

# ANSI/AIHA Z10-2005

*The new benchmark for safety management systems*

**By Fred A. Manuele**

**F**OR THE FIRST TIME IN THE U.S., a national consensus standard for a safety and health management system—applicable to organizations of all sizes and types—has been issued. On July 25, 2005, ANSI approved ANSI/AIHA Z10-2005, Occupational Health and Safety Management Systems.

This is a major development. The standard provides senior managements with a well-conceived, state-of-the-art concept and action outline to improve safety and health management systems. However, few organizations have management systems in place that meet all of the standard's provisions. As employers make improvements in their safety and health management systems to meet the standard's provisions, the frequency and severity of occupational injuries and illnesses will likely be reduced. The societal implications of this standard are substantial. A few of those implications are addressed in this article.

This standard will have a significant and favorable impact on the content of the practice of safety—and on the knowledge and skill requirements for SH&E practitioners. This article reviews select provisions of the standard to which SH&E practitioners should pay particular attention. Those provisions pertain to risk assessment and prioritization; applying a prescribed hierarchy of controls to achieve acceptable risk levels; design reviews; management of change systems; having safety specifications in procurement systems; and safety audits.

## **ANSI/AIHA Z10-2005: Background**

American Industrial Hygiene Assn. (AIHA) obtained approval as the ANSI Accredited Standards Committee (ASC) for this standard in March 1999. The first full meeting of the committee was held in February 2001. Over the past six years, as many as 80 SH&E practitioners have been involved as committee members, alternates, resources and interested commenters. They represented industry, labor, government, business organizations, professional organizations, academe and persons of general interest.

Through this, broad participation in the development of and acceptance of the standard was achieved. The breadth of that participation is significant. A large number of SH&E professionals have written a stan-

dard that incorporates what has been learned in the past several years concerning the best practices in occupational safety and health management. In effect, they have stated that no matter how effective an existing safety management system has been if it is lacking with respect to some of the provisions in the standard, risks can be further reduced by adoption of those provisions.

Employers who have a sincere interest in employee safety will welcome discussions on how their safety management systems can be improved. Many companies have issued safety policy statements that say the organization will comply with or exceed all relative laws and standards. Those employers in particular will want to implement provisions in the standard that are not part of their current safety management systems.

Furthermore, ANSI/AIHA Z10 places an obligation on SH&E professionals who give counsel on what safety management systems should encompass to become current with the standard's provisions. Having occupational safety and health management systems that comply with the standard is the right thing to do.

One reason the Z10 Committee succeeded was its strict adherence to the due diligence requirements mandated by the ANSI process. A balance of stakeholders provided input and open discussion, which resulted in vetting to a conclusion each issue raised. In the early stages of the group's work, safety and health, quality, and environmental standards and guidelines from around the world were collected, examined and considered. In crafting Z10, the intent was not only to achieve significant safety and health benefits through its application, but also to impact favorably on productivity, financial performance, quality and other business goals.

The standard is built on the well-known Plan-Do-Check-Act process for continuous improvement, for which there is abundant reference material. Briefly stated, the purpose of the standard is to

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provide organizations with an effective tool for continuous improvement in their occupational health and safety management systems and to reduce the risk of occupational injuries, illnesses and fatalities. As to breadth of coverage, "This standard is applicable to organizations of all sizes and types" (AIHA).

A major theme apparent throughout the standard is that hazards are to be identified and evaluated, risks are to be assessed and prioritized, and risk elimination, reduction or control measures are to be taken to achieve an acceptable risk level. According to the standard:

A hazard is defined as a condition, set of circumstances or inherent property that can cause injury, illness or death.

Risk is defined as an estimate of the combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or illness that may be caused by the event or exposures (AIHA).

One must understand these definitions to successfully apply the standard. Every SH&E practitioner who has responsibilities for occupational safety and health should have a copy of this standard and be familiar with its provisions. With its annexes, the standard is a brief safety and health management system manual.

### **Compatibility, Harmonization & Possible International Implications**

Z10 is a management system standard—a performance standard, not a specification standard (see sidebar below). The drafters set out to ensure that it could be easily integrated into any management systems an organization has in place. As to structure, the standard is compatible and harmonized with quality and environmental management system standards (ISO 9000 and ISO 14000 series).

Of particular note is the recognition given in the Z10 introduction to the International Labor Organization's (ILO) Guidelines on Occupational Health and Safety Management Systems (ILO-OSH 2001) as a resource. The guideline is an additional reference for a safety and health management system. Available for purchase through ILO, the document can also be read (but not printed) online ([www.ilo.org/public/english/support/publ/xtextoh.htm](http://www.ilo.org/public/english/support/publ/xtextoh.htm)). ILO is an international organization of considerable influence. Intentionally, Z10 adopts from and is in harmony with ILO-OSH 2001.

Similarities between the guideline and Z10 are notable. However, Z10 goes beyond the guideline in some respects, and it may very well be considered as a model by the International Organization for Standardization (ISO). ISO is the world's largest nongovernmental developer of standards, working with a network of the national standards institutes of 148 countries. The U.S. is represented at ISO by ANSI, which is the approval body for Z10.

On two occasions—in 1996 and 2000—ISO voted on developing a standard for an occupational safety and health management system. Neither proposal was approved; in the latter case, the vote against carried by a narrow margin. The ISO membership is worldwide and a consensus for such a standard has not yet emerged among its membership.

However, since Z10 represents current best practices and since ISO will likely again consider the development of an international safety and health management system, one can speculate that Z10 will become the model for that standard. Continue the speculation, and one can envision international requirements for accredited safety and health management system audits related to the provisions of ANSI/AIHA Z10.

### **Long-Term Influence: Societal Implications**

This is the standard's scope: "This standard defines the minimum requirements for occupational health and safety management systems (OHSMS)" (AIHA). Even though the standard sets forth minimum requirements, only a small segment of employment locations

## **Management System Standards vs. Specification Standards**

In a management system standard, which is essentially a performance standard, general process and system guidelines are given for a provision without specifying the details on how the provision is to be carried out, as would be the case in a specification standard. Section 5.2-B, a "shall" provision in ANSI/AIHA Z10, is used to illustrate the difference.

*Section 5.2: Education, Training, Awareness and Competence. The organization shall establish processes to:*

*B) Ensure through appropriate education, training or other methods that employees and contractors are aware of applicable OHSMS requirements and are competent to carry out their responsibilities as defined in the OHSMS (AIHA).*

That is the extent of the requirements for Section 5.2-B. Comments are made in the "should" column—the advisory column—on certain subjects such as training for safety design, incident investigation, hazard identification, good safety practices and the use of PPE, but those comments are not part of the standard.

If Z10 were written as a specification standard, requirements comparable to the following might be extensions of 5.2-B in the "shall" column (that is, the required column).

a) A minimum of 12 hours of training shall be given initially to engineers and safety practitioners in safety through design, to be followed annually with a minimum of six hours of refresher materials.

b) All employees shall be given a minimum of three hours training annually in hazard identification.

c) All employees shall be given a minimum of four hours training annually in the use of PPE.

d) All training activities conducted as a part of this provision shall be documented and the records shall be retained for a minimum of five years.

have safety management systems in place that include all of its elements. Over time, as the provisions of this ANSI standard are brought to the attention of employers and they strive to have safety management systems that are compatible with those provisions, its impact on what employers and society believe to be an effective safety management system will be extensive.

The reader should understand that the standard sets forth *minimum requirements*, which in the U.S. may not be enough. According to Ralph L. Barnett, chair of Triodyne Inc. and professor of mechanical and aerospace engineering at Illinois Institute of Technology, while complying with a standard is necessary, doing so may not be sufficient.

Technologists, by and large, treat a standard as a “bible” which provides guidance for the discharge of their professional duties. Throughout the world, compliance or noncompliance with a safety standard is the criterion for determining whether or not safety has been achieved. Only in the [U.S.] is compliance with an appropriate standard treated as a necessary but not sufficient condition for precluding liability. [Thus, the term] minimum standard is an oxymoron (Barnett).

ANSI standards acquire a quasi-official status. Consultants who give counsel on safety management systems to employers other than their own should recognize the status that ANSI standards acquire from a legal liability viewpoint. As Barnett says, “Technologists, by and large, treat a standard as a ‘bible’ which provides guidance for the discharge of their professional duties.”

Over time, as this standard attains that stature, it will become the benchmark against which the adequacy of safety and health management systems will be measured. Societal expectations of employers with respect to their safety and health management systems will be defined by the standard’s provisions.

As awareness of the standard’s provisions spreads, employers will likely seek SH&E practitioners able to give counsel on meeting its requirements. In that respect, certain provisions are of particular importance to safety practitioners; those provisions are in Planning (4.0); Implementation and Operations (5.0); and the Audit provision in Checking and Corrective Action (6.0). In summary, they state that employers “shall” establish and implement processes to:

- identify and control hazards in the design process and when changes are made in operations—which requires that safety design reviews be made for new and altered facilities and equipment, and that a management of change system be put in place through which hazards and risks are identified and evaluated in the change process;
- assess the level of risk for identified hazards—for which knowledge of risk assessment methods will be necessary;
- use a prescribed hierarchy of controls in dealing with hazards to achieve acceptable risk levels—for

## Z10 Table of Contents

To provide a base for review and comparison with safety management systems with which SH&E practitioners are familiar, following is the table of contents from Z10.

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1.1 Scope	<b>6.0 Evaluation and Corrective Action</b>
1.2 Purpose	6.1 Monitoring and Measurement
1.3 Application	6.2 Incident Investigation
<b>2.0 Definitions</b>	6.3 Audits
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<b>4.0 Planning</b>	A Policy Statements (Section 3.1.2)
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The annexes contain explanatory comments, examples of forms and references. While information in the annexes is not part of the standard, it will be helpful to those charged with its implementation.

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which the first step is to attempt to design out or otherwise eliminate the hazard;

- avoid bringing hazards into the workplace by incorporating design and material specifications into procurement contracts for facilities, equipment and materials.

Furthermore, the content of college-level safety degree programs will be affected as employers will seek candidates who understand the standard’s requirements. Since one measure of a technical degree

program's success is employment possibilities for its graduates, professors responsible for those programs will likely ensure that core courses properly equip students to meet employer needs. In many cases, that will require substantive curricula modifications.

Content of the examinations for the CSP designation is reviewed about every five years to ensure that the exams are current with respect to the work SH&E professionals actually perform. As the substance of SH&E practice changes in light of the impact of Z10, what those professionals who participate in the examination review process say about the content of their work at that time will influence the content of the CSP examinations.

### The Continuous Improvement Process

In accord with the Plan-Do-Check-Act concept, the major sections of the standard are:

- 3.0: Management Leadership and Employee Participation;
- 4.0: Planning;
- 5.0: Implementation and Operation;
- 6.0: Evaluation and Corrective Action;
- 7.0: Management Review.

Brief comments on 3.0 and 7.0 follow; more extensive remarks are made on select sections in 4.0, 5.0 and 6.0. When reviewing these excerpts, keep in mind the intent of the terms "shall" and "should." As is common in ANSI standards, requirements in the left column are identified by the word "shall." An organization that chooses to conform to the standard is expected to fulfill these requirements. The text in the right-hand column uses the word "should" to describe recommended practices or to explain the requirements on the left. Comments in the right-hand column are not requirements and are prefaced with an "E." The reader should note that the material printed in italics is taken verbatim from the standard.

#### 3.0: Management Leadership & Employee Participation

Literature commenting on safety management, leadership and employee participation is abundant. Thus, this section of the standard is dealt with briefly here. However, the reader should understand that this is the standard's most important section. SH&E practitioners will surely agree that "top management leadership and effective

employee participation are crucial for the success of an occupational health and safety management system (OHSMS)" (AIHA). The standard says:

*Top management shall direct the organization to establish, implement and maintain an OHSMS.*

*The organization's top management shall establish a documented occupational health and safety policy.*

*Top management shall provide leadership and assume overall responsibility.*

*The organization shall establish and implement processes to ensure effective participation in the OHSMS by its employees at all levels (AIHA).*

Annexes A, B and C provide supporting data on these areas.

#### 4.0: Planning

This section sets forth the planning process to implement the standard and to establish plans for improvement. "The planning process goal is to identify and prioritize OHSMS issues (defined as hazards, risks, management system deficiencies and opportunities for improvement)" (AIHA).

## Hazard Analysis & Risk Assessment Guide

- 1) Select a manageable task, system or process to be analyzed.
- 2) Identify the hazards. Ask the question, "What characteristics of things or actions [or inactions] of people present a potential for harm?"
- 3) Define possible failure modes that result in exposure to hazards and the realization of the potential harm. Ask, "How could an undesirable event happen for a task and each associated hazard?"
- 4) Estimate the frequency and duration of exposure to the hazard.
- 5) Assess the severity of injury/illness. Based on experience and knowledge, make an estimate of the worst credible injury or illness consequence(s), should an incident occur.
- 6) Determine the likelihood of the occurrence of a hazardous event. This is usually subjective. For complex hazard exposure scenarios, brainstorming with knowledgeable people is advantageous. The likelihood of occurrence is normally related to an interval of time (several times a day, weekly, monthly, yearly, etc.).
- 7) Define the level of risk using a risk assessment matrix, risk ranking or scoring system. [An example of a risk assessment matrix can be found in Figure 1 of this article.] The level of risk is determined by plotting the likelihood of an occurrence or exposure and the potential severity of the injury or illness. The organization must then determine if the level of risk is acceptable or unacceptable.
- 8) Hazard risks can then be listed and ranked. Risks, system deficiencies and opportunities for system improvement make up the OHSMS issues for a particular organization. All OHSMS issues are then prioritized by considering the level of risk, potential for system improvements, compliance with standards and regulations, feasibility and business consequences.
- 9) The organization selects prioritized OHSMS issues and develops documented objectives and implementation plans.

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An initial review of the OHSMS is to be made for that purpose (4.1). Issues identified during the review are to be assessed and priorities determined, and documented risk reduction objectives are to be established for the issues selected. An ongoing review process (4.1) is to be maintained for the same purposes. (Note the emphasis on hazards, risks and management systems deficiencies.)

#### 4.2 Assessment & Prioritization

Subsection 4.2 sets forth the requirements for assessment and prioritization. Few current safety management systems contain similar provisions.

*The organization shall establish and implement a process to assess and prioritize OHSMS issues identified in 4.1. The process shall:*

- A) Assess the impact on health and safety of OHSMS issues and assess the level of risk for identified hazards;
- B) Establish priorities based on factors such as the level of risk, potential for system improvement, standards, regulations, feasibility, and potential business consequences; and
- C) Identify underlying causes and other contributing factors related to system deficiencies that lead to hazards and risks (AIHA).

These are the explanatory notes for 4.2A and 4.2B.

*E4.2A: The assessment of risks should include factors such as identification of potential hazards, exposure, measurement data, sources and frequency of exposure, types of measures used to control hazards and potential severity of hazards. Assessing risks can be done using quantitative (numeric) or qualitative (descriptive) methods. There are many methods of risk assessment. Examples are included in the Annexes and References.*

*E4.2B: Business consequences may include either increased or decreased productivity, sales or profit (AIHA).*

Thus, employers are to have processes in place to identify and analyze hazards, assess the risks deriving from those hazards, and establish priorities for improvement that, when acted on, will achieve acceptable risk levels.

Annex K (Bibliography and References) provides a list of publications that describe the many possible risk assessment methods. For example, the *System Safety Analysis Handbook* describes 101 such methods.

**Figure 1**

### Example of a Risk Assessment Matrix

		Severity of Injury or Illness Consequence & Remedial Action			
		CATASTROPHIC Death or permanent total disability	CRITICAL Disability in excess of three months	MARGINAL Minor injury, lost workday accident	NEGLIGIBLE First aid or minor medical treatment
Likelihood of Occurrence or Exposure For selected unit of time or activity	FREQUENT Likely to occur repeatedly	HIGH Operation not permissible	HIGH Operation not permissible	SERIOUS High priority remedial action	MEDIUM Take remedial action at appropriate time
	PROBABLE Likely to occur several times	HIGH Operation not permissible	HIGH Operation not permissible	SERIOUS High priority remedial action	MEDIUM Take remedial action at appropriate time
	OCCASIONAL Likely to occur sometime	HIGH Operation not permissible	SERIOUS High priority remedial action	MEDIUM Take remedial action at appropriate time	LOW Risk acceptable: remedial action discretionary
	REMOTE Not likely to occur	SERIOUS High priority remedial action	MEDIUM Take remedial action at appropriate time	MEDIUM Take remedial action at appropriate time	LOW Risk acceptable: remedial action discretionary
	IMPROBABLE Very unlikely; may assume exposure will not happen	MEDIUM Take remedial action at appropriate time	LOW Risk acceptable: remedial action discretionary	LOW Risk acceptable: remedial action discretionary	LOW Risk acceptable: remedial action discretionary

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The breadth of the field of knowledge in risk assessment can be daunting but it need not be. SH&E practitioners who become familiar with several basic and easily applied risk assessment methods will be able to give counsel on and apply the standard's risk assessment provisions. *Innovations in Safety Management: Addressing Career Knowledge Needs* includes the chapter, "A Primer on Hazard Analysis and Risk Assessment." It is designed to counter the dread that SH&E practitioners may experience in thinking about achieving an understanding of commonly used risk assessment techniques, and to give assurance that acquiring such understanding will not be overly difficult [Manuele(a)].

The chapter provides brief descriptions of eight hazard analysis and risk assessment techniques—preliminary hazard analysis; safety reviews/operations analyses; what-if analysis; checklist analysis; what-if/checklist analysis; hazard and operability analysis; failure modes and effects analysis; and fault tree analysis. Having knowledge of those techniques and how they are applied will satisfy the needs and requirements of Z10. It should also be noted that in the application of these eight techniques, qualitative rather than quantitative judgments will prevail since for all but the complex risks qualitative judgments will be sufficient; in addition, mathematical calculations will be limited.

Annex E provides information on the standard's assessment and prioritization requirements. It also

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contains a brief outline titled “Hazard Analysis and Risk Assessment Guide” which presents an easily understood and applied thought-and-action process on how to conduct a hazard analysis and a risk assessment. The sidebar on pg. 28 presents this outline.

Annex E also gives an example of a risk assessment matrix for illustrative purposes (Figure 1). This matrix gives incident probability categories, severity categories and risk levels, which is typical, but it also incorporates recommended management action levels within the matrix. Such a matrix can serve as a valuable instrument in working with decision makers to set risk levels and prioritize corrective actions. Published risk assessment matrixes vary widely, so SH&E practitioners should develop models that are suitable to the organizations they serve. [See also Manuele(a) and (c).]

### **5.0: Implementation & Operation**

According to the standard, “This section defines the operational elements that are required for implementation of an effective OHSMS” (AIHA). The comments here focus on only four provisions—hierarchy of controls, design review, management of change and procurement. Only a few safety management systems have comparable provisions.

#### **5.1.1: Hierarchy of Controls**

Z10 outlines provisions for the use of a specifically defined hierarchy of controls. The organization “shall” apply the methods of risk reduction in the order prescribed. The standard and the explanatory comments state:

*The organization shall implement and maintain a process for achieving feasible risk reduction based upon the following preferred order of controls:*

- A) Elimination;
- B) Substitution of less hazardous materials, processes, operations or equipment;
- C) Engineering controls;
- D) Warnings;
- E) Administrative control; and
- F) Personal protective equipment.

*Feasible application of this hierarchy of controls shall take into account:*

- a) the nature and extent of the risks being controlled;
- b) the degree of risk reduction desired;
- c) the requirements of applicable local, federal and state statutes, standards and regulations;
- d) recognized best practices in industry;
- e) available technology;
- f) cost-effectiveness; and
- g) internal organization standards.

*E5.1.1: The hierarchy provides a systematic way to determine the most effective feasible method to reduce the risk associated with a hazard. When controlling a hazard, the organization should first consider methods to eliminate the hazard or substitute a less hazardous method or process. If this is not feasible, engineering controls such as machine*

*guards and ventilation systems should be considered. This process continues down the hierarchy until the highest level feasible control is found.*

*Often a combination of controls is most effective. In cases where the higher order controls (elimination, substitution and implementation of engineering controls) do not reduce risk to an acceptable level, lower order controls may be necessary (e.g., warnings, administrative controls or personal protective equipment).*

*For example, if an equipment modification or noise enclosure (engineering control) is insufficient to reduce noise levels, then limiting exposure through job rotation and using hearing protection would be an acceptable supplemental means of control (AIHA).*

Note that Z10 prescribes a hierarchy of controls which contains six elements, the first of which, in priority order, is to design out or otherwise eliminate the hazard. If the hazard is eliminated, the risk is eliminated. Also note that the substitution element is separate from the elimination element.

The number of elements and the separation of substitution from elimination are important. Other published hierarchies of control are not quite as descriptive and complete. Some have as few as three elements. Over time, the hierarchy of controls set forth in Z10 will become the accepted norm. Annex G provides a pictorial and verbal display of the hierarchy of controls listed in 5.1.1 with application examples for each element.

In an occupational setting, these outcomes are to be achieved through the application of the hierarchy of controls:

- 1) an acceptable risk level;
- 2) work methods and processes in which the probability of a) errors by supervisors and workers because of design inadequacy is at a practical minimum; and b) supervisors and workers defeating the system is at a practical minimum.

Similar outcomes should be expected when applying the hierarchy of controls to other hazards and risks, such as for the design and use of industrial and consumer products, and environmental management systems. [See also Manuele(c).]

#### **5.1.2: Design Review & Management of Change**

The following excerpts indicate what the standard requires for design reviews and management of change, and replicate the explanatory information given in its right-hand column. Again, these are “shall” provisions.

*The organization shall establish and implement processes to identify, and take appropriate steps to prevent or otherwise control hazards and reduce potential risks associated with:*

- A) New processes or operations at the design stage; and
- B) Changes to its existing operations, products, services or suppliers.

*The process for design reviews and management of change shall include:*

- a) identification of tasks and related health and safety hazards;
- b) consideration of hazards associated with human factors;
- c) consideration of control measures (hierarchy of controls—5.1.1);
- d) review of applicable regulations, codes and standards; and
- e) a determination of the appropriate scope and degree of the design review and management of change.

E5.1.2: The process for conducting design reviews and managing changes is designed to prevent injuries and illnesses before new hazards and risks are introduced into the work environment. The design review should consider all aspects including design, construction, operation, maintenance and decommissioning.

The following are examples of conditions that should trigger a design review or management of change process:

- new or modified technology (including software), equipment or facilities;
- new or revised procedures, work practices, design specifications or standards;
- different types and grades of raw materials;
- significant changes to the site's organizational structure and staffing, including use of contractors;
- modification of health and safety devices; and
- new health and safety standards or regulations (AIHA).

#### Design Review

The author has long professed that the most effective and economical way to minimize risks is to address the hazards from which they derive during the design process. That is what this standard requires—and it is an extremely important element in this standard. Its impact can be immense.

To become qualified to give counsel on establishing a management system to apply the design review requirements of this standard, many SH&E practitioners will have to acquire new knowledge and skill. A chapter in *Innovations in Safety Management* titled "How to Avoid Bringing Hazards into the Workplace" covers this topic [Manuele(a)]. It includes a general industry guide to safe design and operational requirements; general design safety checklist; and a section on design safety reviews.

Another key reference in this area is *Safety Through Design*, which contains these three major sections: Introducing Safety Through Design; Integrating [Safety Through Design] into Business Processes; and Safety Through Design in Industry. The latter section contains six chapters pertaining to application of safety through design concepts in general industry, the automotive industry, aircraft manufacturing, the chemical industry, construction and in the electronics industry (Christensen and Manuele).

In the chapter on application in general industry, Adams discusses challenges to process implementa-

tion and maintenance. He notes: "Implementing an effective safety through design process often requires challenging the culture within an engineering organization" (Adams) If a design safety review management system is not in place in an organization, SH&E practitioners should anticipate a long-term effort to achieve the culture change necessary to meet the requirements of Z10. This often means establishing a management system that mobilizes engineering, purchasing, quality control and other departments which may not be accustomed to working collaboratively. (To assist in that accomplishment, *Safety Through Design* includes a chapter titled "Achieving the Necessary Culture Change" by Steven I. Simon.)

#### Management of Change

Employers are to have processes in place to identify and take the appropriate steps to prevent or otherwise control hazards and reduce the potential risks associated with them when changes are made to existing operations, products, services or suppliers.

With respect to drafting and implementing management of change procedures, generalists can learn from those in organizations that have met the management of change requirements of OSHA's Process Safety Management of Highly Hazardous Chemicals standard (1910.119), issued in 1992. Briefly, 1910.119 requires that employers establish and implement written procedures to manage changes. Requirements of Z10 and 1910.119 have similar purposes. Getting effective management of change procedures in place and maintained is not easily done, however.

For all occupations, many incidents that result in severe injury occur when out-of-the-ordinary situations arise, particularly when unusual and nonroutine work is being performed and when sources of high energy are present. In support of that premise, consider these excerpts from historical and explanatory data published with respect to 1910.119.

Management of Change: OSHA believes that one of the most important and necessary aspects of a process safety management program is appropriately managing changes to the process. This is because many of the incidents that the agency has reviewed resulted from some type of change to the process. While the agency received some excellent suggestions concerning minor changes to improve this proposed provision, there was widespread support for including a provision concerning the management of change in the final rule (OSHA).

As noted, support for the management of change provisions was strong. However, about two years after 1910.119 became effective, Thomas Seymour, a director at OSHA as the standard was being developed, said that chemical plant operators had reported that the management of change requirement in the standard was the most difficult to apply. Therefore, it is not surprising that courses have been developed to

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help those responsible for meeting the management of change requirements.

Given this, SH&E practitioners should thoroughly study the management of change requirements of Z10 to determine how they might help to achieve the culture change necessary for their implementation. Applying change management methods will be necessary. Fortunately, the literature on change management is extensive. One good reference on the process is Casada, et al's *A Manager's Guide to Implementing and Improving Management of Change Systems*.

### 5.1.3: Procurement

Although the requirements for procurement are plainly stated and easily understood, they are brief in relation to the enormity of what will be required to implement them. An interpretation of the requirements could be: SH&E practitioners, you are assigned the responsibility to convince managements and purchasing agents that, in the long term, it can be very expensive to buy cheap. This is what the standard and the explanatory data state.

*The organization shall establish and implement processes to:*

- A) *Identify and evaluate the potential health and safety risks associated with purchased products, raw materials, and other goods and related services before introduction into the work environment;*
- B) *Establish requirements for supplies, equipment, raw materials, and other goods and related services purchased by the organization to control potential health and safety risks; and*
- C) *Ensure that purchased products, raw materials, and other goods and related services conform to the organization's health and safety requirements.*

*E5.1.3: The procurement process should be documented. See section E5.4.*

*E5.1.3A: For example, organizations should evaluate MSDS and other health and safety information of a new chemical, or examine the design specifications and operations manual for a new piece of equipment being considered for purchase (AIHA).*

Only a small percentage of employers have included specifications in their purchasing agreements and contracts that require suppliers to identify the hazards and assess the potential risks in the equipment and materials being purchased. As a safety

## Z10 Resources from ASSE

### The Standard

ASSE is offering ANSI/AIHA Z10 to its members for \$58; list price is \$65. To learn more, visit [www.asse.org/fr3388.htm](http://www.asse.org/fr3388.htm) or contact ASSE's Customer Service Dept. at (847) 699-2929.

### Safety 2006 Session

ASSE's annual Professional Development Conference will include Session #657, ANSI Z10: What Is It and Can It Be of Benefit to You? The session will provide an overview of the standard, discuss its key elements and review the benefits of its implementation. To learn more about this session, visit [www.safety2006.org](http://www.safety2006.org).

director in a major company said recently, the only safety specification in their contracts is that OSHA standards and other legislative requirements be met.

The Z10 standard implies that safety through design concepts are to be applied in an organization's purchasing system with respect to both physical hazards and work methods. Adding an element to safety management systems that will help to avoid bringing hazards into the workplace could produce startling good reductions in the frequency and severity of hazardous incidents and exposures.

Procedures encompassing the requirements will not be easy to implement, but recognition slowly arises that they

should be an integral part of a safety management system. One example, the ergonomic design criteria established by DaimlerChrysler for equipment suppliers and vendors and company engineers, is cited here to indicate how broad and complex procurement requirements. These criteria can be found at <https://gsp.extra.daimlerchrysler.com/mfg/amedd/tooldesign/textsection15.htm>. The 13-page document covers ergonomics criteria only. It sets forth specifications for suppliers and vendors to meet so as to avoid bringing ergonomics hazards into the workplace. To review the general acquisition provisions instituted by DaimlerChrysler pertaining to "Tool and Equipment Follow-up, Certification and Buy-Off Procedures," change the "15" in the website address to "14."

Getting these procurement provisions in place will be a challenge for SH&E practitioners, but the benefits can be immense.

### 6.0 Evaluation & Corrective Action

This section of the standard outlines the requirements for processes to evaluate the performance of the safety management system and to take corrective action when shortcomings are found. Provisions pertain to monitoring, measurement and assessment, incident investigation and audits. Comments address only one provision in 6.0 (audits). Why only this one? Because audits "shall" be made. From a review of the requirements of this section, it seems that many organizations may be making substantive revisions in their audit systems.

Audit requirements are for safety management systems audits, not specification audits. The audits are to measure the organization's effectiveness in implementing the OHSMS elements. Thus, audits are to determine whether the management systems in place do/do not effectively identify hazards and



control risks. This is what the standard and the explanatory data state.

### 6.3 Audits

The organization shall establish and implement processes to:

- A) Conduct periodic audits to determine whether the organization has appropriately applied and effectively implemented the OHSMS elements, including identifying hazards and controlling risks;
- B) Document and communicate audit results to:
  - a) Those responsible for corrective and preventive action;
  - b) Area supervision; and
  - c) Other affected individuals, including employees and employee representatives.
- C) Immediately communicate situations identified in audits that could be expected to cause a fatality, serious injury, or illness in the immediate future, so that prompt corrective action under 6.4 is taken.

E6.3 Audits required by this section are "system" oriented rather than "compliance" oriented. The audit should determine if the OHSMS meets the requirements of this standard. Audits should be conducted by individuals independent of the activities being examined. This does not mean that audits must be conducted by individuals external to the organization (AIHA).

Although many SH&E practitioners are familiar with safety audit processes, they should review what the standard requires and determine whether it will be to their benefit to revise their audit systems. Annex I is helpful in this respect; it contains an example of an audit outline that matches the Plan-Do-Check-Act sections of Z10.

### 7.0: Management Review

This section requires that OHSMS performance be reviewed and that management take appropriate actions in response. It is an important part of the Plan-Do-Check-Act process.

7.1 The organization shall establish and implement a process for top management to review the OHSMS at least annually, and to recommend improvements to ensure its continued suitability, adequacy, and effectiveness.

E.7.1: Management reviews are a critical part of the continual improvement of the OHSMS (AIHA).

These are a few of the subjects to be reviewed at least annually: progress in risk reduction; effectiveness of processes to identify, assess and prioritize risk and system deficiencies; and effectiveness in addressing underlying causes of risks and system deficiencies.

### Conclusion

ANSI/AIHA Z10-2005 represents an important step in the evolution of the practice of safety. Realistically, it can be expected that over time it will

become the benchmark against which safety and health management systems will be measured. As the quality of safety and health management systems improves, it is logical to expect that the frequency and severity of occupational injuries and illnesses will be reduced.

SH&E practitioners must not ignore the long-range impact Z10 will have on societal expectations concerning the quality of safety management systems that employers have in place, and on the expectations employers will have concerning the knowledge and capabilities of SH&E personnel. Prudent SH&E practitioners will study the requirements of the standard to determine whether they need additional skills and capabilities, then will take action to acquire those skills. Having done so, they will be equipped to help managements put in place safety management system elements that may not currently exist.

The author also suggests that the leaders at professional organizations such as ASSE consider developing seminars to instruct SH&E practitioners about the content and application of ANSI/AIHA Z10-2005, particularly with respect to the requirements for risk assessments, the application of a hierarchy of controls, design reviews, management of change, procurement and audits. ■

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