Updated ANZI standards require industry to use stronger fall protection equipment

By Jim Graef, Capital Safety

THE USE AND enforcement of fall protection equipment on drilling and service rigs has come a long way in the last decade or so. Unfortunately, it has taken several high-profile accidents to spur an increased focus on safety and compliance with established industry standards. Fortunately, however, compliance rates continue to climb.

Recently, the American National Standards Institute, with the American Society of Safety Engineers at the helm, published an update to ANSI Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. The revised standard contains a significant change that will affect a large number of fall protection equipment in use in the oil and gas industry. What follows is a brief guide to the changes, as well as how safety directors should manage the new regulation by phasing out older equipment.

FALL PROTECTION
A wide variety of fall protection equipment is used on drilling and service rigs. In fact, almost all new rigs are outfitted with the necessary equipment prior to being put into service, and anchorage points are engineered into the design of the rig. Standard fall protection systems include sealed self-retracting lifelines (SRL) at the crown, ladder safety systems for protection while climbing the derrick ladder, sloped-line cables or boom arms over the monkey board to provide an anchor for a smaller SRL, harnesses with specialized rig attachments and horizontal lifelines for use above the BOPs and stabbing board and when rigs are laid over.

Some of the more advanced fall protection systems include sloped-line escape systems to replace the aging and often-unsafe Geronimo escape system, man rated tuggers (winch lines) and load limiters that can be used to safely raise workers to difficult-to-access areas on the derrick, rig floor/deck horizontal lifeline systems for use during rig up and down while guardrails are removed and trauma suspension systems and high-angle rescue products for use post-fall arrest.

ANSI Z359.1 DEFINED
Most fall protection equipment is regulated under ANSI Z359.1, a standard that was originally published in 1992 to address technological advances in fall arrest equipment that occurred in the 1970s and ‘80s. Within those decades, fall protection equipment and programs advanced rapidly, outpacing pre-existing national standards and government regulations.

The United States Technical Advisory Group (USTAG), representing national fall protection issues to the International Organization for Standardization (ISO), formed a committee to address the lack of fall protection standards, as recommended by the American National Standards Institute’s Safety and Health Standards Board. The committee drafted and voted on the Z359.1 standard, and the American Society of Safety Engineers became the secretariat.

ANSI Z359.1 consists of eight sections dealing with the purpose, scope, requirements, testing, training, selection, rigging, use, maintenance and storage of fall protection equipment. The standard addresses fall arrest equipment, including harneses, lifelines, lanyards, energy absorbers and anchorage connectors and elements of the equipment including rope, straps, thread, thimbles and connectors.

A FAMILY OF FALL PROTECTION STANDARDS
ANSI Z359.1 was published as the first in a series of fall protection standards. Only this year have the remainder of...
the standards been published. The new standards include sections detailing the requirements for managed fall protection programs, ANSI Z359.2; positioning and travel restraint systems, ANSI Z359.3; and assisted rescue and self rescue systems, ANSI Z359.4.

At the same time the new standards were in the works, the Z359 committee was working on a revision to the existing ANSI Z359.1 to address a specific safety concern: forced rollout. Forced rollout, when a locking connector such as a snap hook or carabiner forcefully disengages from the body support component of the personal fall arrest system, occurs when a worker improperly ties off to a non-D-ring connection. This type of equipment failure is rare when locking connectors are used correctly, but based on incident rates, the committee has revised the strength requirement for the gates of locking connectors to prevent these types of accidents.

The new standard has increased the load that the gate face of a connector must be able to withstand from 220 lbs to 3,600 lbs (Figure 1). Additionally, the side of the gate (Figure 2) must be able to withstand 3,600 lbs, increased from 350 lbs, and the minor axis of snap hooks and carabiners, except for those with captive eyes, must be able to withstand 3,600 lbs, which is new to the Z359.1 standard. The tensile load that a snap hook and carabiner must withstand remains at 5,000 lbs (Figure 3).

This change will affect all connective devices in use in the oil and gas industry, including self-retracting lifelines, lanyards, horizontal lifelines, ladder climbing systems and rope grabs. To ensure that all products on the rig meet this new standard, safety directors will need to replace all equipment with connectors that do not meet the new strength requirements. Due to the construction of the equipment, the hooks alone cannot be replaced because the ultimate strength of the device will be compromised. Therefore, a phase-out of non-compliant equipment will need to take place.

Snap hooks and carabiners meeting the requirements of the new standard will be marked to help equipment managers distinguish them from existing connectors in the field. These markings will include:

- Year of manufacture.
- Manufacturer’s identification.
- Part number.

- Load rating for the major axis of the connector stamped or otherwise permanently marked on the device.
- Load rating for gate stamped or otherwise permanently marked on the gate mechanism.
- For connectors that are non-integral, the standard number, Z359.1(07), will be included.

The revisions to the ANSI Z359.1 section regarding strength requirements of locking connectors, section 3.2.1.4,
will prevent forced rollout. The use of snaphooks and carabiners as described under the new standard will make fall arrest equipment stronger, which must be differentiated from describing it as safer. Equipment that meets the standard in its current form will protect workers in the event of a fall, provided the equipment is used correctly. Accidents happen due to misuse, incompatible elements and damaged equipment, not because elements of the equipment are not strong enough.

**COMPLIANCE, EDUCATION**

Much of the equipment in use today is already rated ahead of the previous version of the ANSI Z359.1 standard. Many elements of the equipment, such as snaphooks and carabiners on lanyards, go far beyond the minimum load requirements. Nevertheless, the new regulation will require an eventual phase-out of old equipment with the snaphooks and carabiners built in. Oil and gas companies that employ fall protection equipment should have a plan developed for the maintenance and overhaul of equipment that contains these elements.

Some leniency will be allowed in the phase-out of old equipment and purchase of new equipment with the upgraded hooks. The new standard was published in mid-2007, however, the effective date of the new requirements, 15 October 2007, has already been extended to 24 November to allow employers time to comply.

Safety directors and trainers will need to prepare derrickhands for the change. The strength and size difference of the new hooks will contribute to a slight increase in weight. The difference will be minimal, however. Operation of the snaphooks and carabiners and the equipment they are incorporated in will remain the same. Equipment will remain ergonomically friendly, and end-users should notice no difference in comfort.

While questions and concerns about the new standard are certain to arise, proper education and training on the requirements of the standard and proper use of equipment will resolve these matters. The updated standard will make fall arrest equipment stronger, which in turn will move the industry forward with continued emphasis on safety.

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Many of the fall protection equipment in use today are already rated ahead of the previous standard, but old equipment will need to be phased out eventually.