

OSHA requires many duties in the realm of Fall Protection to be performed by “Qualified Persons”, requiring appropriate knowledge and skills to capably perform each of duties. It is usual for some Qualified Persons to be capable of performing some but not all of the duties OSHA assigns. We need to understand that most Qualified Persons therefore limit their work to only those activities they are properly qualified to perform.

The instructor of this course has developed and currently offers two versions of this course, titled, “Qualified Fall Protection Engineer” and “Qualified Fall Protection Specialist”. These two courses serve two main groups (Engineers and Non-Engineers) who work as “Qualified Persons” in Fall Protection to meet OSHA’s requirements:

- The Engineers typically have strong understanding of physics and math. They require formulas and software to help them correctly predict the behavior of fall protection systems. They often limit their practice under OSHA as Qualified Persons responsible for the design of the system. Their skills are more suited to designing complex fall protection systems that deal with assembly of components that are not all provided by fall protection manufacturers, certified to fall protection standards or that may be used in ways that are not anticipated by the manufacturer. They rarely become involved in inspections of systems and equipment, training of workers, assessing hazards, or writing safe work practices and procedures.
- The Non-Engineers typically have strong understanding of the Fall Protection equipment and systems and how the workers need or intend to use them. Although they cannot determine strength through calculation, they obtain their knowledge through research and testing of the systems and components they are using. They usually use simplified methods and rules of thumb to (less accurately) determine the behaviour of fall protection systems, including required clearances. Non-engineers often limit their practice as Qualified Persons under OSHA to oversight and training of the users, inspection, assembly and disassembly of the systems, writing safe work procedures and practices, selection of some or all of the components of the system. At the highest level of skill some of them design, erect and certify simple systems, assembled in accordance with the manufacturer’s instructions using only products approved by the manufacturer and certified to appropriate standards such as ANSI Z359..

Qualified Fall Protection Engineer:

The Qualified Fall Protection Engineer course develops knowledge necessary to design and analyze fall protection systems as required by the ANSI Z359.6, CSA Z259.16, SS 607 and other worldwide standards for “Design of active Fall Protection Systems”. It is taught by the engineer who led development of most of the content of these standards. The course teaches essential skills for any person who wishes to serve as a “Qualified Person” in the realm of Fall Protection, as required under the OSHA 1926.502, OSHA 1910.140 regulations, or professional engineers who require these skills to practice in this field.

This is a very intensive program—teaching engineering calculations of fall protection systems, but it is not a structural engineering degree program (which requires years of study and practice to complete). Students who are not structural engineers will develop fall protection expertise that enables them to retain or team with structural engineers, to develop engineered fall protection solutions.

The course develops the physics and mathematical formulae required to predict the forces and distances workers may fall when using fall protection. It augments the skills of structural and mechanical engineers who wish to design complete fall protection solutions. Students are licensed, provided with and practice using software that calculates (in ft-lb or metric units) to analyze a wide variety of fall protection systems, including vertical and horizontal lifelines.

Duration: 5 days (40 hours) including 17 hands-on exercises to practice analyzing a variety fall protection systems. Two levels of certification (vertical systems and horizontal systems) are covered sequentially over the 5 days. While we attempt to do all exercises during class time, there may be evening homework assigned if we slow down to respond to questions and discussions to meet student needs, and if we try to finish up early on Friday.

Recommended attendance: Professional Engineers, designers, safety professionals or key personnel that may be required to design and implement (or oversee those designing and implementing) fall protection systems. This course requires mathematical competency. Successful participants who are not engineers, should have good competency in Algebra and performing calculations using scientific calculators and MS Excel spreadsheets on a personal computer.

This course addresses some of the specific duties of the Qualified Person under the OSHA regulations, including assessment of clearances, determination of the forces seen by the worker, the system and its anchorages. and teaches how to determine the engineering properties of manufactured fall protection equipment and components. This 5-day course addresses these needs through training and examination of competency in the following topics:

Qualified Person Training

Topics discussed:

- Active vs. Passive Fall Protection.
- Travel restraint vs. Fall Arrest design criteria.
- Test mass to properly represent humans in falls.
- Clearance calculations.
- Overview of US OSHA and other worldwide regulations for fall protection.
- Due diligence and design liability
- How to address situations where regulations cannot be met (di-minimus violations and interpretations).
- Physics and Formulae for analysis of active fall protection systems.
- Examples and exercises using Static, Dynamic, Energy and Testing analysis methods, demonstrating the pros and cons of each method.
- Determining if energy absorbers in PPE are adequate to absorb the fall energy.
- Calculating forces when PPE or system energy absorbers are inadequate.
- Ballasted Anchorages.
- ANSI Z359.6, CSA Z259.16 and other worldwide standards for "Design of active fall protection systems"
- Swing fall and swing drop hazards and calculations.
- Pre-engineered systems, independent verification of performance, modifications to improve.

- Vertical fall arrest systems: vertical lifelines, self-retracting devices, ladder systems.
- Force management anchorages: analysis of systems anchored to them.
- Horizontal fall arrest systems: horizontal lifelines and rigid rails.
- Horizontal lifeline performance: sag, tension, energy absorption and clearance.
- Horizontal lifeline complications: multiple spans, thermal effects, deformable anchors, PPE.

Lumped mass vs. sequential fall analysis for multiple user systems

Qualified Fall Protection Specialist:

This course was developed to train non-engineers who wish to serve as a Qualified Person (under US OSHA 1926.502, 1910.140 and other sections of the regulations), this course provides advanced knowledge so they may capably carry out many of the duties cited in the OSHA regulations.

While detailed design of COMPLEX Fall Protection systems remains the pervue of Engineers, this course provides deep understanding of the equipment and systems that may be used for Fall Protection, as would be required for non-engineers to capably assemble, inspect, assess and certify the proper functioning of SIMPLE systems that use only Fall Protection products that meet appropriate industry standards (such as ANSI Z359). and through testing methods taught in the course, certify the strength of anchorages.

This course addresses some of the specific duties of the Qualified Person under the OSHA regulations, including assessment of clearances and certification of the strength (through testing) of the anchorages, inspection and approval of horizontal lifelines and other systems, assessment of fall hazards. This 5-day course addresses these needs through training and examination of competency in the following topics:

- Active vs. Passive Fall Protection.
- Travel restraint vs. Fall Arrest design criteria.
- Test mass to properly represent humans in falls.
- Clearance calculations.
- Brief Overview of US OSHA and other worldwide regulations for fall protection.
- How to address situations where regulations cannot be met (di-minimus violations and interpretations).
- Determining if energy absorbers in PPE are adequate to absorb the fall energy.
- Ballasted Anchorages.
- An overview of the ANSI Z359.6, CSA Z259.16 and other worldwide standards for “Design of active fall protection systems”
- Swing fall and swing drop hazards and calculations.
- Simple Pre-engineered systems, independent verification of performance, modifications to improve.
- Vertical fall arrest systems: vertical lifelines, self-retracting devices, ladder systems.
- Force management anchorages and how they affect systems anchored to them.
- Horizontal fall arrest systems: horizontal lifelines and rigid rails.

- General understanding of Horizontal lifeline performance: sag, tension, energy absorption and clearance.

Note that both Engineers and Non-Engineers are encouraged to attend either or both courses, and that although there is a some overlap in the materials taught in each course, the highest level of knowledge will be obtained by successfully passing both courses.

The most difficult of the two is Qualified Fall Protection Engineer, which will require students to have reasonable skills in physics, math, operating a scientific calculator, and using Microsoft Excel on their laptops. The instructor notes that very few Non-Engineers fail the Qualified Fall Protection Engineer course (for which they only obtain certification as a "Qualified Person" because they are allowed to rely more on the Software, whereas the engineers must perform hand calculations on all exams.

The Qualified Fall Protection Specialist course is often more challenging for the Engineers because they have a lower level of hands-on experience using Fall Protection Systems and Equipment.