring Height from the feet = 5 feet / 1.5 meters

L = Lanyard length 6 feet / 1.8 meters

**Example 4**

FFD = L + B - C

<table>
<thead>
<tr>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFD = 6 feet + 5 feet - 5 feet</td>
<td>FFD = 1.8 meters + 1.5 meters - 1.5 meters</td>
</tr>
<tr>
<td>FFD = 6 feet</td>
<td>FFD = 1.8 meters</td>
</tr>
</tbody>
</table>

DS = 1 foot / 0.3 meters (estimated for this demonstration)

SAE = 4 feet / 1.2 meters (estimated for this demonstration)

**TFD = FFD + DS + SAE**

<table>
<thead>
<tr>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFD = 6 feet + 5 feet - 5 feet</td>
<td>FFD = 1.8 meters + 1.5 meters - 1.5 meters</td>
</tr>
<tr>
<td>FFD = 6 feet</td>
<td>FFD = 1.8 meters</td>
</tr>
</tbody>
</table>
TFD = 6 feet + 1 foot + 4 feet  TFD = 1.8 meters + 0.3 meters + 1.2 meters
TFD = 11 feet  TFD = 3.3 meters

**Required Minimum Clearance (CR)**

The Required Minimum Clearance (CR) is a total of the Total Fall Distance (TFD) plus the distance from the surface to the D Ring before the fall (B) plus a safety margin (SM) of at least 2 feet / .6 meters (note: 3 feet / .9 meters is also commonly used).

**Example** - Using the previous TFD information

**CR = TFD + B + SM**

<table>
<thead>
<tr>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR = 11 feet + 5 feet + 2 feet</td>
<td>CR = 3.3 meters + 1.5 meters + 0.6 meters</td>
</tr>
<tr>
<td>CR = 18 feet</td>
<td>CR = 5.5 meters</td>
</tr>
</tbody>
</table>