

SUBJECT: Citing Improper Steel Chain Slings that do not use "Alloy" Steel Chain

Purpose: To clarify the application of 29 CFR 1910.184 to chain slings.

Scope: This instruction applies MNOSHA-wide.

References:

- A. 29 CFR 1910.184: Slings
- B. Minn. Rule 5205.0710, Alteration of Tools and Equipment
- C. ANSI B30.9 - 2006, Slings
- D. ASTM A391/A391M – 2007 Specification for Grade 80 Alloy Steel Chain
- E. Memorandum, Directorate of Compliance Programs, dated June 11, 1992, "Slings Used in Conjunction with Other Material Handling Equipment for the Movement of Materials by Hoisting in the Workplace."
- F. Memorandum, Chief of Occupational Safety Programming Division, dated May 18, 1978, "Only Alloy Steel Chain is recommended by Chain Manufacturers for Overhead Hoisting."

Cancellation: This instruction replaces STD 1-11.11 "Citing Improper Steel Chain Slings that do not use 'Alloy' Steel Chain" dated September 15, 2010.

I. Background:

29 CFR 1910.184(a) defines the scope of this section, and provides: "The types of slings covered are those made from alloy steel chain,..". Alloy steel chain is a specific type of chain defined in the "ASTM Standard Specification for Alloy Steel Chain A391-65", and is characterized with having greater strength, quality, and resistance to abrasion, wear, and deformation than other materials. Section 9-1.2.1 of ANSI B30.9-2006 provides, "Alloy steel chain shall be manufactured and tested in accordance with ASTM A391/A391M for Grade 80 chain and ASTM A973/A973M for Grade 100 chain".

When the standards under 29 CFR 1910.184 were initially adopted, the issue was posed as to whether or not 29 CFR 1910.184 prohibited the use of "other than alloy chains" for overhead lifting. Initially, the adopted wording of 29 CFR 1910.184(a), which was modified from that of the parent ANSI B30.9, appeared to support the use of only alloy chain in chain slings used for overhead lifting (NOTE: "Overhead lifting" was intended to mean lifting from an overhead source, such as an overhead bridge crane, and not lifting over a person's head). However, this appears to have been an unintentional oversight, as evidenced in the FEDERAL REGISTER, Volume 40, No. 125, Friday, June 24, 1975, which adopted the standards under 29 CFR 1910.184. The "Scope" discussed in the Preamble to 29 CFR 1910.184 provides, "The final standard, like the proposal and the consensus standard, covers the five major types of slings (alloy steel chain, wire rope, metal mesh, fiber rope and synthetic webbing) that are used to hoist material. The provisions of paragraphs (a) through (d) of the standard apply to all slings of these types. Paragraphs (e) through (i) of the standard contain specific requirements applicable to each of the five types of slings listed above respectively. To the extent that slings of these five types are not

covered by the tables on rated capacities provided in these paragraphs, the standard requires that they be used in accordance with the manufacturer's recommendations.”

Section 9-1.2.3 of ANSI B30.9-2006 allows chain or components of slings to be made from materials other than Grade 80 alloy chain and Grade 100 alloy chain, but further requires either the manufacturer or a qualified person to provide specific data, and that the manufacturer and user comply with all other requirements of Chapter 9-1 in ANSI B30.9-2006.

The issue was also presented whether the requirements under 29 CFR 1910.184 applied to chains made from materials other than alloy steel. Due to the wording in 29 CFR 1910.184(a), chains made from materials other than alloy steel, such as carbon steel (e.g. proof-coil, high-test, high-tensile transport), which do not possess the strength, hardness, and quality required of alloy chain, would be excluded from the requirements of 29 CFR 1910.184. The June 24, 1975 Preamble to the standard (FR, Vol 40, No.125) provides, "To the extent that slings of these five types are not covered by the tables on rated capacities provided in these paragraphs, the standard requires that they be used in accordance with the manufacturer's recommendations." Furthermore, 29 CFR 1910.184(e) relates to sling use, and indicates that slings not addressed in Table N-184-1 (for alloy chain) shall be used only in accordance with the manufacturer's recommendations. Manufactured chains, connectors and hooks, clamps, etc., which have been tested by the manufacturer, shall be used per the manufacturer's recommendations, and must not exceed the maximum rated load of any component part.

II. Marking:

Section 9-1.6 of ANSI B30.9-2006 requires, "Prior to initial use, all new and repaired chain and components of an alloy steel chain sling, ... shall be proof tested by the sling manufacturer or qualified person". Section 9-7.1 also requires, "Each sling shall be marked to show name or trademark of manufacturer, grade, nominal chain size, number of legs, rated loads, length (reach), and individual sling identification (e.g. serial numbers)". ASTM Standard Specification for Alloy Steel Chain A391-65 requires, "Body chain links shall not be marked with indented characters." Most alloy chain is marked every 10 inches with the letter "A" and the manufacturer's symbol alternating. This marking is to be done with raised, not indented (or stamped) letters, per ASTM A391-65.

New alloy chain, if marked with the letter "A", should be proof-tested by the manufacturer before shipping. A proof-test certificate is not normally required for new alloy chain unless welding or heat testing is performed on the sling, or if there is a question regarding the adequacy of attachments. Some older alloy chain may not have the "A" marked on the chain links. In this case, it would be acceptable to have the grade of chain and rated capacity indicated on the sling identification tag required by 29 CFR 1910.184(e)(1), provided that a certificate of proof-test is retained by the employer and is available for inspection as required by 29 CFR 1910.184(e)(4).

When materials other than those listed in Section 9.1.2 of ANSI B30.9-2006 are used, those slings shall comply with all other requirements of Chapter 9.1. Those slings would be required to be marked in accordance with Section 9.1.7.1 of ANSI B30.9-2006. The following identifications would be required: manufacturer, grade, chain size, number of legs, rated loads, length, and individual identification.

III. Action:

- a. Deficiencies involving chain slings made of alloy steel chain are to be cited under the appropriate paragraph of 29 CFR 1910.184 (c - e).
- b. Chain slings identified as being made of a material other than alloy steel chain, which are accompanied by proof-testing certificates and proper markings, but are not used in accordance with the manufacturer's recommendations or rated loads (i.e. equipment being used for other than their intended purpose), are to be cited under Minn. Rule 5205.0710.
- c. Steel chain slings not identified as alloy steel chain, and which are not accompanied by proof-testing certificates, identification tags, annual inspections, and proper attachments are to be cited under the General Duty Clause to get the sling brought up to the minimal requirements of 29 CFR 1910.184 to address deficiencies involving proof-testing certificates, identification tags, annual inspections, and proper attachments.

NOTE: Citations should be supported by documenting employee exposure; the condition, size, and use of the chain; the nature, weight, and height of the lift, including associated components used to perform the lift; and working conditions.

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