



MNOSHA Instruction **STD 3-16.1A**

August 24, 2016

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## **SUBJECT: Steel Erection**

### **Purpose:**

To describe MN OSHA's enforcement criteria and guidelines for the application of the standards for Steel Erection under 29 CFR 1926.750-761(Subpart R).

### **Scope:**

This instruction applies MN OSHA-wide.

### **Cancellations:**

This instruction cancels and replaces MNOSHA Instruction STD 3-16.1 CH-1 issued November 16, 2010.

### **References:**

1. 29 CFR 1926.500-503 (Subpart M)
2. 29 CFR 1926.750-761 (Subpart R)
3. Federal OSHA's CPL 02-01-034, "Inspection Policy and Procedures for OSHA's Steel Erection Standards for Construction"
4. Federal OSHA's CPL 02-01-048, "Clarification of OSHA's enforcement policies relating to floors/nets and shear connectors; Cancellation of CPL 02-01-046 (Sept. 30, 2009)"

### **Background:**

The Steel Erection standard under 29 CFR 1926.750 - 761 is OSHA's safety standard to address the unique issues involving steel erection activities. On January 26, 1988, Federal OSHA announced its intent to develop a revised steel-erection standard, which was separate from the fall-protection standard

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under 29 CFR 1926.500-503 (Subpart M). In 1992, Federal OSHA announced a Notice of Proposed Rule Making (NPRM), which addressed recommendations and continued requests for negotiated rulemaking by various affected stakeholders. Accordingly, Federal OSHA received more than 225 submissions and sixty nominations for membership to the Steel Erection Negotiated Rulemaking Advisory committee (SENRAC). SENRAC began negotiations in 1994, and met eleven times as a full committee. The eventual Final Rule was the direct result of the cooperative efforts of employers, labor unions, trade associations, state and federal government, and other interested parties, to develop a rule which provides a sound basis to more effectively reduce the risks of death or serious injury to workers engaged in unique activities associated with steel erection, through a standard that is easier to understand.

## Effective Date:

Federal OSHA adopted the new Subpart R on January 18, 2001, and delayed the effective date to January 18, 2002. MN OSHA observed the extended effective date of January 18, 2002. Federal OSHA also delayed enforcement of the standard until March 19, 2002, which was also observed by MN OSHA.

## Scope:

**Definition of “Steel Erection”:** 29 CFR 1926.751 defines “steel erection” as “the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection”. 29 CFR 1926.750(b)(1) identifies that “steel erection activities” include “hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point-to-point while performing these activities”. The “note” under 29 CFR 1926.750(a) also provides examples of structures where steel-erection activities are commonly found to occur.

**Scope of the “Steel Erection” Standards:** 29 CFR 1926.750(a) provides that the steel-erection standards apply to “steel-erection activities involved in the construction, alteration, and/or repair of single and multi-story buildings, bridges, and other structures where steel erection occurs”, and further provides that the standards “apply to employers engaged in steel erection unless otherwise specified”.

However, 29 CFR 1926.750(a) also provides that the steel-erection standards “**does not cover electrical transmission towers, communication and broadcast towers, or tanks**”. 29 CFR 1926.950-968 (Subpart V) addresses construction-activities involving electric power transmission and distribution equipment, including 29 CFR 1926.954 which addresses “fall protection” for these structures.

## **Structural Steel Assembly (SSA) Work vs. “Detail” Work and “Finishing” Work:**

There are different types of steel-erection activities, the primary of which is referred to as “structural steel assembly”. 29 CFR 1926.751 defines “structural steel” as “a steel member, or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite members). These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building”. 29 CFR 1926.751 further defines a “connector” as “an employee who, working with hoisting equipment, is placing and connecting structural members and/or components”. Under 29 CFR 1926 Subpart R, “structural steel assembly” work is often inter-changeably referred to as “connector work”.

However, it is important to distinguish “structural steel assembly” or “connector work” from other types of steel-erection activities, including “detail” or “finishing” work. As provided in the definition for “connector” under 29 CFR 1926.752, structural steel assembly work involves “hoisting equipment”, which is a fundamental element in distinguishing structural steel assembly work from other types of steel-erection activities. Steel-erection activities that involve “come-a-longs” or other portable hand or powered hoists do not fall under the definition of “connector work”, but are rather associated with “detail work” or “finishing work”. For example, the installation of metal stairs, which is often done with the assistance of come-alongs, qualifies as steel-erection activity, but it is not considered “structural steel assembly” or “connector work”, and is regarded as “detail work”. In another example, the installation of store fronts, such as in a mall setting, is often done from the grade level by workers simply carrying the pieces and setting them into place, and is a type of steel-erection activity regarded as finishing work. The installation of ornamental steel is also regarded as “finishing work”. When inspecting a work-site where steel-erection activities are occurring, OSHI’s must be able to distinguish between the various types of steel-erection activities to ensure the correct standards are considered and applied.

One additional and important aspect of steel erection that OSHIs must be able to identify and distinguish is work-activity involving or occurring upon metal decking. 29 CFR 1926.751 defines “metal decking” as “commercially manufactured, structural grade, cold rolled metal panels formed into a series of parallel ribs”, which includes “metal floor and roof decks, standing seam metal roofs, other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels, and similar products”. 29 CFR 1926.751 further identifies, “After installation and proper fastening, these decking materials serve a combination of functions including, but not limited to: a structural element designed in combination with the structure to resist, distribute and transfer loads, stiffen the structure and provide a diaphragm action; a walking/working surface; a form for concrete slabs; a support for roofing systems; and a finished floor or roof”. Because metal decking serves as a structural component in steel erection, it is important to note that the laying down, positioning, tacking, and installation of metal decking, whether or not a crane is used, is always considered to be “structural steel assembly”. However, for the purposes of evaluating work-activity involving steel erection, OSHIs must distinguish if the metal decking

is in the process of being installed or has been completed; and which workers are actually performing the installation of metal decking.

## Other OSHA Standards:

**Generally:** Steel-erection activities are seldom conducted within the requirements of only the steel-erection standards, as often steel-erectors can be found working, from scaffolding, ladders, aerial lifts, and other equipment. Depending on the work being performed, equipment used, and the hazard involved, OSHIs must cite the most applicable vertical standard. For example, at a work-site involving steel-erection activities, one of the most common work-conditions encountered would involve employees working from an elevation. Under the scaffolding standards, steel connectors who are working from scaffolds supported or suspended to perform their work are required to be protected by proper fall-protection when the scaffold-platforms are ten-feet above the next lower elevation. However, under the aerial lift standards, connectors working from an aerial lift must be properly protected at all elevations. Therefore, OSHIs must consider the specific work-activities being conducted, the specific equipment being used, and the specific hazards involved at the time of the inspection to ensure that the proper standard is considered and applied.

**Roofing Work:** When inspecting work-sites involving roofing-work, OSHIs should identify the type of roof being installed, including the materials being used. If the roofing-work involves the installation of a metal-roof (e.g. pole building, commercial setting), the requirements under 29 CFR 1926 Subpart R should be considered and applied. However, if the roofing-work involves the installation of a metal roof onto existing sheathing or residential-construction materials, the requirements under 29 CFR 1926 Subpart M should be considered and applied.

**Concrete Work:** When inspecting work-sites involving the construction of steel-framed structures with pre-cast concrete, OSHIs should identify which materials are being hoisted, positioned, installed, and connected at the time of the inspection. If the activities involve structural-steel assembly, the requirements under 29 CFR 1926 Subpart R should be considered and applied. However, if the activities involve the erection of pre-cast concrete members, the requirements under 29 CFR 1926 Subpart M should be applied as their erection are not considered steel erection.

## Assembly:

**Structural Stability:** 29 CFR 1926.754(a) requires, “Structural stability shall be maintained at all times during the erection process”.

**Sequence:** 29 CFR 1926.754(b) outlines requirements for multi-story structures, and aims to minimize the number of unfinished stories existing simultaneously within a structure during the steel-erection process by promoting “permanent floors” being completed as the steel erection work is commencing. 29 CFR 1926.754(b)(1) provides, “permanent floors shall be installed as the erection of structural members progresses, and there shall not be more than eight-stories between the erection floor and the

upper-most permanent floor”. 29 CFR 1926.754(b)(2) provides, “At no time shall there be more than four floors or 48-feet, whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor”. Both requirements provide for an exception where the employer can demonstrate that “the structural integrity is maintained as a result of the design”.

**Tripping Hazards:** 29 CFR 1926.754(c)(1) requires, “Shear connectors (e.g. headed steel studs, steel bars, steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists, or beam attachments so that they project vertically from or horizontally across the top flange member until after the metal decking, or other walking/working surface, has been installed”.

**Metal Decking - Installation:** 29 CFR 1926.754(e)(5)(i) requires, “metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement” except where a “Controlled Decking Zone” has been established pursuant to 29 CFR 1926.760(c). 29 CFR 1926.754(e)(5)(ii) also requires, “metal decking panels shall be placed to ensure full support by structural members” during their initial placement.

**Platforms/Safety Nets:** 29 CFR 1926.754(b)(3) requires, “A fully planked or decked floor, or [safety] nets, shall be maintained within two stories or 30-feet, whichever is less, directly under any erection work being performed”. Federal OSHA issued Directive CPL 02-01-034 on March 22, 2002, which provided. “failure to comply with 29 CFR 1926.754(b)(3) for a fully planked or decked floor or net was considered a de minimis violation where the employer required that all workers be protected by fall protection”. However, Federal OSHA rescinded that policy on September 30, 2009, and recognizes that 29 CFR 1926.754(b)(3) “provides additional safeguards”, including additional fall protection, promoting prompt rescue, and protection from falling objects. When evaluating steel erection activities where a fully planked or decked floor, or safety net, is not provided, OSHIs retain usual and customary citation discretion, and should evaluate whether the non-compliance results in “no direct or immediate relationship to safety or health”, or could be more properly addressed under other requirements (as identified in the subsequent sections of this document). However, the Directive further supports a citation if the employer “is not providing 100 percent fall protection, does not have provisions for prompt rescue in the event of a fall, or is not providing protection from falling objects”.

## Falling Objects/Materials:

**Loose Items:** 29 CFR 1926.759(a) requires, “All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement”. 29 CFR 1926.759(b) requires the “controlling contractor” to “bar other construction processes below steel erection unless overhead protection for the employees below is provided”.

**Metal Decking:** 29 CFR 1926.754(e)(1)(v) requires, “At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement”. 29 CFR 1926.754(e)(1)(v) addresses metal decking which has been laid and positioned, and requires the steel-

erection contractor to secure the metal decking in lieu of simply laying and positioning the decking unattached.

## Floor Openings:

**Metal Decking – Roof/Floor Holes/Openings:** 29 CFR 1926.754(e)(2) promotes minimizing the exposure to roof and floor holes and openings by ensuring that openings are not unnecessarily retained and unprotected. 29 CFR 1926.754(e)(2)(i) requires, “structural members turned down to allow continuous deck installation, except where not allowed by structural design constraints or constructability”. 29 CFR 1926.754(e)(2)(ii) requires, “Roof and floor holes and openings shall be decked over”, and where “large size, configuration or other structural design does not allow openings to be decked over (e.g. elevator shafts, stairwells), employees shall be protected in accordance with 29 CFR 1926.760(a)(1)”. 29 CFR 1926.754(e)(2)(iii) requires, “Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use ...”, which minimizes exposure by not creating the opening until it is necessary and capable of being protected.

**Covers:** 29 CFR 1926.754(e)(3) requires that covers for roof and floor openings “shall be capable of supporting, without failure, twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time”, requires that covers “shall be secured when installed to prevent accidental displacement by the wind, equipment, or employees”, and requires that covers “shall be painted with high-visibility paint” or “marked with the word ‘HOLE’ or ‘COVER’ to provide warning of the hazard”.

## Fall Protection:

### Fall Protection - Generally:

29 CFR 1926.760(a)(1) provides, “... each employee engaged in a steel-erection activity who is on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards ...”. This requirement applies to all steel-erection activities, including “structural-steel assembly” work, “detail” work, and “finishing” work, unless otherwise provided by 29 CFR 1926 Subpart R. 29 CFR 1926.760(a)(1) refers to two exceptions, which are identified under 29 CFR 1926.760(a)(3), and include “connectors” performing structural steel assembly work under 29 CFR 1926.760(b), and employees working in “controlled decking zones” under 29 CFR 1926.760(c). Therefore, as a general rule, all persons performing steel erection work at least fifteen (15) feet above lower levels are required to be protected with fall protection unless they are engaged in “connector work” or the “installation of metal decking”, in which the requirements for each of those exceptions apply (as outlined below).

**Fall Protection – “Connector Work”:**

29 CFR 1926.760(b)(1) permits workers that are engaged in “connector work” (as defined previously) be protected in accordance with 29 CFR 1926.760(a)(1) “from fall hazards of more than two stories or thirty (30) feet above a lower level, whichever is less”. 29 CFR 1926.760(b)(3) allows workers engaged in “connector work” not to be actually “tied off” when working below this height, providing that the worker is provided “with a personal fall arrest system, positioning device system or fall restraint system”, and that the worker “wear the equipment necessary to be able to be tied off” (emph. add.). Thus, the employer is required to provide the fall protection system, but employees performing “connector work” are not required to actually “tie off” until the worker is at least the lesser of either two stories or thirty-feet above the lower level. In a Letter of Interpretation dated April 9, 2003, Federal OSHA did clarify that the requirements “do not state that employers are prohibited from” adopting requirements more strict than what 29 CFR 1926.760 requires. MN OSHA recognizes that under 29 CFR 1926.760(a)(1), fall protection is required one-hundred percent of the time for any “connector work” above thirty (30) feet above a lower level, and that the requirements under 29 CFR 1926.760(a), (b), (d), and (e) all apply to workers engaged in “connector work”. Finally, 29 CFR 1926.760(b)(2) also requires that all workers performing “connector work” complete “connector training in accordance with 29 CFR 1926.761” (See “Training” Section).

**Fall Protection – Metal Decking Installation:**

29 CFR 1926.760(c) provides, “A controlled decking zone (CDZ) may be established in that area of the structure over fifteen (15) and up to thirty (30) feet above a lower level where metal decking is being installed and forms the leading edge of a work area”. 29 CFR 1926.751 defines a “controlled decking zone” as “an area in which certain work ... may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems where access to the zone is controlled”. 29 CFR 1926.760(c)(2) requires, “Access to a controlled decking zone shall be limited to only those employees engaged in *leading edge work*”. 29 CFR 1926.760(c)(7) also specifies, “Final deck attachments and installation of shear connectors shall not be performed in a Controlled Decking Zone”. Furthermore, as noted in a Letter of Interpretation dated November 8, 2002, Federal OSHA emphasized that the controlled decking option was designed specifically and only “for the initial installation of metal decking”, and “the Controlled Decking Zone exception does not apply to this deck removal work”. MN OSHA maintains that a Controlled Decking Zone may only be used where metal decking is being initially installed.

Similar to a Controlled Access Zone in 29 CFR 1926 Subpart M (for overhead bricklaying work), a Controlled Decking Zone provides, as set forth in the Preamble, that “an important aspect of a Controlled Access Zone is **controlled** access” (See Letter of Interpretation dated December 22, 2003). Thus, 29 CFR 1926.706(c)(3) requires, “The boundaries of a Controlled Access Zone shall be designated and clearly marked”, and “shall be marked by the use of control lines or the equivalent”. In a Letter of Interpretation dated August 10, 2010, Federal OSHA specified that “a control line restricts access by visually warning employees of an unprotected area”, and that “control lines can be made of rope, wire, tape, or other equivalent materials, **but they must clearly designate the Controlled Decking Zone**”. 29

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CFR 1926.760(c)(3) also provides, “The Controlled Decking Zone shall not be more than ninety (90) feet wide and ninety (90) feet deep from any leading edge”. Federal OSHA indicated that the purpose of this requirement is, first, to “reduce the likelihood that non-deckers/other trades who are on the same floor as the Control Decking Zone will ignore the control lines and enter the Control Decking Zone”; and second “To limit the size of the area where workers are unprotected by conventional fall protection” (See Letter of Interpretation dated December 22, 2003). Thus, MN OSHA recognizes that for a Controlled Decking Zone to be properly established, 1) The boundaries must be established and designated; 2) The boundaries must be clearly marked through the use of “control lines”; 3) The “control lines” must consist of tangible materials such as rope, wire, tape, or other equivalent materials; 4) The Controlled Decking Zone cannot exceed ninety (90) feet in width and ninety (90) feet in length; and 5) Access into the Controlled Decking Zone must be controlled, and limited to employees NOT engaged in leading-edge work.

As previously, 29 CFR 1926.754(e)(5)(i) requires, “metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement” except where a “Controlled Decking Zone” has been established pursuant to 29 CFR 1926.760(c). 29 CFR 1926.760(c)(6) permits that metal decking need not be entirely secured immediately upon placement, but does require that each metal decking panel “have at least two attachments”. 29 CFR 1926.760(c)(6) further requires that metal decking be attached “from the leading edge back to the control line” to ensure workers are working “away” from the leading edge. Finally, 29 CFR 1926.760(c)(5) provides, “Unsecured decking in a Controlled Decking Zone shall not exceed 3,000 square-feet”.

In contrast to “connector work”, the employer is **not required** to provide the fall protection system, and employees performing “leading edge work” while installing metal decking in a controlled decking zone are **not required** to wear fall protection equipment, if the controlled decking zone is configured, implemented, and utilized properly. It is also important to emphasize that under 29 CFR 1926.760(c)(1), fall protection is required one-hundred percent of the time for any employee “working at a leading edge” in a controlled access zone where the fall hazards are at least the lesser of either “more than two stories or thirty (30) feet” above a lower level, and that the requirements under 29 CFR 1926.760(a), (b), (c), and (e) all apply to workers engaged in “leading edge work”. Finally, 29 CFR 1926.760(c)(4) also requires that all workers performing “leading edge work in a controlled decking zone” complete “controlled decking zone training in accordance with 29 CFR 1926.761” (See “Training” Section). Thus, only employees actually performing leading edge work within a properly established Controlled Decking Zone, and who are working no more than the lesser of either “more than two stories or thirty (30) feet” above a lower level, fall within the scope of the “Controlled Decking Zone” provisions under 29 CFR 1926.760(c).

### **Fall Protection - Criteria:**

29 CFR 1926.760(a)(1) provides that employees “... shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems”. Although the fall-protection requirements under 29 CFR 1926.501 do not apply to steel-



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erection activities, 29 CFR 1926.761(d)(1) requires that fall protection systems and equipment “shall conform to the criteria in 29 CFR 1926.502”. Specifically, guardrail systems must comply with 29 CFR 1926.502(b); safety-net systems must comply with the criteria set forth under 29 CFR 1926.502(c); personal fall-arrest systems must comply with the criteria set forth under 29 CFR 1926.502(d); and positioning device systems must comply with the criteria set forth under 29 CFR 1926.502(e). See “Fall Protection Systems – Fall Restraint Systems” below for the criteria involving the use of fall restraint systems.

### **Fall Protection - Perimeter Cables:**

29 CFR 1926.760(a)(2) requires, “perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed”, and 29 CFR 1926.760(d)(3) requires, “Perimeter safety cables shall meet the criteria for guardrail systems in 29 CFR 1926.502”. In a Letter of Interpretation dated July 17, 2002, Federal OSHA clarified, “the standard does NOT require a perimeter guardrail to be installed prior to the installation of the decking”. However, on multi-story structures, perimeter safety cables shall be installed as soon as the metal decking has been installed. The metal decking is considered installed once all the primary tack down welds are completed and the edges trimmed. Fundamentally, MN OSHA does require that if perimeter cables have not yet been installed, employees exposed to fall hazards shall be otherwise protected from fall-hazards in accordance with applicable fall-protection requirements.

There has also been clarification set forth by Federal OSHA regarding what constitutes a “perimeter guardrail”. In the afore-mentioned Letter of Interpretation dated July 17, 2002, Federal OSHA identified that a “perimeter safety cable must meet the guardrail requirements in 29 CFR 1926.502”, and noted that a perimeter safety cable (i.e. horizontal life line) would not meet the requirements of a perimeter guardrail (although they also identified that employees were utilizing the horizontal lifeline in conjunction with personal fall arrest systems, and the metal decking had not yet been installed, thus a perimeter guardrail was not required). In a Letter of Interpretation dated July 21, 2003, Federal OSHA also addressed the issue whether “other” types of guardrail systems (e.g. wooden rails) would be permissible as a “perimeter guardrail”. Although Federal OSHA acknowledged that the intended design of the perimeter cables and perimeter columns was to “facilitate the speedy erection” of the fall protection system, Federal OSHA further provided that “other types of guardrail systems, such as wooden guardrails, will be considered to meet this requirement” so long as the following conditions are met: “1) Workers installing the system are protected with personal fall arrest systems or other forms of conventional fall protection; 2) The system meets the guardrail requirements of 29 CFR 1926.502; 3) It is durable with respect to exposure to the conditions at the site; and 4) It does not create a greater hazard during initial steel erection connection activities”.

### **Fall Protection– Warning Line Systems:**

At present, 29 CFR 1926 Subpart R does not expressly recognize the use of warning line systems as a fall-protection measure used in steel-erection activity. MN OSHA enforces 29 CFR 1926.760(a)(1), which

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provides that employees "... shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems", and does not recognize the use of warning line systems for steel-erection activities in lieu of applicable fall protection requirements.

### **Fall Protection– Fall Restraint Systems:**

29 CFR 1926.751 defines a "fall restraint system" as "a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices". The fall-restraint system, unlike personal fall arrest systems, *can utilize body belts* or harnesses. Currently, there is no expressed standard that provides criteria for the design, application, and use of fall-restraint systems, including under 29 CFR 1926.502. In addition, there is currently little detailed information available on the application or use of fall restraint systems used in conjunction with steel-erection activities.

The Preamble to 29 CFR 1926 Subpart R (See page 5204) provides some reference to fall-restraint systems, and identified that the fall-protection requirements under 29 CFR 1926 Subpart M does not address fall-restraint systems. On November 5, 1995, Federal OSHA issued two Letters of Interpretation regarding the use and application of fall-restraint systems. In the first Letter (addressed to Dennis Gilmore), the Director provided that the Agency does "accept properly utilized fall restraint systems in lieu of fall arrest systems when the restraint system is rigged in such a way that the employee cannot get to the fall hazard". In the second Letter (addressed to Mike Amen), the Director provided that "it is perfectly acceptable to use fall restraint systems to protect employees from fall hazards", and that "as long as the restraint system prohibits the employee from falling off an edge, the employee can be within inches of the edge". Both Letters further provide that the fall restraint system "have the capacity to withstand at least twice the maximum expected force that is needed to restrain the person from the fall hazard". MN OSHA recognizes that fall-restraint systems are proper means of fall protection so long as they effectively prevent the employee from "getting to" and "working within" the danger zone associated with the fall hazard.

MN OSHA does recognize that fall-restraint systems are best utilized on horizontal surfaces only. Where fall-restraint systems are used, MN OSHA recognizes the "twice the maximum" safety factor for horizontal or nearly horizontal surfaces only. However, MN OSHA's current position is that the fall-restraint system cannot be utilized for a person already within the danger zone, such as those working on a steep sloped roof and installing structural or ornamental steel, or installing the steep sloped roof deck itself. MN OSHA currently holds that workers in those situations should be utilizing positioning device systems or personal fall arrest systems instead of fall-restraint systems.

Due to the limited information available, and the limited experience factor concerning fall-restraint systems, OSHI's should consult with their supervisors when responding to questions from stakeholders

or encountering issues involving fall-restraint systems in the field. Fall-restraint systems will be evaluated on a case-by-case basis.

## Training:

29 CFR 1926.761 sets forth a “vertical” training requirement specific to the hazards associated with steel-erection activities. 29 CFR 1926.761(a) requires that each employee be trained by a “qualified person”, and receive training on the following subjects:

- 1) Fall hazards and fall protection (29 CFR 1926.761(b));
- 2) Multi-lift rigging procedures (29 CFR 1926.752(c)(1));
- 3) Connector procedures (29 CFR 1926.761(c)(2));
- 4) Controlled decking zone (CDZ) procedures (29 CFR 1926.752(c)(3));

In addition, 29 CFR 1926.21 requires that employees be provided training/instruction on hazards not otherwise covered by the steel-erection standard. Typically, OSHIs should cite the applicable standard(s) under 29 CFR 1926.761 separately and individually for each violation.

Note: 29 CFR 1926.761 does not require that the employer document or maintain records of employee training.

## Inspection Procedures:

OSHIs will follow the criteria and guidelines as set forth in this instruction when addressing steel erection activities, as they apply to those activities involving construction, alteration, and/or repair.

**Steel Erection Checklist:** To assist OSHIs conducting inspections of work-sites where steel erection activity is occurring, a non-mandatory Steel Erection Checklist was developed by MN OSHA (see Appendix A of this instruction). The Steel Erection Checklist is a summary of 29 CFR 1926.750 - 761 (Subpart R) with which the most common problem areas may be more quickly referenced and identified. OSHIs must always refer to the complete text of 29 CFR 1926.750 - 761 (Subpart R) when making final determinations involving violations or recommendations.

**Federal OSHA Compliance Directive CPL 02-01-034:** Federal OSHA’s inspection policies and procedures for inspections involving steel erection activities are outlined in CPL 02-01-034, which became effective March 22, 2002. This document should be used by MN OSHA personnel as a resource for additional guidance or information that may not be readily addressed in this or other MN OSHA instructions. The Federal Directive includes definitions, inspection guidelines, answers to commonly asked questions, and illustrations. However, this directive has been revised to clarify OSHA's enforcement policy on the requirements regarding: (1) fully planked or decked floors or nets, and (2) the use of pre-installed shear connectors during steel erection. The Federal Directive can be retrieved from Federal OSHA’s website ([www.osha.gov](http://www.osha.gov)).

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**OSHI use of Personal Protective Equipment (PPE):** While conducting inspections of work-sites where steel-erection activities are occurring, OSHIs are expected to refrain from entering and/or accessing areas which directly expose OSHIs to fall-hazards. However, where potential inspection areas may directly expose OSHIs to fall-hazards, and necessitate that OSHIs use personal protective equipment (i.e. fall protection) (e.g. body harnesses, lanyards), OSHIs must discuss the circumstances with their immediate supervisor, and obtain approval for the use of fall protection equipment in advance before proceeding.

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James Krueger, Director MNOSHA Compliance  
For the MNOSHA Management Team

Distribution: OSHA Compliance and WSC Director

Attachments: Appendix A – Non-mandatory Steel Erection Checklist

NOTICE: Minnesota OSHA Directives are used exclusively by MNOSHA personnel to assist in the administration of the OSHA program and in the proper interpretation and application of occupational safety and health statutes, regulations, and standards. They are not legally binding declarations and they are subject to revision or deletion at any time without notice.

The following Appendix A contains an inspection checklist that lists specific items that should be looked at concerning the 1926.750 standard set that applies to steel erection.

**Appendix A**  
**Steel Erection Inspection Checklist (Non-Mandatory)**

Site Address: \_\_\_\_\_  
 General Contractor: \_\_\_\_\_  
 Steel-Erection Contractor: \_\_\_\_\_  
 Engineer of Record: \_\_\_\_\_  
 Crane Operator/Contractor: \_\_\_\_\_  
 Qualified Person - Rigging: \_\_\_\_\_

<b>Site Planning:</b>			
Y	N	1926.752(a)	Written notice by controlling contractor for concrete footings, piers, and walls?
Y	N	1926.752(b)	Written notice received by steel-erection contractor for footings, piers, and walls?
Y	N	1926.755(b)	Written notification of all repairs, replacement, or modifications to anchor rods, and approved by engineer?
Y	N	1926.752(c)	Adequate roads provided and maintained for delivery and movement?
Y	N	1926.752(d)	Pre-planning to ensure that no loads are hoisted/suspended over employees unless otherwise provided under 1926.753(d)?
Y	N	1926.752(e)	Site-specific plan being utilized for alternative means of protection?
<b>Hoisting &amp; Rigging:</b>			
Y	N	1926.753(c)(1)	Visual inspections of crane conducted prior to each shift by competent person?
Y	N	1926.753(c)(2)	Inspections of rigging conducted prior to each shift by qualified rigger?
Y	N	1926.753(c)(3)	Employees prohibited from being transported by hooks/loads of cranes?
Y	N	1926.753(c)(5)	Safety latches present on all hoist-hooks?
Y	N	1926.753(e)(2)	"Multiple" lift rigging conducted with "certified" equipment, within capacity, and with 5:1 safety factor?
Y	N	1926.753(e)(1)	Employees engaged in "multiple lifts" trained by "qualified person(s)" under 1926.761(c)(1)?
Y	N	1926.753(e)(4)	Members of "multiple rigging" rigged at least 7-feet apart, from top-down, and at center of gravity; and maintained "reasonably level"?
<b>Column Erection:</b>			
Y	N	1926.755(a)(1)	All columns anchored by at least 4 anchor rods (i.e. anchor bolts)?
Y	N	1926.755(a)(3)	All columns set on finished floors, plumbed up, and resting on shim packs?
Y	N	1926.755(a)(4)	All columns evaluated by competent person for guying/bracing?
<b>Beam/Column Assembly:</b>			
Y	N	1926.756(a)(1)	At least two bolts, which are "wrench-tight", for each connection of solid-web structural members prior to releasing from the hoist-line?
Y	N	1926.756(b)	At least one bolt, which is "wrench-tight", for each connection of diagonal-bracing?
Y	N	1926.756(c)(1)	At least one bolt, which is "wrench-tight", for a common connection between two structural members (i.e. joint-process) unless otherwise seated from displacement?
Y	N	1926.756(e)(1)	Perimeter columns extend at least 48-inches above the finished floor?
Y	N	1926.756(e)(2)	Perimeter columns have pre-punched holes or devices to accommodate cables?

<b>Open Web Steel Joists:</b>			
Y	N	1926.757(a)(1)	At least two bolts, which are “wrench-tight”, for each connection of solid-web structural members prior to releasing from the hoist-line?
Y	N	1926.757(d)	Hoisting cables not released unless diagonal erection bridging is installed/anchored?
Y	N	1926.757(c)(3)	No more than one employee allowed to access steel-joists where erection-bridging is not required until all bridging is installed and anchored?
Y	N	1926.757(d)	No more than one employee allowed to access spans < 60-feet of steel-joists until all bridging is installed and anchored? No more than two employees for spans > 60-feet?
Y	N	1926.757(e)(2)	Construction loads are not placed onto steel-joists unless all bridging is installed and anchored, and all bearing-ends are attached (See exception)?
Y	N	1926.757(e)(3)	Bundles of joist-bridging, which are placed upon steel joists, are less than 1,000 lbs., placed on a minimum of three steel-joists, and within one-foot of the secured ends?
<b>Decking/Sequence:</b>			
Y	N	1926.754(b)(1)	Less than 8 floors between upper-most permanently installed floor & erection floor?
Y	N	1926.754(b)(2)	Less than 4 floors or 48-feet between foundation or upper-most permanently installed floor and unfinished bolting/welding?
Y	N	1926.754(b)(3)	Fully planked/decked floor or safety-nets less than 2 stories or 30-feet directly under erection-work being performed?
Y	N	1926.754(c)(1)	Shear connectors, reinforcing bars, anchors and studs not attached as projections prior to metal decking being installed?
Y	N	1926.754(c)(2)	Shear connectors not installed until after the metal-decking has been installed?
Y	N	1926.754(e)(5)	Metal decking laid tightly and immediately secured upon placement?
Y	N	1926.754(e)(1)	Metal decking secured against displacement where conditions necessitate and/or at end of shift?
<b>Holes &amp; Openings:</b>			
Y	N	1926.754(e)(2)(ii)	All roof and floor holes/openings decked over, and are employees utilizing fall protection where openings are present?
Y	N	1926.754(e)(2)(iii)	All metal decking holes/openings not cut until immediately prior to being needed?
Y	N	1926.754(e)(3)	All covers capable of support 2x weight, secured, and painted and/or labeled?
Y	N	1926.754(e)(4)	All gaps around columns protected by wire mesh, plywood, or equivalent?
<b>Fall Protection - Generally:</b>			
Y	N	1926.760(a)(1)	Fall protection utilized by “steel erection” employees working at least 15-feet above the lower-level protected by guardrail, safety-net, fall-arrest, or fall-restraint? NOTE: Exceptions for “Connectors” and “Controlled Decking Zones”;
Y	N	1926.760(a)(2)	Perimeter safety cables immediately installed along perimeters after metal decking?
Y	N	1926.761(b)	Employees trained in fall protection by “qualified person(s)” under 1926.761(c)(1)?
Y	N	1926.757(a)(9)	Qualified person has provided written approval for all steel joists and girders used as anchor-points for fall-arrest systems?
<b>Fall Protection – “Connectors”:</b>			
Y	N	1926.760(b)(1)	Fall protection utilized by “connecting” employees working at least 2-stories or 30-feet, whichever is less, above lower levels?
Y	N	1926.760(b)(3)	Fall protection equipment worn (but not necessarily ‘tied-off’) by “connecting” employees working at least 15-feet, but less than 30-feet, above lower levels?
Y	N	1926.760(b)(2)	“Connecting” employees trained in fall protection by “qualified person(s)” under 1926.761(c)(1)?

<b>Fall Protection – “Controlled Decking Zones”:</b>			
Y	N	1926.760(c)	Height of Controlled Decking Zone limited to at least 15-feet, but less than 30-feet, above lower levels?
Y	N	1926.760(c)(1)	Fall protection utilized by “metal-decking” employees within Controlled Decking Zone working at least 2-stories or 30-feet, whichever is less, above lower levels?
Y	N	1926.760(c)(2)	Access to Controlled Decking Zone limited to “metal decking” employees performing leading-edge work?
Y	N	1926.760(c)(7)	Work within Controlled Decking Zone limited to “placing” and “tacking” metal decking panels?
Y	N	1926.760(c)(3)	Boundaries of Controlled Decking Zone clearly designated and marked?
Y	N	1926.760(c)(3)	Controlled Decking Zone does not exceed 90-feet in width and 90-feet in length?
Y	N	1926.760(c)(5)	Unsecured decking in Controlled Decking Zone does not exceed 3,000 sq. ft.?
Y	N	1926.760(c)(6)	Each metal decking panel maintains at least two attachments?
Y	N	1926.760(c)(4)	“Decking” employees working in a Controlled Decking Zone trained by “qualified person(s)” under 1926.761(c)(1)?
Y	N	1926.760(d)	Guardrails, safety-nets, fall-arrest, and positioning-device systems meet requirements of 1926.502?
Y	N	1926.760(e)	Fall protection of steel-erection contractor not to be left in place and used by other contractors/trades unless custody accepted by controlling contractor?
<b>Falling Object Protection:</b>			
Y	N	1926.759(a)	All materials, equipment, tools secured from accidental displacement?
Y	N	1926.759(b)	Work below steel erection activities prohibited, or adequate protection provided (i.e. beyond just personal protective equipment)?