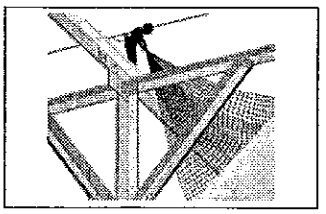


Steel Erection—General Safety Requirements

Overview of Topic

This Toolbox Talk covers general work practices for OSHA's new steel erection standard. This new standard went into effect January 18, 2002.

New steel erection standard

A very quick overview of the new steel erection standard is all that one Toolbox Talk can handle. The difference between the old and new standard is like night and day, and the protection offered by the new one, compared to the old one, is also like night and day. The following information is an overview of the contents of the new rule.

Scope and Application—Who the standard applies to (and who it doesn't apply to) is specified in this section. The standard does not cover electrical transmission towers, communication and broadcast towers, or tanks. There is quite an extensive list of examples of steel erection activities.

Definitions—The new standard offers an extensive list of definitions—an education in itself.

Site layout, site-specific erection plan and construction sequence—Pre-erection communication and planning results in a safe operation. This section requires communication between the controlling contractor and the steel erector.

Hoisting and rigging—An essential element of steel erection is the rigging and hoisting of structural steel members and materials. This section includes requirements for hoisting and rigging operations during steel erection activities.

Structural steel assembly—Structural stability must be maintained at all times during erection. This section is intended to help prevent collapse due to lack of stability, a major cause of fatalities.

Anchor bolts—Column stability, and the proper use of anchor bolts is addressed in this section. Inadequate anchor bolt installation could be a factor in causing structure collapse.

Beams and columns—Inappropriate/inadequate connections of beams and columns is inherently hazardous and can lead to collapse. Recommendations include a combination of performance and specification requirements that address hazards.

Falling object protection—A real and everyday hazard is loose items that have been placed aloft and that can fall and strike employees working below. Securing materials, equipment, and tools that are not in use; and requiring head protection below is the major points in this section.

Fall protection—Fifteen feet is the distance that triggers the fall protection requirement. Exceptions are: (1) connectors working at heights between 15 and 30 feet, and (2) workers engaged in decking in a controlled decking zone between 15 and 30 feet.

Employee Training

There are employee training requirements in the new steel erection standard (§1926.761). In addition to jobsite hazard training required by §1926.21, the new regulation requires you to provide: (1) training by a qualified person, (2) fall hazard training, and (3) special training programs for those involved in multiple lift rigging, connecting, and controlled decking zones.

OSHA state-plan-states: Remember that certain states have more stringent regulations that go above and beyond the OSHA standards.

Training Tips

This Toolbox Talk is an introduction to the new steel erection standard. An additional Toolbox Talk called Steel Erection—Assembly Overview has been included in this update. Future updates will include additional Steel Erection Toolbox Talks.

Where To Go For More Information

29 CFR 1926, Subpart R—Steel Erection.

OSHA Directive 99-1 (CPL 2-1)—Steel Erection.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Steel Erection—General Safety Requirements

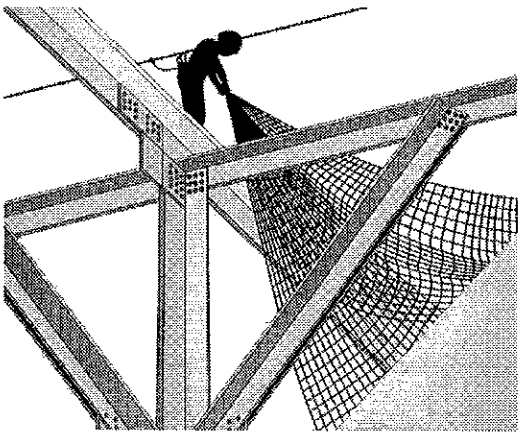
This Toolbox Talk covers general work practices for OSHA's new steel erection standard. The new standard went into effect January 18, 2002.

New steel erection standard

Steel erection activities include: hoisting, connecting, welding, bolting, and rigging structural steel, steel joists, and metal buildings; installing metal deck, siding systems, miscellaneous metals, ornamental iron, and similar materials; and moving point-to-point while performing these activities.

Scope and Application—Who the standard applies to (and who it doesn't apply to) is specified in this section. The standard does not cover electrical transmission towers, communication and broadcast towers, or tanks.

Hoisting and rigging—This section includes requirements for hoisting and rigging operations during steel erection activities, including crane inspections, working under loads, and multiple lift rigging procedures.



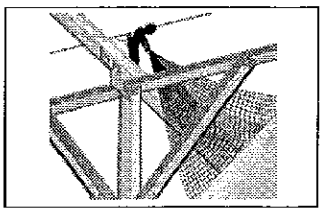
Structural stability—Structural stability must be maintained at all times during erection. This section is intended to help prevent collapse due to lack of stability, a major cause of fatalities in this industry.

Anchor bolts—Column stability, and specifically, the proper use of anchor bolts is addressed in this section of the rule. Inadequate anchor bolt installation could be a factor in causing structure collapse.

Beams and columns—Inappropriate/inadequate connections of beams and columns is inherently hazardous and can lead to collapse. Recommendations include a combination of performance and specification requirements that address hazards.

Falling object protection—A real and everyday hazard is loose items that can fall and strike employees working below. Securing materials, equipment, and tools that are not in use; and requiring head protection below is the major points in this section.

Fall protection—Fifteen feet is the distance that triggers the fall protection requirement. Exceptions are: (1) connectors working at heights between 15 and 30 feet, and (2) workers engaged in decking in a controlled decking zone between 15 and 30 feet.



Steel Erection—General Safety Requirements—Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Steel Erection—General Safety Requirements at _____ .
(company name)

The session covered:

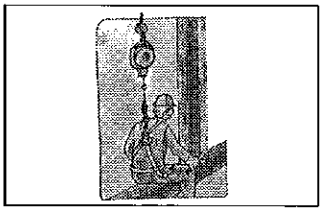
- New steel erection standard requirements.
- Training requirements of the new steel erection standard.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Steel Erection—Assembly Overview

Overview Of Topic

This Toolbox Talk is an overview of the steel erection assembly requirements that went into effect January 18, 2002.

General structural steel assembly requirements

You should maintain structural stability at all times during the erection process to prevent collapse due to lack of stability, a major cause of fatalities in the steel erection industry.

For multi-story structures, comply with the following:

- Install permanent floors as the erection of structural members progresses. Do not allow more than eight stories between the erection floor and the upper-most permanent floor (unless the structural integrity is maintained as a result of the design).
- Do not allow more than four floors or 48 feet, whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor (unless the structural integrity is maintained as a result of the design).
- Maintain a fully planked or decked floor or nets within two stories or 30 feet, whichever is less, directly under any erection work being performed.

Other assembly requirements

The new structural steel assembly section (29 CFR 1926.754) has specific requirements for various types of assembly.

There are requirements that have to be followed when performing work on a flat surface (walking/working surfaces). Walking/working surfaces is broken down into two areas:

- Working with shear connectors and other similar devices (which can pose a trip hazard), and
- Working on the top surface of skeletal structural steel (which can pose a slip hazard).

The installation of plumbing-up equipment is covered in 29 CFR 1926.754(d). Plumbing-up equipment includes guy lines, stabilizer bars and solid web members. The plumbing-up equipment must be in place and properly installed before the structure is loaded with construction material. Loading the structure before it is plumbed can change the true lines of beams and columns, altering the final alignment of the members.

There are specific requirements to protect employees during the installation of metal decking. Decking installation is one of the most hazardous operations for an ironworker. This includes:

- Hoisting, landing, and placing of metal decking bundles;
- Installing and covering roof and floor holes and openings;
- Decking gaps around columns; and
- Installing metal decking and derrick floors.

Employee Training

Employees must be trained by a qualified person. All employees exposed to fall hazards must be trained according to 29 CFR 1926.761(b). Connectors need to be trained according to 29 CFR 1926.761(c)(2). Employees performing multiple lift procedures must be trained according to 29 CFR 1926.761(c)(1). Controlled decking zone training is to be done according to 29 CFR 1926.761(c)(3).

Training Tips

Include your company's steel erection rules in the training.

Where To Go For More Information

29 CFR 1926.754—Structural Steel Assembly.

OSHA Directive 99-1 (CPL 2-1)—Steel Erection.

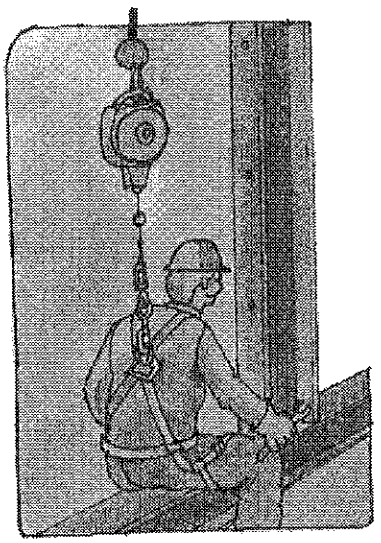
KELLER'S CONSTRUCTION TOOLBOX TALKS

Steel Erection—Assembly Overview

The main safety requirement in steel erection assembly is to maintain structural stability at all times. This is necessary to prevent collapse of the building and the associated injuries and deaths.

New steel erection assembly requirements

The old steel erection rule did not cover assembly work in enough detail to keep workers safe. The new rule is much more specific regarding the following:

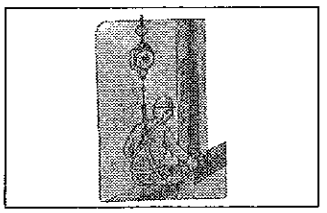


- The general steel assembly requirements and how they apply to multi-story structures.
- There are requirements that have to be followed when performing work on a flat surface (walking/working surfaces). Walking/working surfaces is broken down into two areas: Working with shear connectors and other similar devices (which can pose a trip hazard), and working on the top surface of skeletal structural steel (which can pose a slip hazard).
- The installation of plumbing-up equipment is covered. Plumbing-up equipment includes guy lines, stabilizer bars and solid web members. The plumbing-up equipment must be in place and properly installed before the structure is loaded with construction material. Loading the structure before it is plumbed can change the true lines of beams and columns, altering the final alignment of the members.
- The steel erection assembly section addresses specific requirements to protect employees during the installation of metal decking including: hoisting, landing, and placing of metal decking bundles; installing and covering roof and floor holes and openings; decking gaps around columns; and installing metal decking and derrick floors.

Training for steel erection assembly

- Employees must be trained by a qualified person.
- All employees exposed to fall hazards must be trained according to 29 CFR 1926.761(b).
- Connectors need to be trained according to 29 CFR 1926.761(c)(2).
- Employees performing multiple lift procedures must be trained according to 29 CFR 1926.761(c)(1).
- Controlled decking zone training is to be done according to 29 CFR 1926.761(c)(3).

Remember, the new steel erection rule does not cover electrical transmission towers, communication and broadcast towers, or tanks.



Steel Erection—Assembly Overview Sign-Off Sheet

This sign-off sheet documents the employees at this company, _____, who have taken part in a training session on Steel Erection—Assembly Overview—New Regulation. The session covered:

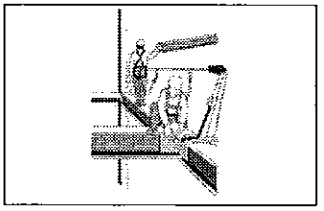
- The general steel assembly requirements and how they apply to multi-story structures.
- Requirements that have to be followed when performing work on a flat surface (walking/working surfaces).
- Installation of plumbing-up equipment.
- Specific requirements to protect employees during the installation of metal decking including: hoisting, landing, and placing of metal decking bundles; installing and covering roof and floor holes and openings; decking gaps around columns; and installing metal decking and derrick floors.
- Fall hazard training and other special training program requirements.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Steel Erection—Fall Protection

Overview of Topic

This Toolbox Talk covers general work practices for OSHA's new steel erection standard. This new standard went into effect January 18, 2002.

15-foot threshold

The major difference between the old fall protection requirements and the new standard is the 15-foot threshold for requiring fall protection. Two exceptions are: connectors working at heights between 15 and 30 feet, and workers engaged in decking in a controlled decking zone working between 15 and 30 feet.

Except for the exceptions above, each employee on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level must be protected from fall hazards.

Your choice of fall protection

Steel erectors, just as in the general fall protection standard, can choose the best fall protection system for the job. The standard says protection from fall hazards can be: a perimeter safety cable, guardrail, safety net, personal fall arrest, or a fall restraint (positioning device) system.

For all of the above systems, except a perimeter safety cable, the new standard points you to 29 CFR 1926.502 (general fall protection standard) for the system requirements.

Connectors

Connectors must be protected from fall hazards of more than two stories or 30 feet, whichever is less. They must also be provided and must wear a personal fall arrest or restraint system, or be provided with other means of protection between 15 and 30 feet.

This does not mean they have to tie off for heights between 15 and 30 feet, it only means they must be given the opportunity to do so. Anchorage points must be present from 15 feet up.

Connectors must also attend specialized training that includes: the nature of the hazards associated with connecting, and the establishment, access, proper connecting techniques, and work practices required by §1926.760(b), and §1926.756(c).

Custody of fall protection

OSHA also has a procedure for transferring custody of fall protection. Steel erectors must take their fall protection with them unless the controlling contractor or its authorized representative has: (1) directed the steel erector to leave the fall protection in place, and (2) has inspected and accepted control and responsibility of the fall protection before others can work in the area.

Employee Training

Fall hazard training in the new rule is very specific. You must have a program, and that program must include: recognizing and identifying fall hazards; use and operation of the fall protection the employee will be using; correct procedures for erecting, maintaining, disassembling, and inspecting the system to be used; fall prevention; and the requirements of §1926.760.

OSHA state-plan-states: Remember that certain states have more stringent regulations that go above and beyond the OSHA standards.

Training Tips

Fall protection systems and equipment takes extensive training. For this Toolbox Talk, meant to be a short overview, go over the new fall protection requirements in the rule. This will meet the training requirement above for discussing §1926.760.

Where To Go For More Information

29 CFR Part 1926, Subpart R—Steel Erection.

OSHA Directive 99-1 (CPL 2-1)—Steel Erection.

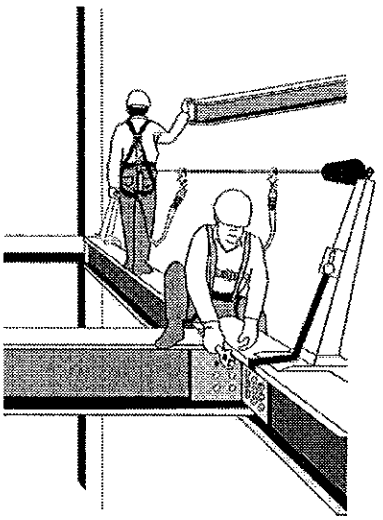
KELLER'S CONSTRUCTION TOOLBOX TALKS

Steel Erection—Fall Protection

This Toolbox Talk covers general work practices for OSHA's new steel erection standard. The new standard went into effect January 18, 2002.

15-foot threshold

The major difference between the old fall protection requirements and the new rule is that at 15 feet you must have fall protection. Two exceptions are: Connectors working at heights between 15 and 30 feet, and workers engaged in decking in a controlled decking zone working between 15 and 30 feet.



Employers' choice of fall protection

Steel erectors, just as in the general fall protection standard, can choose the best fall protection system for the job. The standard says protection from fall hazards can be: a perimeter safety cable, guardrail, safety net, personal fall arrest, or a fall restraint (positioning device) system. You must go to the general fall protection standard (29 CFR 1926.502) for the system requirements.

Connectors

Connectors must be protected from fall hazards of more than two stories or 30 feet, whichever is less. They must also be provided and wear a personal fall arrest or restraint system, or be provided with other means of protection between 15 and 30 feet. This does not mean they have to tie off for heights between 15 and 30 feet, it only means they must be given the opportunity to do so.

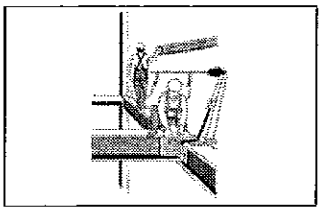
Other fall protection requirements

The new rule also discusses: (1) controlled decking zones, and (2) covering roof and floor openings.

Training requirements

Fall hazard training in the new standard is very specific. Your company must have a training program, and that program must include:

- recognizing and identifying fall hazards;
- use and operation of the fall protection equipment you will be using;
- correct procedures for erecting, maintaining, disassembling, and inspecting the system to be used;
- fall prevention; and
- the requirements of §1926.760.



Steel Erection—Fall Protection Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Steel Erection—General Safety Requirements at _____ .
(company name)

The session covered:

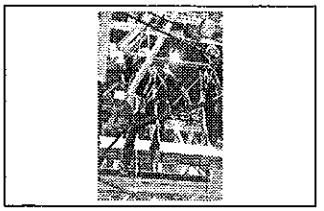
- The new 15 foot threshold height (except for connectors and controlled decking zones).
- Fall protection systems.
- Training for fall protection users.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature



Steel Erection—Communication Towers—Fall Protection and Safe Access

Overview of Topic

This Toolbox Talks discusses the provisions of OSHA's Compliance Directive (CPL) 2-1.29—Interim Inspection Procedures During Communication Tower Construction Activities. CPL's are inspection instructions for OSHA inspectors. However, they also provide insight into what you need to do to keep your jobsite safe.

The instruction applies only to the construction of new towers.

Background

Using fixed ladders with attached climbing devices is the preferred method for accessing towers and tower work stations. It provides conventional fall protection during ascent and descent. However, to alleviate the problems associated with continual climbing of high towers (physical demands, stress and medical ailments), the industry has asked OSHA to allow employees to ride hoist lines to work stations on towers.

Since OSHA does not specifically address tower erection under its current standards, but wants to help reduce the accident and injury rates associated with tower erection, OSHA believes that the methods in Appendix A of OSHA's Compliance Directive—*Compliance Guidelines for Employee Access by Hoist During Communication Tower Construction Activities* represent the best practices which can be implemented to safeguard employees while being hoisted to work stations on a tower.

Hoist lines

OSHA agrees that the hoist line may be used to hoist employees to work stations over 200 feet high if the work practices in Appendix A of CPL 2-1.29 are followed. Hoist lines cannot be used to access work stations at 200 feet and below.

Appendix A contains 16 specific requirements when hoisting employees on a hoist line to reach work stations at heights greater than 200 feet. Those provisions are: training, equipment, trial lift and proof testing, pre-lift meeting, documentation, hoisting an employee to the work station, communication between the hoist operator and hoisted employee, weather conditions, energized power lines, hydraulic hoists (drum hoists), hoist mounting, drums, brakes and clutches, hoist control, wire rope and rigging, hoist operator, and hoist inspections.

Climbing towers

When climbing towers, your employees must be protected from falls using a fall arrest system meeting the criteria of §1926.502—Fall protection systems criteria and practices, or a ladder assist safety device meeting the requirements of §1926.1053(a)—Ladders—General.

These are acceptable methods of accessing tower work stations regardless of height.

Fall protection

OSHA and other industry representatives recommend that employees six feet or more above a lower level should be protected from falling by a guardrail system, safety net system, ladder safety device, fall arrest system, or positioning device system. However, current OSHA standards only require fall protection at heights of more than 25 feet.

Citation guidelines

Under this CPL, for hazards associated with falls once employees ar at their workstation at levels in excess of 25 feet, employers who fail to provide fall protection will be cited under 1926.105(a)—Safety nets.

When using hoist lines, employers will be cited when failing to use the guidelines in Appendix A of CPL 2-1.29—Interim Inspection Procedures During Communication Tower Construction Activities. The citation will be cited under the applicable provisions of Subpart N—Cranes and Derricks, or in the alternative, the General Duty Clause.

Employee Training

Whatever method your employees use to access towers, they must also be trained to recognize and avoid fall hazards and using the fall protection system to be used. These requirements are found in 1926.21—Safety training and education, 1926.1060—Training requirements for ladders, and 1926.503—Fall protection training requirements.

When using hoist lines, employers must receive training on safe access using Appendix A of CPL 2-1.29—Interim Inspection Procedures During Communication Tower Construction Activities. The hoist operator must have a thorough understanding of the guidelines pertaining to hoisting employees on the hoist line.

Training Tips

Since this Toolbox Talk can cover various topics and span more than one Toolbox Talk session, go to the Toolbox Talk covering the particular subject for a training tip.

Where To Go For More Information

OSHA's Compliance Directive (CPL) 2-1.29—Interim Inspection Procedures During Communication Tower Construction Activities.

29 CFR 1926, Subpart M—Fall protection.

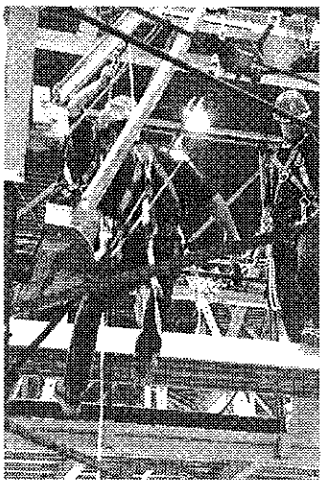
29 CFR 1926, Subpart N—Cranes and Derricks.

29 CFR 1926, Subpart X—Ladders and Stairways.

KELLER'S CONSTRUCTION TOOLBOX TALKS

Communication Towers—Fall Protection and Safe Access

Using fixed ladders with attached climbing devices is the preferred method for accessing towers and tower work stations. It provides conventional fall protection during ascent and descent. However, some tower construction industry representatives say that continual climbing of high towers is physically demanding and can lead to stress and medical ailments over an extended period of time and may contribute to other safety problems including falls.



To alleviate these problems, your industry has asked OSHA to allow employees to ride hoist lines to work stations on towers.

Since OSHA does not specifically address tower erection in its current OSHA rules, but wants to help reduce the accident and injury rates associated with tower erection, OSHA believes that the methods in Appendix A of CPL 2-1.29—*Compliance Guidelines for Employee Access by Hoist During Communication Tower Construction Activities*, represent the best practices which can be implemented to safeguard employees while being hoisted to work stations on a tower.

Hoist lines

OSHA agrees that the hoist line may be used to hoist employees to work stations over 200 feet high if the work practices in Appendix A are followed. Hoist lines cannot be used to access work stations at 200 feet and below. Appendix A contains 16 specific requirements when hoisting employees on a hoist line to reach work stations at heights greater than 200 feet. Those requirements are: training, equipment, trial lift and proof testing, pre-lift meeting, documentation, hoisting an employee to the work station, communication between the hoist operator and hoisted employee, weather conditions/ energized power lines, hydraulic hoists (drum hoists), hoist mounting, drums, brakes and clutches, hoist control, wire rope and rigging, hoist operator, and hoist inspections.

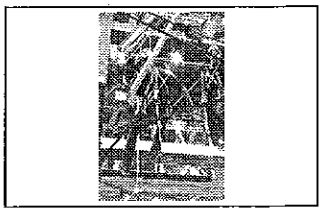
Climbing towers

When climbing towers, you must be protected from falls using a fall arrest system or a ladder assist safety device. These are acceptable methods of accessing tower work stations regard less of height.

Fall protection

OSHA and other industry representatives recommend that employees six feet or more above a lower level should be protected from falling by a guardrail system, safety net system, ladder safety device, fall arrest system, or positioning device system. However, current OSHA standards only require fall protection at heights of more than 25 feet.

Climbing communication towers is a tough job. OSHA has recognized this and wants to help. However, OSHA will not sacrifice safety. Using hoist lines is a complex and complicated business. If your company wants to use this method to lift employees over 200 feet, that's fine. But, they must follow the 16 steps outlined in CPL 2-1.29—*Interim Inspection Procedures During Communication Tower Construction Activities*.



Steel Erection—Communication Towers—Fall Protection and Safe Access Sign-Off Sheet

This sign-off sheet documents the names of employees who attended this training session on Steel Erection—Communication Towers—Fall Protection and Safe Access at _____ .
(company name)

The session covered:

- Hoist line procedures.
- Fall protection.
- Tower climbing.

The space below is for employees to "sign-off" that they were in attendance.

Date of Training: _____ **Job Location:** _____

Employee Signature	**Print Name Here**

_____
Supervisor's Signature