



Compatibility of Personal Fall Protection System Components

Safety and Health Information Bulletin

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Purpose

The purpose of this safety and health information bulletin is to alert users of personal fall protection systems that:

1. Personal fall protection components made by different manufacturers may not be compatible. Components made by the same manufacturer also may not be compatible if they are not sized properly;
2. In some situations, large snap hooks may be susceptible to roll out; and
3. To remind users of OSHA's standard on personal fall arrest systems and its requirements for snaphooks.

Background

The Methuen Area Office recently investigated an accident that involved a non-fatal fall of an ironworker from a steel beam onto the metal decking below. At the time of the fall, the ironworker was wearing personal fall arrest equipment. A 2 1/4-inch gate snap hook (Figure 1) on the end of his lanyard was connected to the D ring on a beamer (a portable anchorage connector that rolls along the upper or lower flange of the beam, figures 2 and 3) that was attached to the top flange of the beam on which he was walking. This snap hook was the locking type that requires at least two consecutive, deliberate actions to open. When the ironworker fell, the snap hook rolled out of its attachment.

This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with hazard-specific safety and health standards. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, the failure to implement any recommendations contained in this Safety and Health Bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

Incident Description

The lanyard and snap hook were owned by the ironworker and were manufactured by the same personal fall arrest system manufacturer, while the beamer that was attached to the beam was supplied by the ironworker's employer and was manufactured by a different fall protection equipment manufacturer. The worker's lanyard had a large hook on one end with a 2 1/4-inch gate. Apparently, the ironworker did not know that the snap hook of the personal fall arrest system he was using was compatible with the beamer's D ring

ONLY when the beamer is attached to an overhead beam, rather than to the beam on which he was working.

While working on the cross beam, the ironworker lost his balance and fell. Due to the nature of the fall, the snap hook experienced a side load which caused the hook's keeper to fail, and the snap hook rolled out of its attachment. It is not known whether the side load exceeded the 350 pound side load requirements of ANSI A 10.14 and Z 359.1 standards for the snap keeper. The ironworker fell to the metal decking 16 feet below and sustained non-fatal injuries.

OSHA Standards

29 CFR 1926.502(d)(5) states in relevant part, that "snaphooks shall be a locking type snaphook designed and used to prevent disengagement of the snaphook by the contact of the keeper by the connected member."

29 CFR 1926.502(d)(6)(v) states "snaphooks shall not be engaged to any object which is incompatibly shaped or dimensioned in relation to the snaphook such that unintentional disengagement could occur by the connected object being able to depress the snaphook keeper and release itself."

ANSI Standard

ANSI A10.14, 1991, *American National Standard for Construction and Demolition Operations - Requirements for Safety Belts, Harnesses, Lanyards and Lifelines for Construction and Demolition Use*, paragraph 4.2.2.4, states that "snap-hooks with throat opening larger than 5/8" (1.6 cm) shall have a label attached." The label shall indicate the minimum size diameter to which the snap-hook shall be attached.¹ "The snap keeper shall be retained by the nose of

the snap and shall be capable of withstanding a minimum 350 pound (159 kg) side load."

Paragraph 4.2.3.4, states "[t]he snap-hook for attachment of D-rings and O-rings shall be designed to minimize the possibility of accidental disengagement from the D-ring."

ANSI Z 359.1, 1992, *American National Standard Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components*, paragraph 3.2.1.4 states "[w]hen tested in accordance with 4.3.1.1.3, the gate of the snaphook or carabiner shall be capable of withstanding a minimum side load of 350 pounds (1.55 kN) applied to a point midway between the nose and gate hinge without breaking, permanent deformation greater than 0.125 inches (3.1 mm), or separating from the nose of the snaphook or carabiner body by more than 0.125 inches (3 mm)."

Other Information

After the accident, it was learned that both the lanyard and the beamer manufacturers had stated that the large snap hook (2 1/4-inch gate opening) on the lanyard was not compatible with the beamer's D ring, unless the beamer is attached to an overhead beam. The lanyard manufacturer explained that the snap hook on this lanyard is designed for connection to large, continuous objects such as horizontal rebar, horizontal tower bracing or other structural steel that will not press against the gate of the hook when the hook rotates, twists or turns.

During the investigation, it was established that lanyards with this type of large hook are prevalent in the steel erection industry. They are popular in part because, given the larger hook's gate opening, they offer greater versatility because they can be connected to a greater number of possible

¹ For example on a rebar snap-hook with a 1-5/8" (4.1 cm) throat opening, the warning might read "Warning: Do not use on attachments less than 1-1/4" (3.2 cm) in diameter."

anchorage points. This lanyard and hook design are popular not only with employers, but also are selected by many ironworkers who purchase and use their own personal fall arrest systems.

Conclusions

Personal fall arrest systems must be designed and used in accordance with the provisions set forth in 29 CFR 1926.502 (d)(1) through (d)(24).

29 CFR 1926.502(d)(5) & 29 CFR 1926.502 (d)(6)(v) require employers to determine whether the snaphooks on the personal fall arrest systems used by their employees are compatible with the members to which they are connected in order to prevent unintentional disengagement of the snaphook. Also, employers must ensure that the snaphooks on the personal fall arrest systems that their employees use are not engaged to any object which is incompatibly shaped or dimensioned in relation to the snaphook.

OSHA reminds all employers that they must evaluate the compatibility of all fall arrest systems and anchorage devices used on the job site before they are used to protect employees. Employers should review carefully manufacturer instructions and warnings, and should be particularly vigilant when components are manufactured by different entities and not sold as a complete system since such components are more likely to be incompatible for use together.



Figure 1



Figure 2



Figure 3

