Scaffolding A Major Violation for Electrical Contractors





July 27, 2010 Webinar

This webinar addressed how to avoid scaffolding citations and prevent accidents. An overview of OSHA's Scaffolding standards in CFR 29 1926, Subpart L, (including aerial lifts) and required training was provided. It also discussed NECA's resources available to assist in compliance and accident prevention (i.e. NECA's Safety Expert System eSafetyLine software.

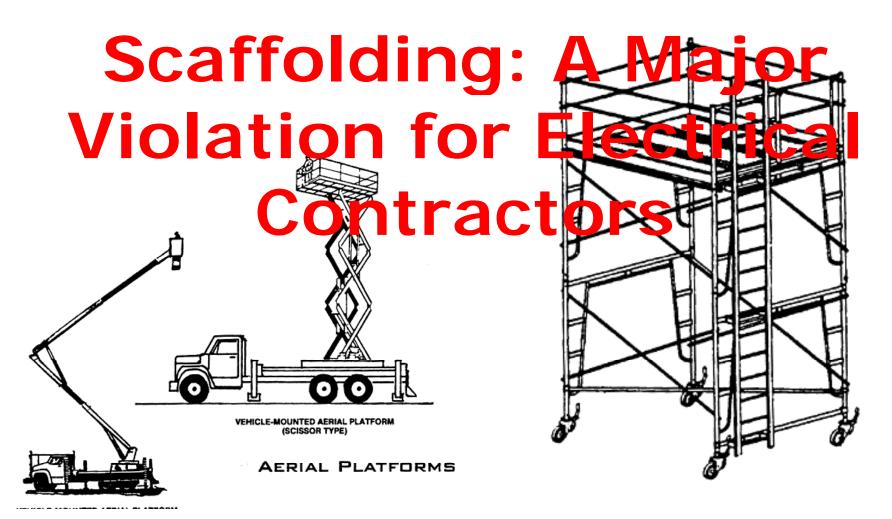
A copy of the PowerPoint file has been posted on the **NECA eSafetyLine software website. It is available free to all subscribers.** If you are currently registered for eSafetyLine, you can access it under the training section in the Accident reporting module. If you are not registered for eSafetyLine, you can contact NECA at for more information on how to subscribe to eSafetyLine.

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Subpart L: 1926.450 - Scope, Application

- Covers all scaffolds used in workplaces
- Does not apply to crane or derrick suspended personnel platforms, which are covered by 1926.550(g)
- Aerial lifts are covered exclusively by 1926.453

1926.450 – Major Points

- 10 foot trigger height for fall protection on scaffolds
- 36 inch minimum guardrail height where fall arrest systems are primary fall protection
- 38 inch minimum guardrail height where guardrail is primary fall protection
- Provides for use of cross-bracing as guardrail under certain conditions, in lieu of either a mid-rail or a toprail
- Requires after 1 year, that competent person determines feasibility of providing fall protection for built-up scaffold erectors and dismantlers

Scaffold Case Study

- 22-year-old electrical apprentice fell from scaffold and died of injuries
- Was installing wiring at a residential job
- Was working with a lead worker

- Day of incident
 - Mobile Mason's scaffold; 2- 6' frames, single prefabricated platform that hooked on frame
 - Victim and lead worker were helping to install jewel boxes



Day of incident

- Scaffold was positioned about 1' from the wall
- Lead worker locked wheels on his side, uncertain about the victim's wheels
- Both climbed scaffold
- Victim held the jewel box against wall, scaffold moved backward, victim lost balance, fell forward between scaffold and wall

- Victim hit his head on concrete floor
- Unclear if event was caused by
 - Movement of scaffold's wheels
 - Victim losing balance
- Cause of death:Blunt force head injuries



NIOSH Recommendations

- 1. Workers on mobile scaffolding should double-check the structural stability of the scaffold and ensure that wheels are locked before mounting to the work platform.
 - Workers should also check that scaffold is on a hard level surface, properly braced and secured.
 - Employers should encourage workers to actively supervise their own safety and safety of coworkers.

2. A competent person must supervise the erection and use of scaffolds.

- The competent person must
 - Supervise work that present fall hazards
 - Inspect all fall-protection equipment including scaffolds
 - Directly supervise erection of scaffolding
 - Give specific attention to new workers
 - Victim had been on the job only 2 weeks

- 3. Employers must ensure that construction workers are trained to identify, understand and control fall hazards.
 - Employers are required to provide safety training and necessary protective equipment to all workers exposed to fall hazards
 - The victim received no formal safety training, only on the job training

- 4. Employers should consider using guardrails on scaffolds
 - Guardrails and toe guards are only required at heights of 10' or more
 - This incident shows that serious, even fatal injuries can occur at heights of LESS than 10'





Scaffold Inspection

 According to 1926.451(f)(3) a competent person must inspect scaffolds and scaffold components for visible defects before each work shift and after any occurrence that could affect a scaffold's structural integrity



Competent person

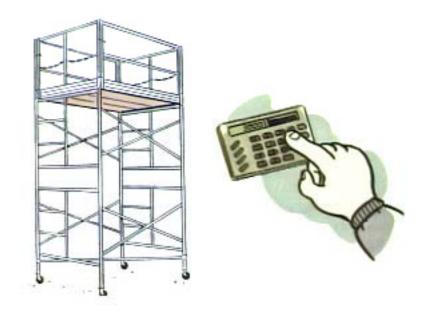
- Inspect scaffolding and components prior to each work shift
- Determine feasibility of providing fall protection and access
- Evaluate connections to support load and prevent swaying
- Determine structural soundness when intermixing components from different manufacturers
- Train erectors and dismantlers to recognize work hazards





Qualified Person

- Designs ALL scaffolds
- Conducts training on scaffold safety and fall protection



1926.451(a) Capacity

Non-Adjustable

- Support its own weight and
 4 x maximum intended load
- Suspension rope and connecting hardware support 6 x maximum intended load

Adjustable

- Stall load of scaffold hoist not to exceed 3 x rated load
- Designed by a qualified person and built to loaded design





1926.451(b) Platform Construction

- Fully planked and decked
 - No more than 1" gap between adjacent units and platform and uprights
 - Max openings between platform and uprights 9 1/2"
 - Platform and walkways at least 18" wide



- Each abutted end shall rest on a separate support surface
- Overlap platforms not be less than 12" over supports unless restrained to prevent movement
- On direction changes, platforms that rest on a bearer at an angle other than a right angle must be laid first
- Platforms that rest at right angles over the same bearer laid second

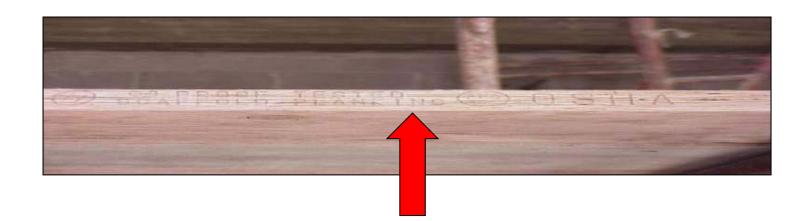


- Front edge of all platforms
 - No more than 14" from face of work
 - 3" from face for outrigger scaffolds
 - 18" from face for plastering and lathing operations
- Platforms 10' and less to extend at least
 6" but not more than 12" past support
- Platforms greater than 10' can not extend more than 18" over its support, unless designed to prevent tipping or ends are blocked with guardrails

- Fully planked and decked
 - Ladder jack, top plate bracket, roof bracket, and pump jack scaffold at least 12" wide
 - Guardrails and/or personal fall arrest systems for platforms and runways not 18' wide



- No paint on wood platforms, except edges that may be marked for identification
- Fully planked between from upright and guardrail
- No mixed components, unless compatible and integrity maintained



1926.451(c) Supported scaffolds

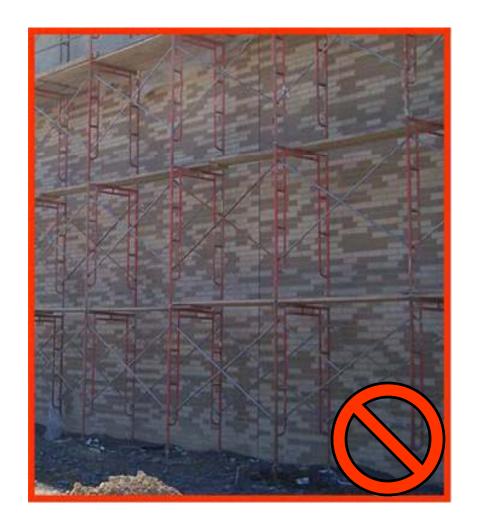
- Restrained from tipping by guys, ties, or equivalent when higher than 4:1 ratio
- Support installed per recommendations or at closest horizontal member to the 4:1 height



 Never use scaffolds that do not have proper guardrails installed



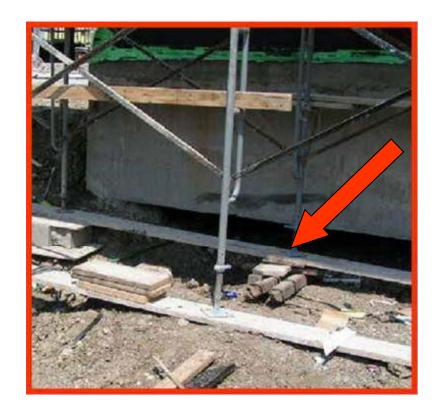
 Scaffold platforms must be fully planked



Must bear on adequate foundations

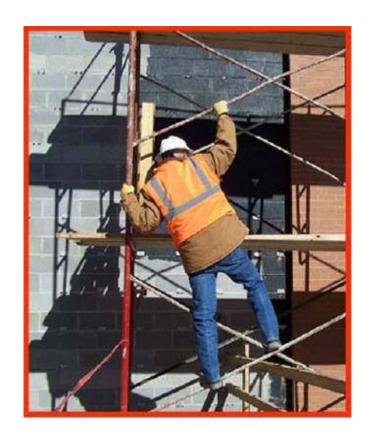
 Unstable objects will not be used as working platforms

Plumbed and braced



1926.451(e) Access

- Must have safe access
- Cross-braces prohibited as means of access
- Bottom rung no more than 24' high
- Rest platforms required at 35' intervals
- Slip-resistant treads on all steps and landings
- September 2, 1997, set specific rules for access of erectors and dismantlers
- Can use end frames for access



- Hook-on attachable ladders
 - Specifically designed for type of scaffold
 - Lowest rung no more than 24 inches above level on which scaffold is supported
 - Rest platforms at 35 foot intervals when more than 35 feet high
 - Maximum rung length
 11 ½ inches, and a maximum space
 between rungs 16 ¾ inches



1926.451(f) Use

Proper clearance near overhead lines



Keep 10 foot minimum unless lines have been de-energized, relocated, or protective covering has been installed!

- No work on snow, or ice covered platforms
- No barrels, boxes or ladders on top of scaffolds



1926.451(g) Fall Protection (PFAS or Guardrails)

- Required at 10'
- May be used in lieu of guardrails on some scaffolds
- PFAS and guardrails on suspension scaffolds
- Required for erectors and dismantlers after September 2, 1997 if feasible and no greater hazard
- Top-rails after 1-1-2000, 38" to 45" high
- In some cases, may use cross bracing in lieu of top-rail or midrail



1926.451(h) Falling Object Protection

- Hardhats required for employees
- Protect
 employees below
 from falling
 objects
 - Toe-boards
 - Canopies
 - Barricades



Mobile

- Plumb, level and squared
- Braced to prevent collapse
- Casters and wheels locked to prevent movement while in a stationary position
- Platforms must not extend beyond the base supports of the scaffold, unless stability is ensured



- Not allowed to ride on scaffolds unless the following exist
 - Surface on which scaffold is being moved is within 3 degrees of level, and free of pits, holes and obstructions
 - Height to base width ratio during movement is 2:1 or less
 - Outrigger frames, when used, are installed on both sides of the scaffold
- When power systems are used, the propelling force is:
 - Applied directly to the wheels
 - Does not produce a speed in excess of 1 foot per second
- No employee is on any part of the scaffold that extends beyond the wheels, casters, or other supports

1926.453 - Aerial lifts

- Must meet ANSI criteria
- Secured to lower traveling position by a locking device before moving
- Ensure proper fall protection prior to using
 - Includes use of guardrails
- Lifts must allow you to access heights and work from a protected area



- Requires use of harness and lanyard attached to the boom or basket
- Worker must stand on floor of basket
- Never exceed load capacity
- Do not move lift truck with workers in basket unless adequately designed (upper controls – personnel carriers)
- Brakes set for outrigger use (wheels chocked)



 Vehicle-mounted or self-propelled elevating work platforms – training is required!





All pneumatic and hydraulic components must comply with ANSI A92.2.1969 and non-critical parts must have a burst factor of 2:1

1926.454 Training

- Employees must receive training from qualified person that covers:
 - Nature of hazards, electrical, falls, and falling items
 - Use of scaffold / handling
 - Maximum intended load and load carrying capabilities of scaffold
 - Procedures for setup, dismantling or moving the system
 - Requirements of subpart "L"

Retraining

- When the employer has reason to believe an employee lacks the skill or understanding needed for safe work involving scaffolds, retraining shall be performed until proficiency is established
- Retraining is also required when:
 - Additional or new hazards exists
 - Changes occur in the type of scaffold and fall protection exist
 - Where there are inadequacies in an employee's work

June 24, 2002

Mr. J. Robert Harrell Safety Management Services 44012 Santa Nella Place San Diego, CA 92130-2291

Re: §1926.452(w)(2), 1926.452(w)(3), and 1926.452(w)(6)(iv); mobile scaffolds

Dear Mr. Harrell:

This is in response to your December 26, 2001, and April 8, 2002, letters addressed to the Occupational Safety and Health Administration (OSHA) and a subsequent phone conversation with a member of my staff, Mr. Steve Stock. We apologize for the delay in responding to your request.

Question: The issue you raise concerns an OSHA interpretation letter regarding whether OSHA construction standards allow employees to stay on a certain type of scaffold with the casters in the unlocked position. This issue was addressed in OSHA's letter to Mr. Douglas Holman on June 8, 1998. The type of scaffold in question is commonly referred to as a "Perry" or "Baker" scaffold. Specifically, you assert that the guidance we provided in the letter is contrary to the manufacturers' instructions on their use and is not safe. In your April 8 letter and telephone conversations with my staff, you have submitted court documents and have described two accidents that you assert are illustrative of your assertion.

Response: From the June 8, 1998 letter to Mr. Holman

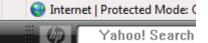
In the Holman letter, we stated:

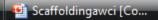
Your questions related specifically to Baker style scaffolds and whether a person could move and work from this type of scaffold without dismounting, with the casters in the unlocked position. We apologize for the delay in this response.

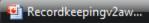
Baker scaffolds, sometimes referred to as Perry scaffolds, are covered by the mobile scaffold section of subpart L. Section 1926.452(w)(2) requires the casters and wheels to be locked when in use. If a device were installed to permit the casters to be locked while on the scaffold, this requirement could be met without dismounting.

Section 1926.452(w)(6) specifies the requirements for riding a scaffold. Where these conditions are met, the scaffold may be moved while employees are on it.

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Discussion

As we explained in the Holman letter, 1926.452(w)(2) requires that mobile scaffold casters and wheels be locked to prevent scaffold movement when in use. If a device were installed to permit the casters to be locked while on a scaffold, this particular requirement could be met without dismounting the scaffold. However, there are other requirements that must be met where an employee is on (and moves) a scaffold, and they must be met as well. Section 1926.452(w)(3) and 1926.452(w)(6)(iv) address the manual and powered forces used to move the scaffold. Section 1926.452(w)(6) specifies requirements for moving a scaffold while an employee is on it.

One of those requirements is §1926.452(w)(6)(i):

"The surface on which the scaffold is being moved [must be] within 3 degrees of level, and free of pits, holes, and obstructions."

We will not comment on the particular accident cases you refer to, since it would be inappropriate for us to attempt to assess facts involved in private litigation. However, for illustrative purposes, we will comment on two hypothetical scenarios: one in which there is debris in the path of the scaffold, and another in which there is a cover over a floor opening, and the cover is either raised above or depressed below the floor surface.

In both scenarios, the requirement that the floor area be free of obstructions is violated. In the first scenario, the floor is not clear of debris. In the second scenario, the cover interferes with/disrupts the scaffold's movement. Such conditions would violate the procedure explained in the Holman letter. In both scenarios, the employees would have to dismount before the scaffold was moved to be in compliance with OSHA requirements.

The next issue is as follows: if moving a scaffold with an employee on it is contrary to the scaffold manufacturer's instructions, is such a practice prohibited by OSHA requirements? You have submitted a copy of a letter from a manufacturer indicating that having an employee move a scaffold while on it is contrary to the manufacturer's instructions. That letter points out two reasons for the company's policy: (1) encountering an obstruction can cause the rider to be thrown from the scaffold, and (2) the scaffold was not designed to withstand the loads imposed by an employee moving the scaffold while on it.

There is no general provision in the standard requiring that manufacturer instructions be followed. However, note that there are requirements in the standard that address both points raised in the manufacturer's letter. Regarding the first point, as discussed above, the standard prohibits an employee from being on a moving scaffold if there is an obstruction in the path of the scaffold.

Regarding the second point, under §1926.451(a)(1), "each scaffold and scaffold component shall be capable of supporting, without failure, its own weight and at least 4 times the maximum intended load applied or transmitted to it." Under §1926.451(f)(1), "scaffolds and scaffold components shall not be loaded in excess of their maximum intended loads or rated capacities, whichever is less." Therefore, OSHA requirements prohibit a scaffold from being used in a way that would exceed these load restrictions. If having an employee move a scaffold while on it would result in a violation of the load restriction requirements, such a practice would be prohibited by the standard.

inuary 14, 2009

etter # 20070823-7896

e: Whether a manufacturer-stipulated minimum anchor point elevation of $18\frac{1}{2}$ feet precludes the use of a shock absorbing lanyard in an erial lift. 29 CFR 1926.453(a)(1)(v); 29 CFR 1926.453(b)(2)(v); 29 CFR 1926.500(b); 29 CFR 1926.502(d); 29 CFR 1926.502(d)(15); 29 FR 1926.502(d)(16)(iii)

uestion (1): Section 1926.453(b)(2)(v) requires employees to tie off to the boom or the basket when working from an aerial lift. In Idition, §1926.502(d)(16)(iii) provides that a personal fall arrest system shall be rigged such that an employee can neither free fall more an six (6) feet, nor contact any lower level. The manufacturer of a particular shock absorbing lanyard sets a minimum anchor point evation for the lanyard of 18½ feet to prevent contact with a lower level in the event of a fall. My concern centers around the fact that, hen raising an employee from a work surface, or upon returning an employee to a work surface, the employee at times will be at evations that are less than 18½ feet.

ince at times the distance between a lift's work platform and a lower level will be less than 18½ feet, does the manufacturer's instruction agarding the minimum anchor point elevation preclude its use as part of a fall protection system in an aerial lift?

nswer (1): Fall protection during construction work in aerial lifts is required by 29 CFR §1926.453(b)(2)(v), which is located in Subpart L OSHA's construction standards; it provides:

(v) A body belt [or body harness] shall be worn and a lanyard attached to the boom or basket when working from an aerial lift. $\frac{1}{2}$

he other standard to which you refer, 29 CFR §1926.502(d), is in 1926 Subpart M; it provides:

- (16) Personal fall arrest systems, when stopping a fall, shall:
- (iii) be rigged such that an employee can neither free fall more than 6 feet (1.8 m), nor contact any lower level;
- ... [Emphasis added]

ection 1926.502(d)(16)(iii) is made applicable to the use of personal fall arrest systems2 in aerial lifts by 29 CFR §1926.500(a)(3)(i).3

s noted above, section 1926.502(d)(16)(iii) requires a personal fall arrest system to prevent the employee from contacting a lower level. he lanyard you describe would not meet that criterion when the aerial lift's work platform is at heights less than 18½ feet. Even if the orking level of the aerial lift will ultimately be higher than 18½ feet, §1926.453(b)(2)(v) requires fall protection for employees in aerial

to at locace beights as well 4 Cines the fall protection system you describe would not most the requirements of \$1035 F03/dV15/(iii)

Favorites Tools Help

/2009 - Whether a manufacturer-stipulated ...

Question (2): Would the use of a retractable lanyard as part of a personal fall arrest system provide adequate fall protection to an employee working in an aerial lift, under 29 CFR 1926 Subpart M?

Answer (2): Section 1926.500(b) of Subpart M provides the following definition of a self-retracting lanyard:

Self-retracting lifeline/lanyard means a deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

There are a variety of self-retracting lanyards available for fall protection. Some provide an operating range of over 100 feet with a capability of limiting a free fall distance to less than 2 feet.

Section 1926.502(d)(16)(iii) requires that a personal fall arrest system be rigged such that an individual can neither free fall more than 6 feet, nor contact any lower level in the even of a fall (see Question (1)). This requirement applies irrespective of the type of lanyard used (i.e., self-retracting or other type).

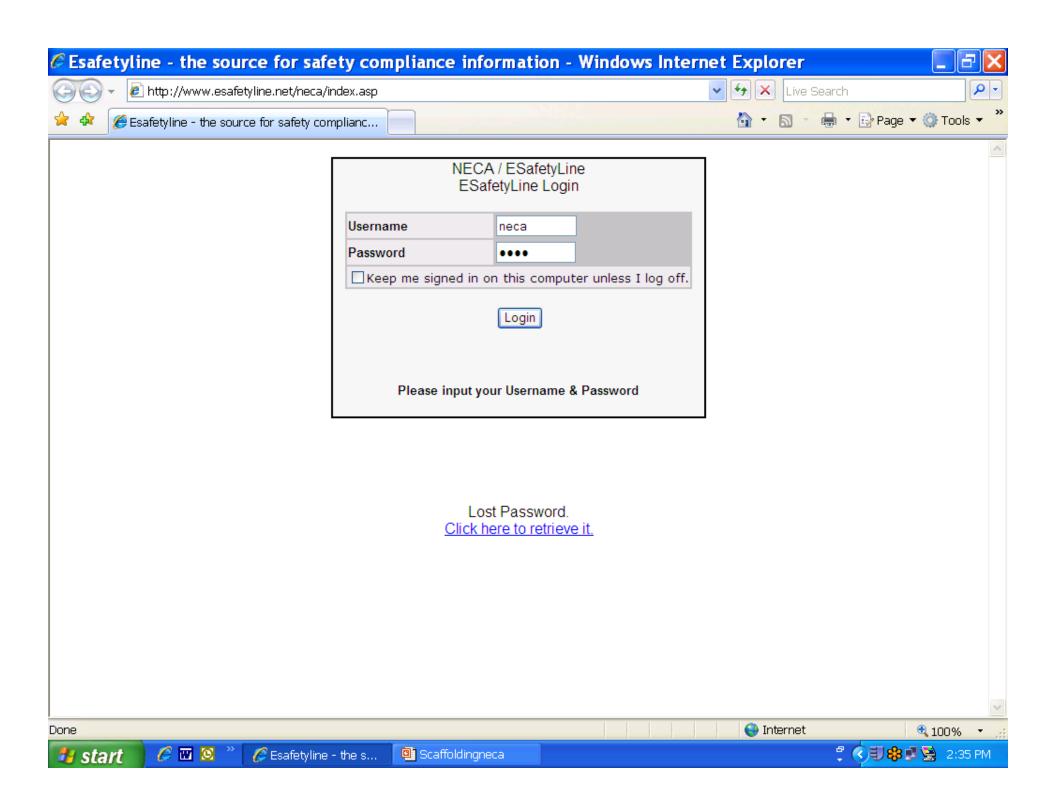
Without more specific information, we can only address your question in general terms. So, for example, if the lanyard were rigged so that the free fall distance of the employee in the aerial lift was limited to 2 feet, the system would meet the requirements in §1926.502(d)(16) (iii). However, an additional factor must be considered - the vertical and lateral loads that may be placed on an aerial lift in the event of an arrested fall. Under §1926.453(b)(2)(v) (quoted above), personal fall arrest systems in aerial lifts must be anchored to the lift's boom or basket. Section 1926.502(d)(15) sets load requirements for anchorages in a fall arrest system:

Anchorages used for attachment of personal fall arrest equipment shall be... capable of supporting at least 5,000 pounds (22.2 kN) per employee attached, or shall be designed, installed, and used as follows: (i) as part of a complete personal fall arrest system which maintains a safety factor of at least two;

The length of the free fall permitted by a self-retracting lanyard may affect whether or not a personal fall arrest system complies with §1926.502(d)(15). The longer the fall, the greater the impact forces imparted to the system. Thus, the more free-fall allowed by the selfretracting lanyard, the greater the load imposed upon the aerial lift. Some aerial lifts may lack the capacity to withstand the vertical and lateral loads caused by an arrested fall. Therefore, the length of free fall permitted by the self-retracting lanyard must be such that the aerial lift is capable of maintaining a safety factor of at least two when it arrests a fall.

A restraint system may be used instead of a personal fall arrest system if a self-retracting lanyard cannot be rigged to satisfy §1926.502(d) (15). A restraint system is a system that prevents an employee from falling any distance from a work surface. The note to §1926.453(b)(2) (v) indicates a body belt or body harness may be used as part of a restraint system. However, the system must be rigged to prevent the employee from falling.

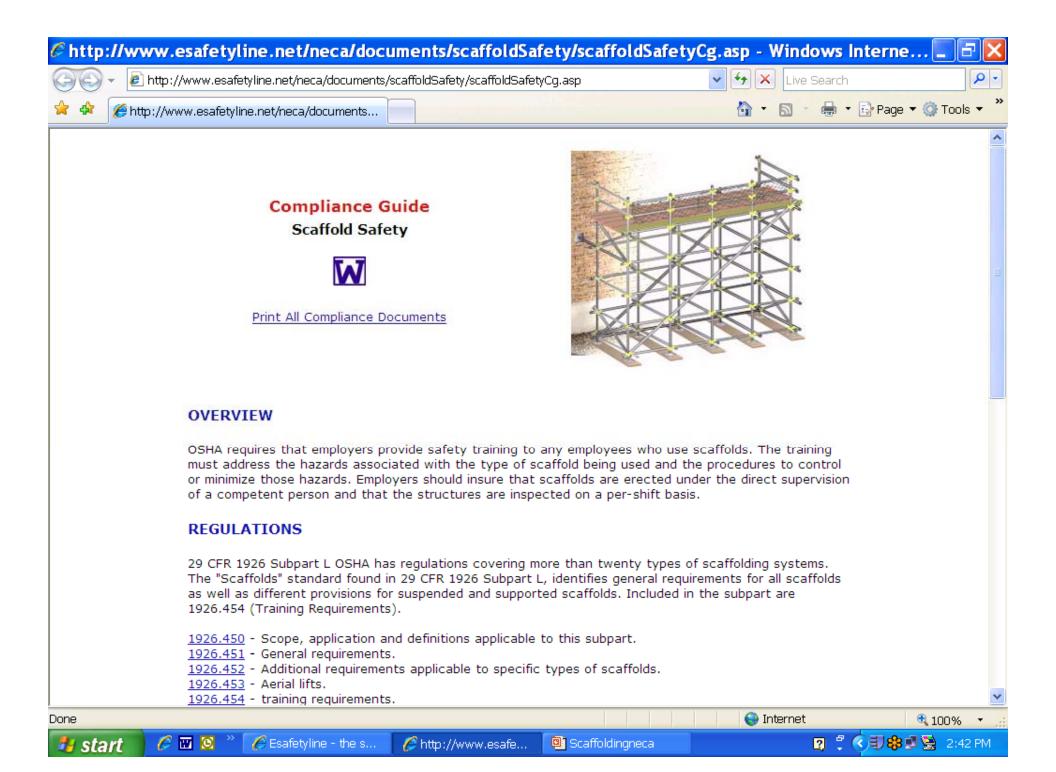


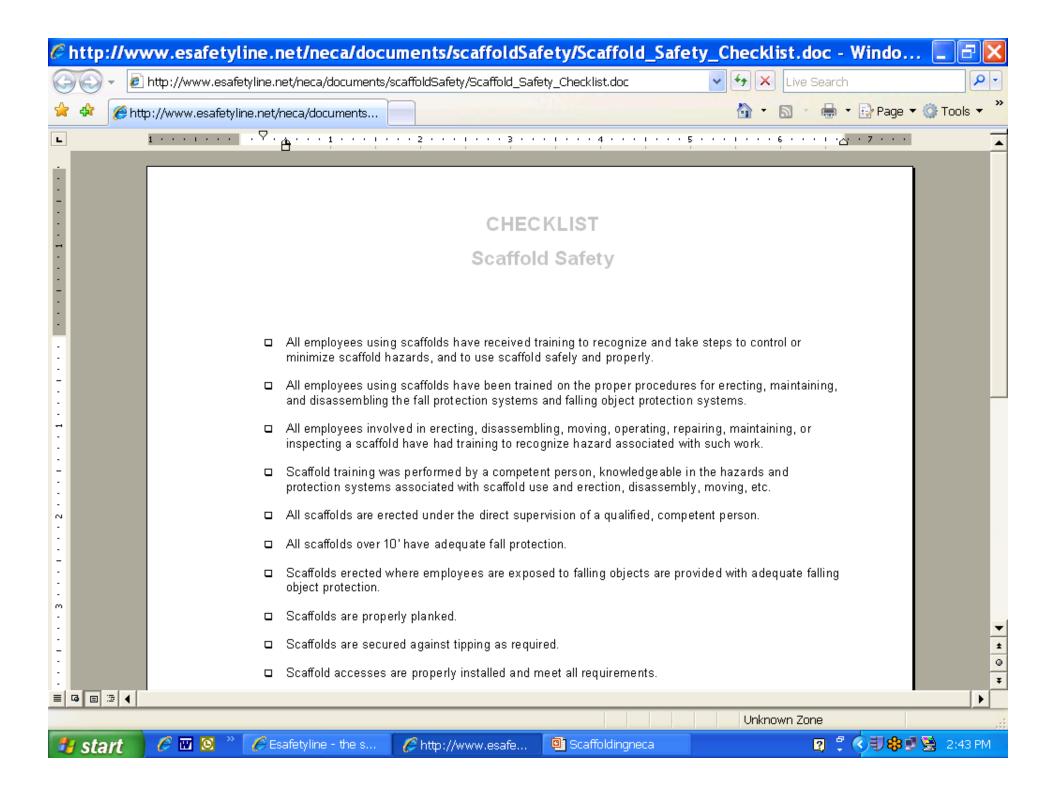


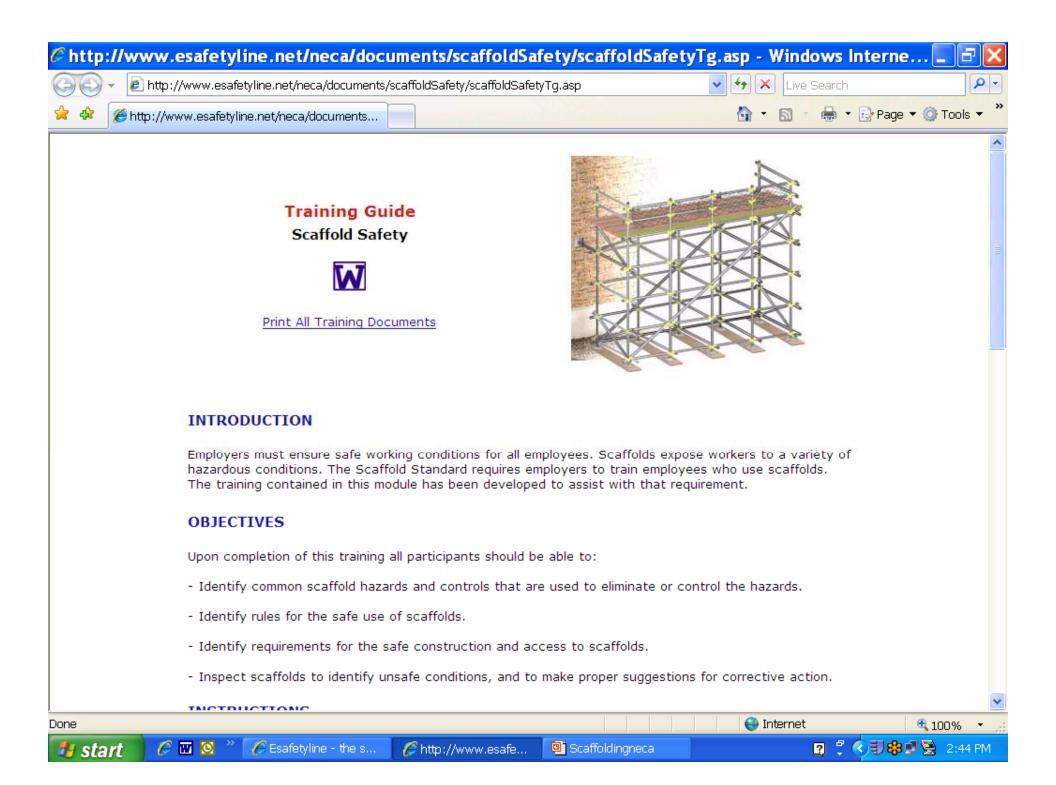


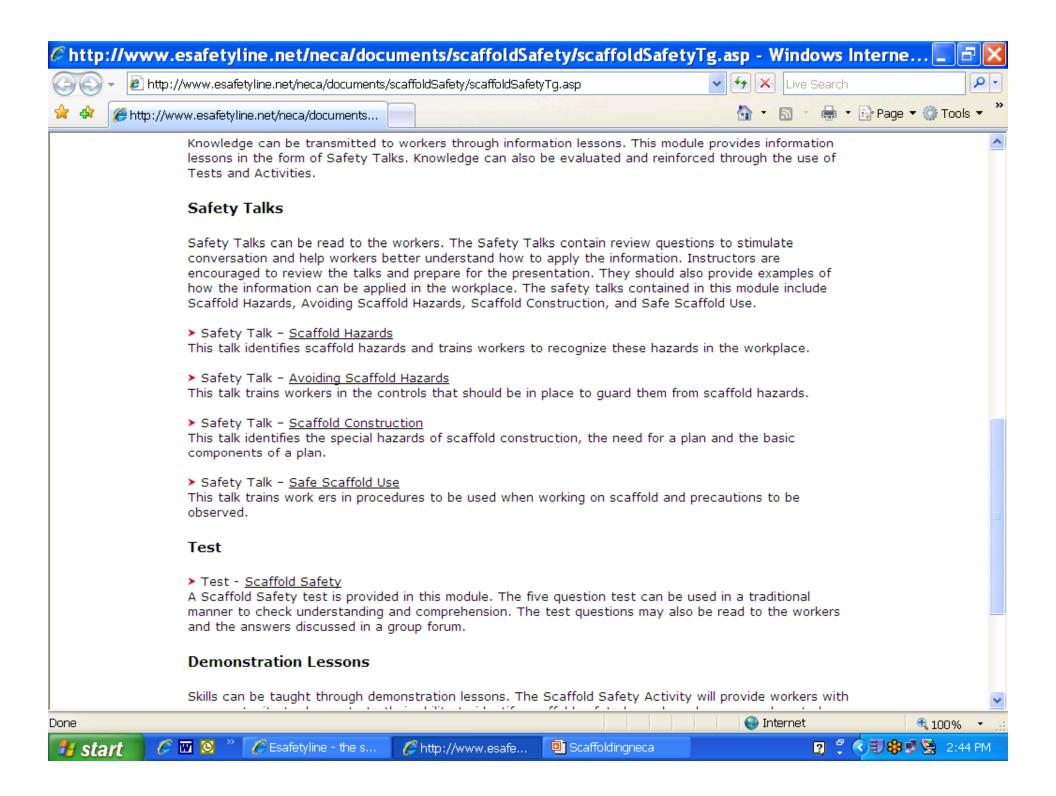




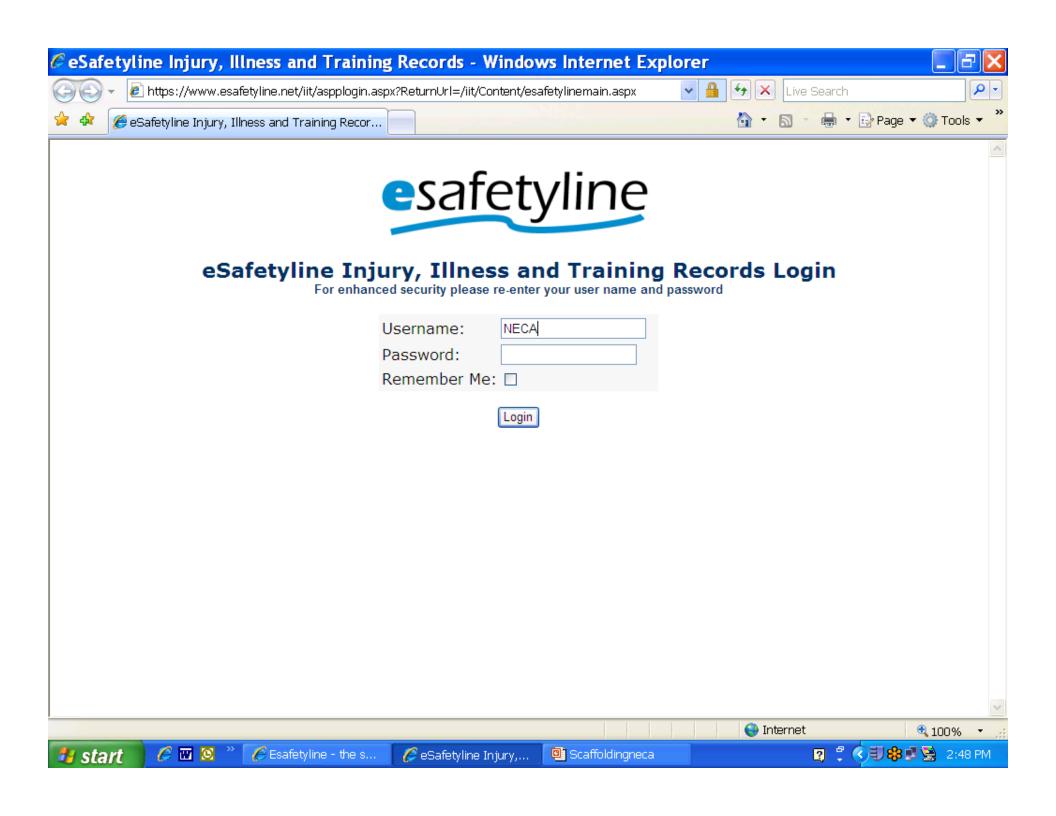


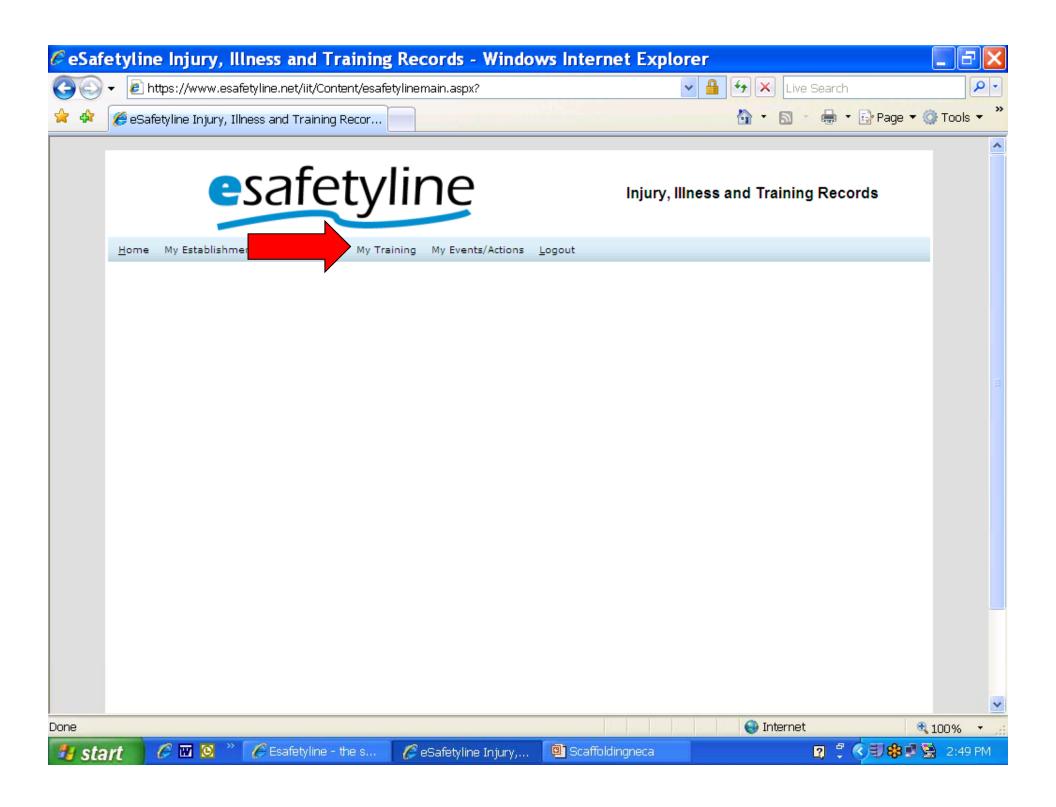


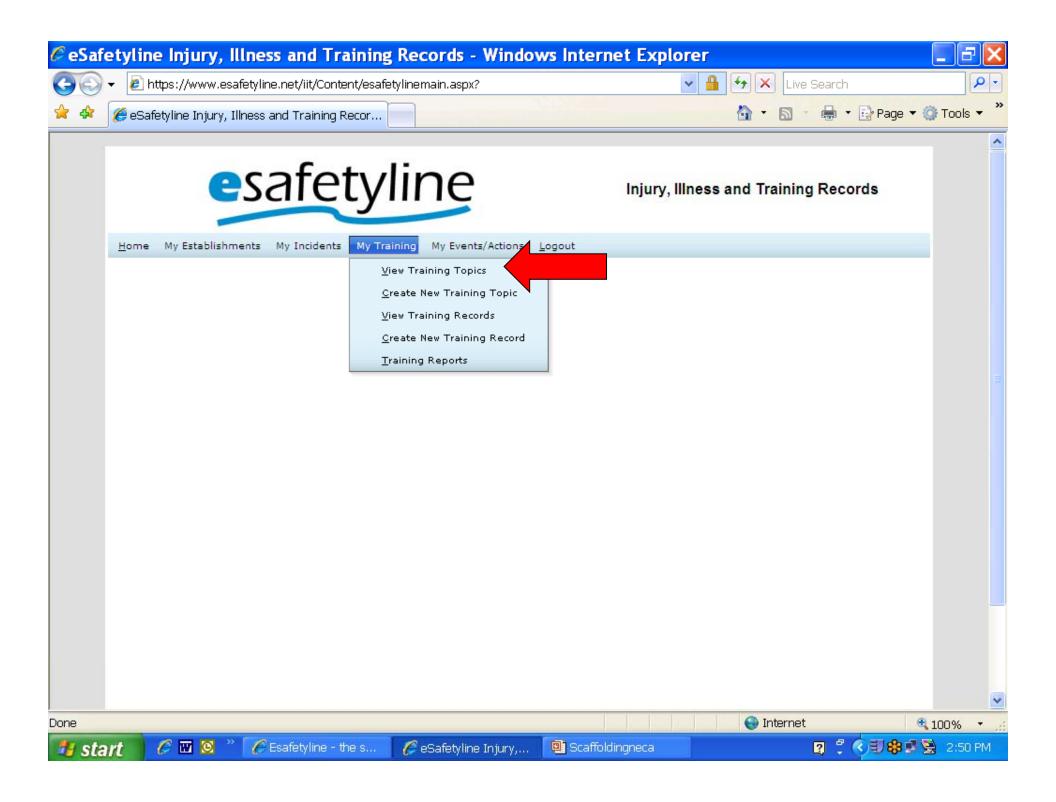


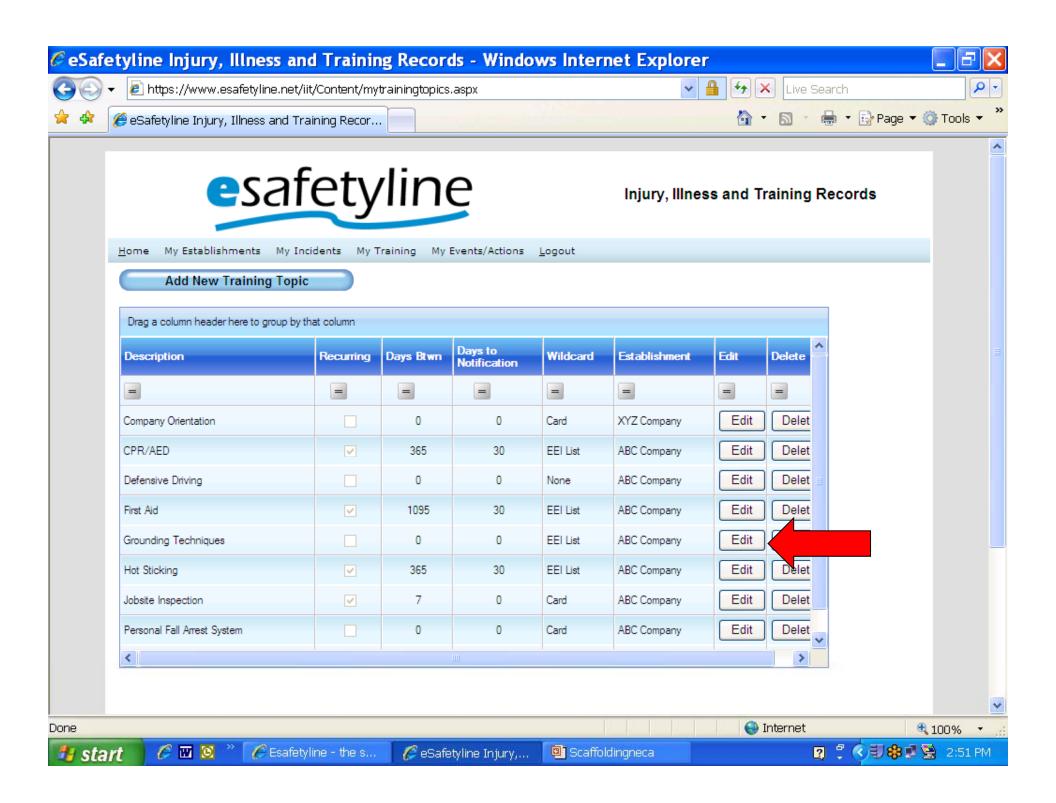


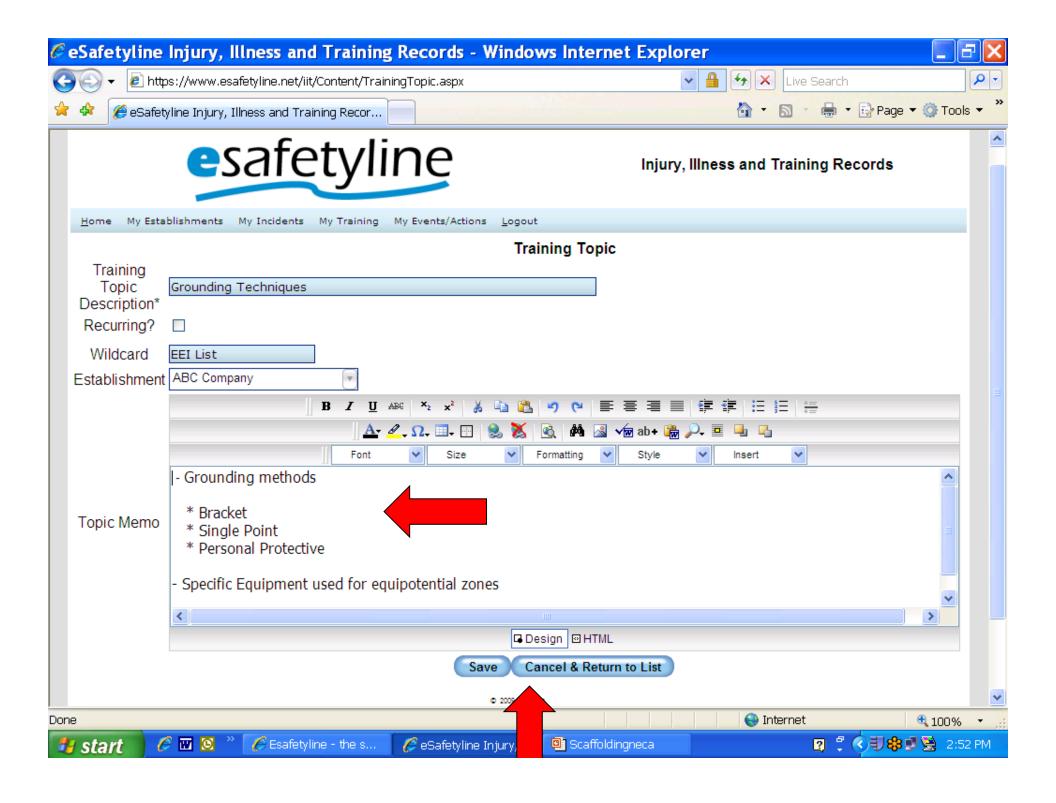


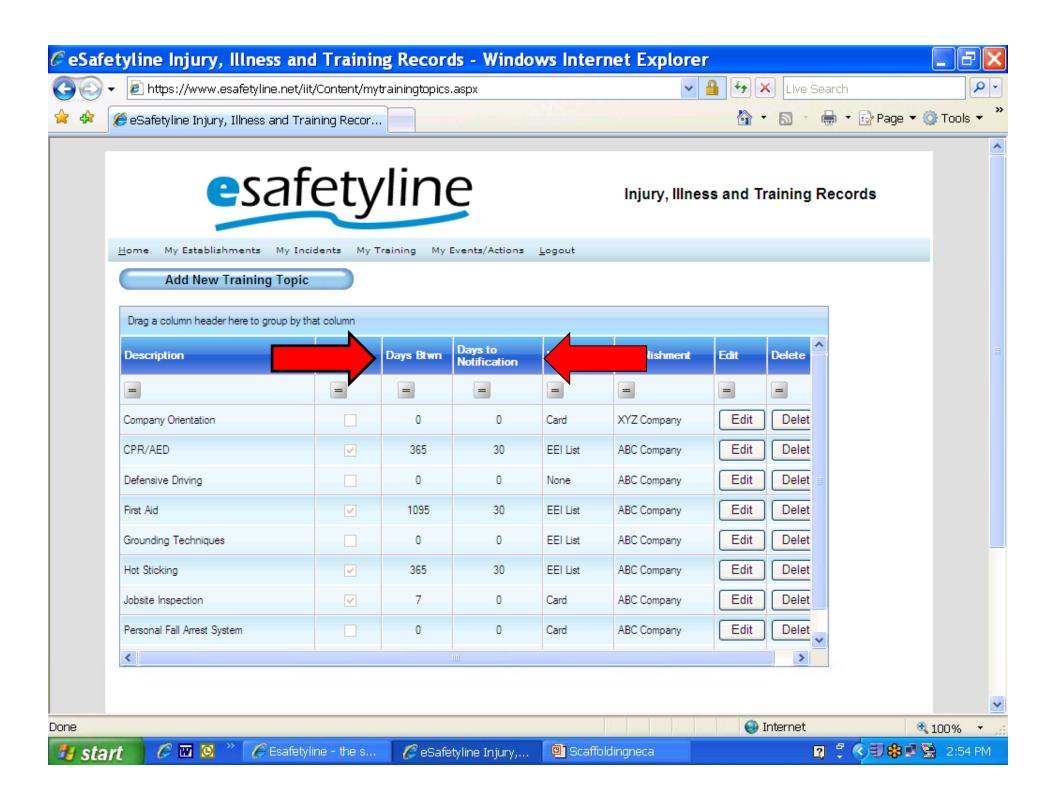


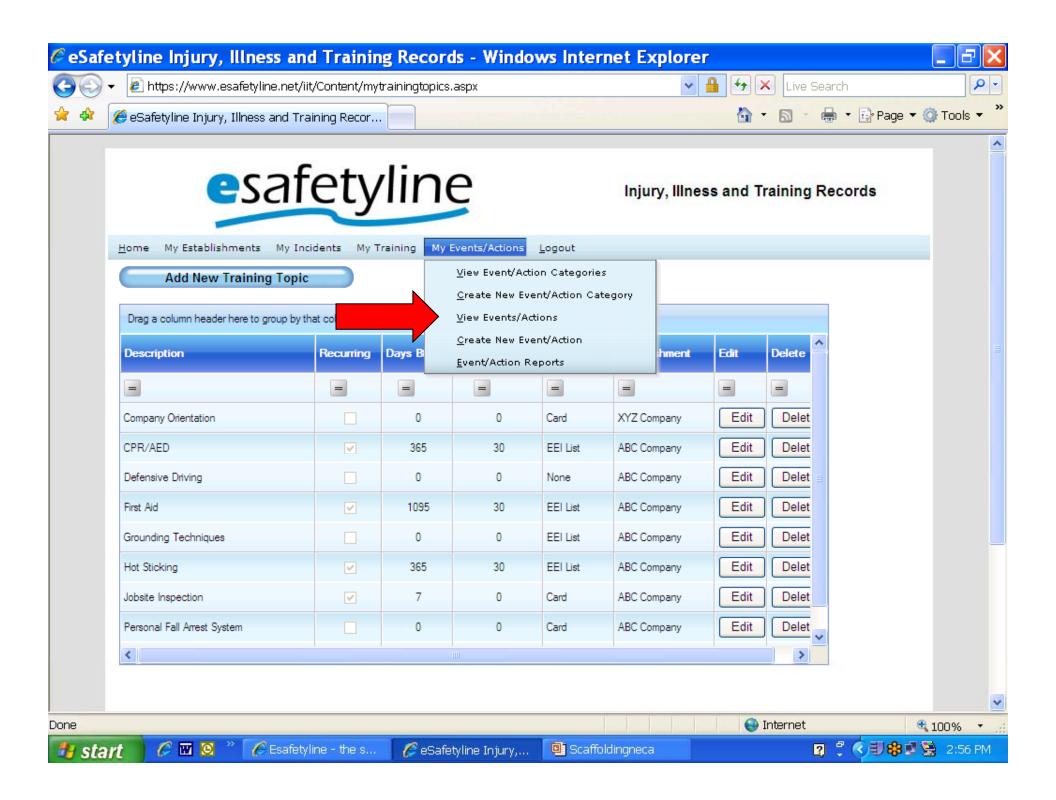


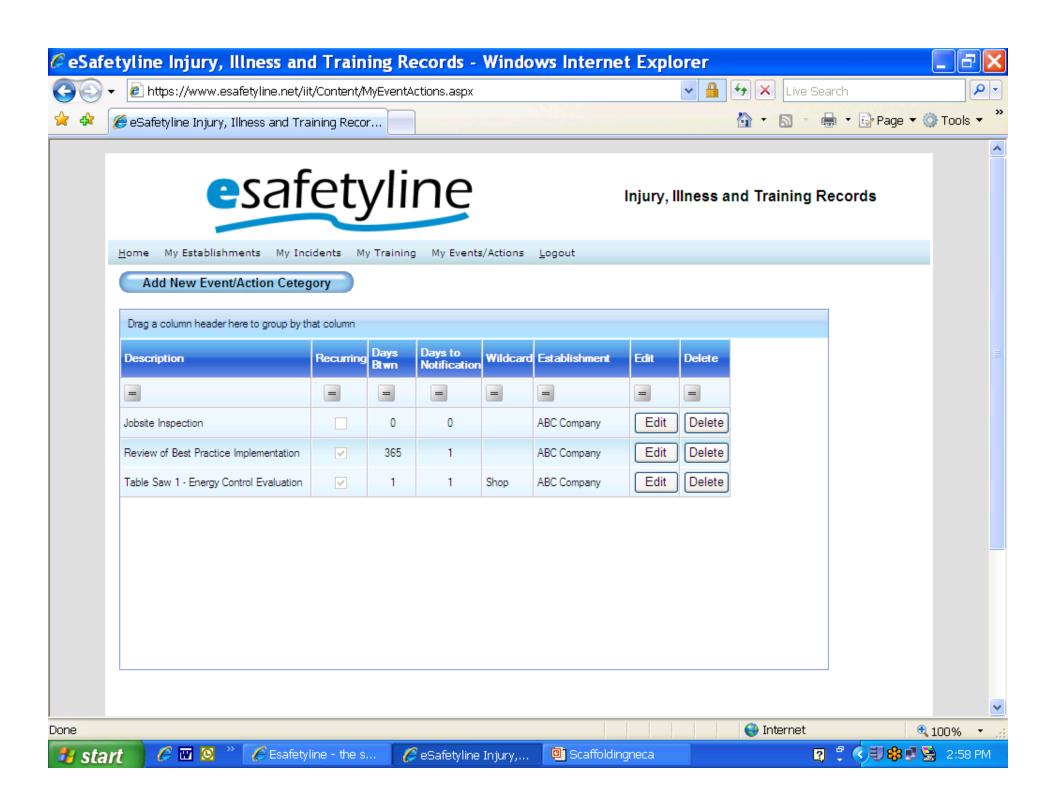












End of Session

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